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Policies on Non-Discrimination and Sexual Harassment
The City College prohibits discrimination on the basis of age, gender, sexual orientation, transgender, disability, genetic predisposition or carrier status, alienage or citizenship, religion, race, color, nationality or ethnic origin, or veteran, military or marital status in its student admissions, employment, access to programs, and administration of educational policies. Questions, concerns, or complaints based on any of the above may be directed to the Office of Affirmative Action, Administration 200 (212-650-7331). In addition, the specific form of gender discrimination, “sexual harassment,” is prohibited by the policies of the Board of Trustees of The City University of New York. Student complaints alleging sexual harassment should be directed to the Sexual Harassment Awareness and Intake Coordinator (see Appendix B, and the Sexual Harassment brochure for the name of the current Coordinator and a list of Committee members who may be contacted). Brochures are available in the Affirmative Action Office, the Office of Human Resources, the Office of the Vice President for Student Affairs and at the NAC Information Desk.

Important Notice of Possible Changes
The City University of New York reserves the right, because of changing conditions, to make modifications of any nature in the academic programs and requirements of the University and its constituent colleges without advance notice. Tuition and fees set forth in this publication (or website) are similarly subject to change by the Board of Trustees of The City University of New York. The University regrets any inconvenience this may cause.
### Mail Address:
The City College/CUNY  
Convent Avenue at 138th Street  
New York, N.Y. 10031  
Telephone: 212-650-7000  
www.ccny.cuny.edu

#### School and Division Offices

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#### Other Important Numbers

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Welcome to The City College of New York! And congratulations—you have successfully completed your undergraduate degree. Now you are about to embark on a course of study that will prepare you to excel in the profession of your choice.

Whether you completed your undergraduate work at City College or come to us from another university, this is the point in your academic life where the depth and breadth of your program, supported by the excellence of the faculty, become the most important guarantor of your success. At CCNY, you will be taught by intensely committed faculty whose achievements in fields as diverse as molecular biology, film and video production, creative writing, urban design, biomedical engineering and psychology, to name just a few, are internationally recognized. You may find yourself working with world-renowned scholars in search of a cure for cancer, for example, or on a “dig” in Central Park, looking for the lost African-American village, or developing new remote sensing technologies to analyze atmospheric pollution. Whatever program you choose, you will be studying with the best.

Use this bulletin to familiarize yourself with our graduate programs. Each one will prepare you to become a leader in an increasingly complex and global world. Our rich curriculum offers you the academic foundation for future success, just as it did CCNY’s earlier graduates, from Supreme Court Justice Felix Frankfurter to former Secretary of State Colin Powell, from artist Faith Ringgold to astronaut Mario Runco to Judge Carol Edmead, to our eight Nobel Prize-winning scientists. As a graduate of City, you will join their company and carry on their tradition of excellence and achievement as you shape not only the career you have chosen, but also the world you live in.

Of course college—even graduate school—equals more than classes, and life at City is as varied and exciting as our student body. You will find opportunities here to join with other like-minded students to pursue your interests in more than 90 student clubs and in the graduate student government.

I look forward to welcoming you personally to City College.

Sincerely,

GREGORY WILLIAMS
President
About The City College
The City College of New York

The City College of New York is a small university within The City University of New York, offering a rich program of undergraduate and graduate study through its College of Liberal Arts and Science and the Professional Schools. The College of Liberal Arts and Science consists of the following:

- Humanities and the Arts
- Science
- Social Science

The Professional Schools are the:

- School of Architecture
- School of Education
- School of Engineering
- Sophie Davis School of Biomedical Education (undergraduate program only)

Founded in 1847 by a referendum of the people of New York City, City College’s mandate was to offer the best education possible to the children of the poor and working people, and to open to new immigrants the opportunities of America. The City College (CCNY) is the oldest college among the twenty public institutions that make up The City University of New York (CUNY), which was established in 1961.

The City College campus occupies thirty-five acres along tree-lined Convent Avenue from 131st Street to 141st Street in Manhattan. The College can be reached easily by several subway and bus lines. Many buildings in the area are landmarks, including the six historic Neo-Gothic structures and three archways on CCNY’s North Campus.

The College’s resources include the Morris Raphael Cohen Library, the largest library in the University system, with holdings of over one million volumes; more than two hundred teaching and research laboratories; and an Information Technology Center that provides instructional and research-oriented services and student access through numerous student computer labs. The Aaron Davis Hall is the site of rehearsals, performances, exhibits and technical training for students in the arts, as well as presentations by professional artists. It is a major cultural asset for CCNY as well as the New York City community.

A $185 million modernization program is underway on the campus, which includes renovation of the landmark Neo-Gothic buildings.

Note on Building Designation Codes: In spring 2005, the City University assigned the buildings on the City College campus new designation codes to be used on campus maps. Because most maps and signage have not yet been changed, this Bulletin maintains the previously used codes. The key to building designation codes is as follows:

Steinman Hall = T (old code), ST (new code)
Baskerville Hall = B (old code), BH (new code)
Compton-Goethals Hall = CG (old code), CG (new code)
Shepard Hall = S (old code), SH (new code)
Harris Hall = H (old code), HR (new code)
Administration Building = A (old code), A (new code)
Marshak Building = J (old code), MR (new code)
North Academic Center = NAC (old code), NA (new code)
Wingate Hall – W (old code), WG (new code)

RESIDENCE HALL

Construction has begun on the first residence hall to be built on the CCNY campus in its 158-year history. The 180,000 square-foot facility, which is rising on the southeast corner of the campus at St. Nicholas Terrace and West 130th Street, will provide accommodations for approximately 600 students and include a limited number of apartments for faculty. It is scheduled for completion in August 2006, in time for the fall 2006 semester.

The residence hall will consist of 164 fully furnished, air-conditioned apartments in four configurations: studio, one bedroom, two bedrooms and four bedrooms. All units will have kitchen facilities including a cook-top, microwave, full-size refrigerator, sink, cabinets and countertop space. Many units will include separate living room and dining areas. The building will also include a student lounge, a vending machine area, multipurpose/classroom space, a conference room, a fitness center, a central laundry room and a community kitchen facility. A large protected front lawn and a patio/picnic area overlooking St. Nicholas Park and Harlem will enhance the residential hall’s appeal.

Information concerning costs and the application procedure will be published both on the College website and in printed material available through the Office of Enrollment Services in the spring of 2006.

ACCRREDITATION

All degree programs are registered by the New York State Department of Education. The College is regionally accredited by the Middle States.
Commission on Higher Education (3624 Market Street, Philadelphia, PA, 19104-2680; 215-662-5606). Additionally, professional curricula are accredited by the appropriate professional educational agency or board including the National Architectural Accrediting Board, the American Society of Landscape Architects, and the Accreditation Board for Engineering and Technology.

**CONTINUING A TRADITION OF EXCELLENCE**

The College continues today to pursue aggressively its joint goals of excellence and access in its undergraduate and graduate offerings as well as its research and community service efforts.

More than 85% of the City College faculty hold the Ph.D. and twenty Distinguished Professors teach at The City College, more than at any other City University college. The faculty are committed to active professional lives as teachers, researchers and scholars. At the same time, the College, through the efforts of its faculty, has developed important collaborative projects with other institutions and agencies in the New York City area to provide needed services in education, housing, health care and communications.

In recent years, The City College has become a major center for research and scholarship and leads all other colleges of the City University in attracting outside funding for research activities. In addition, many funded programs on campus seek to promote participation in the sciences, engineering and other fields, especially by minority, women and economically disadvantaged students.

**ABOUT GRADUATE STUDY**

The City College master's programs are designed both for the student seeking graduate training ending at the master's level and for those interested in preparing for admission to doctoral degree programs. More than fifty different master's degree programs in the College of Liberal Arts and Science as well as in Architecture, Education and Engineering offer students a wide range of specialized learning opportunities. Eighty-eight percent of students enrolled in the College's graduate programs are pursuing advanced degrees. Currently, more than six hundred master's degrees are conferred each year.

The City College's student body of approximately 12,000 men and women is drawn from eighty different countries and represents some fifty different language groups, bringing an international and cosmopolitan ambiance to the campus. An equal number of men and women make up the graduate student body of approximately 3,000. Two-thirds of these attend school on a part-time basis. The wealth of diversity and range of experience represented in the graduate student body is an important learning asset that enriches both classroom and out-of-class learning for all students.

The graduate programs are designed for individuals at different stages of career development. Students returning to school after time spent working or in other pursuits will find a particularly receptive environment. Schedules can accommodate both full-time and part-time students.

Programs offer a balance of coursework, research training and, where appropriate, supervised fieldwork. Graduate faculty engage with students in classrooms, tutorials, laboratories and independent inquiry to develop skills in creative thinking as well as in the academic discipline. Working in partnership with the faculty, students are in situations where they are known personally and well, and where concern for them is strong.

The City College also participates fully in doctoral programs in many different disciplines. Offered by The City University of New York (CUNY), Ph.D. work in thirteen disciplines is based wholly or in part at The City College campus. These Ph.D. programs are in the fields of Biology, Biochemistry, Biomedical Engineering, Chemical Engineering, Chemistry, Computer Science, Clinical Psychology, Earth and Atmospheric Sciences, Civil Engineering, Electrical Engineering, Experimental Cognition, Mechanical Engineering and Physics. Information and applications for doctoral programs may be obtained from the Office of Admissions, The City University Graduate Center, 65 Fifth Avenue, New York, NY 10036 or online at www.gc.cuny.edu.

**ADMISSIONS REQUIREMENTS**

Graduate study is open to qualified students who possess a bachelor's degree from an accredited U.S. college or university or the equivalent from a foreign institution, and an adequate background in the field of study that they wish to pursue. Normally the equivalent of an undergraduate major in the field is required but the final judgment of preparation remains with the department concerned and the divisional dean. Applicants will be evaluated based on the following:

- Previous academic record: A minimum of 3.0 in the undergraduate field of specialization and a minimum overall undergraduate minimum of 2.7 overall undergraduate average.
- A personal statement.
- International students whose native language is not English and who are not permanent residents (green-card holders) must take the TOEFL (Test of English as a Foreign Language) and are expected to have a minimum score of 500. Some departments require higher scores for admission.
- Letters of recommendation.
- Some programs require writing samples, portfolios or auditions.
- GRE test scores are required for most programs. Contact the Office of Admissions for further information.

**APPLICATION PROCEDURES**

To receive applications for admission to all Liberal Arts and Science or Engineering programs contact:

The City College of New York
Office of Admissions
Room 101, Administration Building
Convent Avenue at 138th Street
New York, NY 10031
Telephone: 212-650-6980
Applications may be downloaded from: www.ccny.cuny.edu/admissions

Information and applications for Architecture and Education programs may be obtained from:

School of Architecture
Shepard 103, 109D
212-650-8748

School of Education
NAC 3/233A
212-650-6236

To apply for admission to a City College master’s program, submit the following information:
- An application for Graduate Admission with a $125 non-refundable fee;
- Official transcripts of all undergraduate and graduate work;
- Letters of recommendation;
- A personal statement;
- GRE scores;
- International students must have a minimum passing TOEFL score of 500 or better (please see Graduate Application for more information).

Admissions decisions are made only after receipt of all valid credentials. The Graduate Admissions Office encourages applicants to apply early. International students should apply a minimum of six months prior to the semester of enrollment.

Deadline Dates

Architectural
Fall: Jan. 15 (fall admission only)
Spring: April 15
Education
Fall: May 1
Spring: Nov. 15
Engineering
Fall: Contact Graduate Admissions at 212-650-6891 for dates
Spring: Nov. 15

Applications received and completed after the deadline dates cannot be guaranteed a review and will be considered for the subsequent semester.

Official offers of admission are made by the divisional dean of each division or school. Admission is only for the semester requested. Formal requests for postponements should be made in writing to the Office of Graduate Admissions.

ADMISSION TO A DEGREE PROGRAM

Admissions decisions are made by the Graduate Advisory Committee of the department and the divisional dean. Students may be admitted to the graduate program as fully matriculated or matriculated with conditions.

Matriculant conditional students must fulfill requirements as specified by the academic department.

Non-Matriculated Status

The Graduate Advisory Committee of the department and the divisional dean also admit students on a non-matriculated basis. Applicants who do not meet the requirements for admission may be allowed to take courses as non-matriculants. There are two types of non-matriculated students. Students who have submitted all official documents to the Graduate Admissions Office and have received a formal letter from the divisional dean accepting them as non-matriculated students may achieve matriculation by meeting college and university requirements.

To obtain degree candidacy and receive a master’s degree, a student must be matriculated. To seek matriculation the student must contact the departmental advisor or chair of the program. No more than fifteen credits taken while in non-matriculated status may be applied toward a graduate degree. In the School of Education, non-matriculated students may not take more than twelve credits. Graduate advisors will inform the dean and the Graduate Records Office in writing of any approved change in status.

The second type of non-matriculated status is for students who have not submitted official documents or are unable to complete their application by the deadline date. These students may be admitted on a “walk-in” basis (students who require an F-1 Visa are not eligible for this status). Walk-in non-matriculation is also available for students who wish to take a graduate course for personal or professional enrichment and who do not seek matriculation.

A student may apply to the College of Liberal Arts and Science and the School of Engineering as a walk-in non-matriculant during the fall, spring and summer registration periods as space permits. To apply for this status students must obtain a walk-in non-matriculant application form from the Graduate Admissions Office, pay the $125.00 application fee, and provide transcripts indicating proof of a baccalaureate degree. The student will then personally transmit the non-matriculant application to the departmental advisor for the necessary approval. Students who obtain approval in this status are limited to one semester of study and they are limited in the number of credits they may take:

School of Engineering—six credits
Liberal Arts & Science—twelve credits

Walk-in non-matriculants are encouraged to apply if they wish to continue graduate study at City College. Students must submit official documents to the Graduate Admissions Office in order to have their application reviewed.

ADVANCED STANDING

Students who have completed graduate work at other institutions may receive a maximum of twelve transfer credits (a maximum of six credits in the School of Engineering) toward the master’s degree if the course work has been taken within a five-year period preceding matriculation at The City College. Twelve credits may be granted for courses taken in one or more of the senior colleges of The City University of New York. The precise number of transfer credits will be determined in each case by the appropriate Graduate Committee and by the divisional dean’s office after the student has satisfactorily completed a minimum of twelve credits of graduate work at the College.
CCNY UNDERGRADUATES

Qualified City College undergraduates may take graduate courses under the same tuition conditions as undergraduate courses, with credit for such courses to count toward their undergraduate degree, provided that they have a B average, the approval of the undergraduate dean, the recommendation of their department, and approval of the dean in whose unit the course will be taken.

IMMUNIZATION

New York State Public Health Law (PHL) 2165 requires proof of immunity to measles, mumps and rubella (MMR) as a condition for attendance. The College reserves the right to prevent the registration of any applicant who fails to provide a record of immunization or who otherwise provides a health risk to the College community. It is University policy that all students who register for six or more credits/equivalent credits and were born after December 31, 1956 must provide proof of their immunity to measles, mumps and rubella. Students may fax their immunization records and the forms to 212-650-8227.

Recently, New York State passed Public Health Law 2167, addressing meningococcal meningitis. In compliance with PHL 2167, all New York State students, regardless of how many credits they take in college, must fill out a Meningococcal Meningitis Response form within 30 days of registration or at the same time they send in their MMR compliance document.

Students may download forms at http://origin.admin.ccny.cuny.edu/student_affairs/wellness/default.asp. If submitting the forms by fax, be sure to include the student’s name, social security number (or assigned City College identification number) and birth date. Applicants are advised to confirm the receipt of the fax by calling 212-650-8222.
Academic Requirements and Regulations

Policies for Graduate Students

CERTIFICATION OF FULL-TIME STATUS

A full-time student is one taking twelve credits or the equivalent in equated credits. A student is eligible to enroll for equated credits when the student enrolls for a minimum of six real credits and is a matriculated student.

Equated credits include: (1) teaching assistantship - three credits (quarter-time) to six credits (half-time); (2) research assistantship - three credits (quarter-time) to six credits (half-time); (3) research for thesis - a maximum of six credits; (4) field work - a maximum of six credits; (5) preparation of thesis - a maximum of six credits; (6) foreign students may be certified full-time if they take nine credits or the equivalent. Up to three credits may be in English as a Second Language. International students who are registered for certified credits are not necessarily in compliance with Immigration Service requirements. They must consult with the Foreign Student Advisor in NAC 1/107 for additional information.

MAINTENANCE OF MATRICULATION

Graduate students are expected to maintain continuous involvement and enrollment in the program. Failure to register for any period constitutes de facto withdrawal. A student is not eligible to receive a master’s degree while not in attendance. Students who find it necessary to interrupt their graduate studies and wish to maintain their academic standing during the semesters when they are not registered for courses or research credits must pay the Maintenance of Matriculation fee of $630 for residents and $1,070 for non-residents. Students who do not maintain matriculation and wish to resume study must apply for readmission. Readmission is granted only on the recommendation of the department and the approval of the divisional dean.

TIME FOR COMPLETION OF DEGREE

Normally a student will complete all requirements for the master’s degree within four years of matriculation. Extension of time for a student in regular attendance may be granted in exceptional circumstances upon recommendation by the departmental Graduate Committee and approval of the dean. However, a student who has been absent from the College for more than five years must reapply for admission to the program. All previous credits will be reevaluated by the graduate advisor and the remaining courses necessary for completion of the degree will be determined.

POLICY ON LATENESS AND ABSENCE

Students are expected to attend every class session of each course in which they are enrolled and to be on time. An instructor has the right to drop a student from a course for excessive absence. Students are advised to determine the instructor’s policy at the first class session. They should note that an instructor may treat lateness as equivalent to absence. No distinc-
tion is made between excused and unexcused absences. Each instructor retains the right to establish his or her own policy, but students should be guided by the following general College policy:

In courses designated as clinical, performance, laboratory or field work courses, the limit on absences is established by the individual instructor. For all other courses, the number of hours absent may not exceed twice the number of contact hours the course meets per week.

When a student is dropped for excessive absence, the Registrar will enter the grade of WU. A student may appeal this action to the Committee on Course and Standing in the school in which the course is offered.

**GRADE OF INCOMPLETE**

A grade of Incomplete (INC) may be given by an instructor to a student who, through unavoidable circumstances, has been unable to complete the assigned course work. Course work must be completed no later than the date published in each semester's academic calendar (e.g., a student who receives an INC for a course ending in May must complete the work by mid-March of the following year). A grade of INC not resolved in a timely manner will become an FIN. Extensions of time for resolving INC grades may be considered only by written appeal to the appropriate Committee on Course and Standing of the particular school.

**WITHDRAWALS**

A student may withdraw from a course during the first ten weeks of the semester by requesting a withdrawal form from the Office of the Registrar, obtaining the signature of the course instructor and the dean, and returning the card to the Office of the dean. A course dropped during the first three weeks will not appear on the record and a grade of W will be assigned to courses dropped between the third and tenth week. A student who wishes to drop a course later than the tenth week must petition the appropriate Committee on Course and Standing and must present, in writing, satisfactory reasons for requesting permission to withdraw. A student who fails to appear in class for a substantial portion of the semester will be given a grade of WU by the instructor.

**AUDITING**

Students wishing to audit a course must select audit status at the time of registration. Auditors must register in the normal manner and pay required tuition and fees. No credit or grade will be given for audited classes. Auditor status cannot be changed to credit status after the closing date for late registration. Likewise, credit status cannot be changed to auditor status after late registration.

**PROGRESS OF NON-MATRICULATED STUDENTS**

A student who is registered as a non-matriculant is not eligible to receive a master's degree while in that status. A non-matriculant will not be granted a permit to register for courses off campus. Non-matriculated students must change status by formal application if they originally applied to City College as non-matriculated students. A non-matriculated student who wishes to become matriculated and thus eligible to receive a degree must have a B average or better in courses which do not include more than two courses of Independent Study or Tutorial.

No more than fifteen credits (twelve in School of Education) taken as a non-matriculated student may be credited toward a graduate degree.

**ACADEMIC APPEALS**

The faculty of each of the schools defines the degree requirements, academic standards, and rules for students enrolled in the school and has jurisdiction over the courses offered by the school. Each of the schools has a Committee on Course and Standing charged with overseeing special cases and appeals. Students have the right to appeal any decision to the appropriate Committee on Course and Standing, which is the final authority on enforcement of curriculum, degree requirements, academic standards, grades and academic rules.

It should be noted that most academic rules are enforced without exception. Generally, the committee will consider requests for deviations from the rules only when the deviation is within the spirit, if not the letter, of the rule.

**GRIEVANCES**

Students with grievances concerning classroom matters other than grades should first attempt to resolve the grievance at the department level through discussion with the faculty member(s) or department chair. If the matter is not resolved, the student or department may refer the problem to the appropriate academic dean, the Ombudsman, or to the Vice President for Student Affairs, who shall, if necessary, refer it to the Office of the Provost for further consideration and possible action.

**PROBATION AND DISMISSAL**

A student will be placed on probation if the grade point average falls below 3.0. The student may be removed from probation when the G.P.A. reaches 3.0.

A student will be dismissed if the G.P.A. remains below 3.0 for two semesters. Students may appeal their dismissal to the Committee on Course and Standing.

**COURSES OUTSIDE A DEGREE PROGRAM**

Students who wish to take courses that do not count toward the degree must receive permission to do so from the department and the dean of the school or division awarding the degree.
REQUIREMENTS FOR THE MASTER’S DEGREE

The master’s degree is awarded three times during the year: February, June, and September. Commencement exercises take place once each year, in late May or early June.

Students are expected to be familiar with the requirements of their degree programs. All requirements for the degree must be met before the date of graduation. Therefore, all temporary grades (INC, ABS) must be resolved prior to the date of graduation, including those assigned in the final semester of attendance.

In addition, all “stops” must be cleared by the date of graduation. Failure to clear “stops” will result in the delay of the distribution of diplomas and the processing of requests for transcripts.

Students should have a preliminary graduation check conducted a minimum of two semesters before the anticipated date of graduation by an advisor in their department or division. Final graduation check and certification is conducted in the divisional dean’s office.

1. Residence: A minimum of 24 credits in residence at the College.


3. Satisfactory Completion of an Approved Program of Study: This program should normally comprise a coherent sequence of courses, lectures, seminars, discussions, and independent studies or investigations designed to help the student acquire an introduction to the mastery of knowledge, creative scholarship and research in the chosen field. Completion of the program generally requires one to two years of full-time study or the equivalent beyond the bachelor’s degree. Each program must be approved and must include a minimum of 30 credits. Some programs may require more credits.

4. Grades: An average grade of B in all courses taken toward the degree. When students receive a grade of less than B in any of the required courses, their candidacy will automatically become subject to review.

5. Comprehensive Examination: Most programs require the successful completion of a comprehensive examination; in some cases a comprehensive examination may be substituted for a thesis. The specific requirements are listed under each program. Students who plan to take a comprehensive examination must file an application with the chair of their program’s Graduate Committee. Students who wish to take a first examination in a doctoral program in lieu of a master’s comprehensive examination should make arrangements with the chair of the Graduate Committee.

6. Research and Thesis: Many programs require a thesis; some do not. Where a thesis is required, the student must register the thesis topic, together with written certification of the mentor’s acceptance of the topic, both with the chair of the department’s Graduate Committee and with the divisional dean. Any change of topic or mentor must be similarly recorded. When the completed thesis has been approved by the mentor and by additional faculty readers, the formal written notice of acceptance of the thesis must be submitted to the chair of the Graduate Committee in the field and to the divisional dean. Appropriate forms for both thesis topic registration and certification of the approved thesis may be secured from department or divisional offices.

The original and two carbon or photocopies of the approved thesis must be submitted to the office of the divisional or school dean, by December 12, May 13, or August 15, together with the formal certification of the accepted thesis, signed by the thesis mentor and by the chair of the Graduate Committee in the program.

All three copies of the thesis should be prepared on paper equivalent to a 16 lb. bond, 8 1/2 x 11 inches, with a margin of 1 1/2 inches on the left-hand side of the page, and with pages consecutively numbered. The original and the second copy should be left unbound; the first copy is to be placed in a hardcover, springback binder. The thesis must have a title page bearing the subject, the department, the author’s name, the mentor’s name, and the date.

7. Foreign Language Proficiency: Some but not all programs leading to the master’s degree require evidence of proficiency to read and utilize in research a foreign language or proficiency to use another appropriate tool of research (e.g. statistics, computer). The specific requirements are listed under each program. The Language Proficiency Examination is administered by the Department of Foreign Languages and Literatures, which assists in appropriate selection of texts and is responsible for grading the examination. Translation will be from the chosen language into English. Students wishing to take the language exam must apply in the office of the appropriate divisional or school dean.

8. Graduate Scholastic Standards: The result of a student’s work in any course completed will be expressed by one of the following grades (including + and – grades): A (Excellent), B (Good), C (Pass), F (Failure). Graduate students are bound by the grading policy of the school offering the course, not by the school offering the degree.

MASTER’S DEGREES AWARDED TO PH.D. CANDIDATES

Under certain circumstances, students who are registered in a Ph.D. program in the CUNY Graduate School and are taking courses at the City College may receive a master’s degree from City College. In all cases, the student must request an official transcript from the Registrar at the Graduate School, which should be submitted to the appropriate department in the College.

1. Students who have taken forty-five credits, passed the First Examination in their field of study, and are continuing in the Ph.D. program in the same field may receive a master’s degree by filing the Eligibility for Degree form. The form is available
from the departmental graduate advisor. The En-Route Master’s will be awarded as of the normal commencement dates. The College will not maintain a set of transcript records for En-Route Master’s students.

2. Students who are registered in a Ph.D. program in the CUNY Graduate School and do not intend to complete that degree may receive a master’s degree from the College when they have completed the College’s requirements for that degree. These include completion of a total of a minimum of thirty credits and passing a Comprehensive Exam or the First Examination with a master’s level passing score or writing a thesis.

a. Students who will complete the requirements for the master’s by the end of the term and plan not to continue should have the departmental advisor file the Eligibility for Degree form. The student’s records will be transferred to the College and the degree awarded at the next commencement.

b. Students who decide, before completing thirty credits, not to pursue the Ph.D. should apply for admission to the College as transfer students for the next semester and, if accepted, register for a master’s degree in the normal way. If credits are complete, but the student must still pass an examination or complete a thesis, he or she should transfer to the College and then pay the Maintenance of Matriculation fee for one semester before graduation.

THE RIGHT TO PRIVACY

The College complies fully with the Family Educational Rights and Privacy Act (FERPA). FERPA regulations appear in Appendix B of this bulletin.

CANCELLATION OF COURSES

The College does not guarantee to give all courses it announces. The announcement is made in good faith, but circumstances beyond the control of the College sometimes necessitate changes. The College may cancel courses if the enrollment does not warrant their being offered or if other contingencies make such a cancellation necessary.
The Bursar’s Office is located in the Administration Building, Room 103, and the telephone number is 650-8700.

Tuition is set by the CUNY Board of Trustees and is subject to change without notice by their actions. Students should arrange to pay their total tuition, fees and charges as the final step of the registration process if they wish to be admitted to classes. Students who may be eligible for financial assistance or grants should consult with the Financial Aid Office as early as possible.

### GRADUATE TUITION PER SEMESTER

<table>
<thead>
<tr>
<th>Flat Rate</th>
<th>Per Credit</th>
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<tbody>
<tr>
<td>12-18 credits</td>
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<table>
<thead>
<tr>
<th>Masters in Architecture and in Engineering</th>
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<tbody>
<tr>
<td>New York State Residents $3,750.00</td>
<td>$315.00</td>
</tr>
<tr>
<td>Non-resident Students N/A</td>
<td>$555.00</td>
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</table>

<table>
<thead>
<tr>
<th>All other Masters Programs</th>
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<tbody>
<tr>
<td>New York State Residents $3,200.00</td>
<td>$270.00</td>
</tr>
<tr>
<td>Non-resident students N/A</td>
<td>$500.00</td>
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<tr>
<th>Technology Fee</th>
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<tbody>
<tr>
<td>Full-time</td>
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<tr>
<td>75.00</td>
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<table>
<thead>
<tr>
<th>Student Activity Fee</th>
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<tbody>
<tr>
<td>$15.35</td>
<td>$15.35</td>
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<table>
<thead>
<tr>
<th>Consolidated Fee</th>
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<tbody>
<tr>
<td>$5.00</td>
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**Maintenance of Matriculation Fee**

$750 fee per semester must be paid by all matriculated New York State resident graduate students who wish to maintain their academic standing during terms when they are not registered for course or research credits. The fee for non-residents is $1,250. Students paying this fee need not pay the Activity Fee. Students who fail to pay the Maintenance of Matriculation fee will be deemed to have withdrawn from the graduate program and must reapply if they wish to be readmitted.

### OTHER FEES

<p>| | |</p>
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<tbody>
<tr>
<td>Application</td>
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</tr>
<tr>
<td>Re-entry</td>
<td>$ 10.00</td>
</tr>
<tr>
<td>Late Registration</td>
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<tr>
<td>Change of Program</td>
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<tr>
<td>Check Reprocessing</td>
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</tr>
<tr>
<td>Non-payment</td>
<td>$ 15.00</td>
</tr>
<tr>
<td>Transcript</td>
<td>$ 4.00</td>
</tr>
<tr>
<td>Make-up Examination</td>
<td></td>
</tr>
<tr>
<td>First in semester</td>
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<tr>
<td>Second in semester</td>
<td>$ 5.00</td>
</tr>
<tr>
<td>Duplicate Receipt</td>
<td>$ 5.00</td>
</tr>
<tr>
<td>Duplicate ID Card</td>
<td>$ 5.00</td>
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</tbody>
</table>

There may be other costs and fees associated with academic work, such as textbooks and studio or lab materials.
TUITION REFUNDS

When courses are cancelled by the College, a full refund of appropriate tuition and fees will be made. In other cases, tuition refunds will be made or liability reduced only in accordance with Board of Trustees regulations. Further information can be obtained from the Office of the Registrar. The date on which the application is filed, not the last date of attendance, is considered the official date of the student’s withdrawal and serves as the basis for computing any refund. Proportionate refunds of tuition will be made in accordance with the schedule below.

Withdrawal before first day of classes (as published in the Academic Calendar) .........................100%

Withdrawal before completion of the first full scheduled week of classes ..............................75%

Withdrawal before completion of the second full scheduled week of classes ..........................50%

Withdrawal before completion of third full scheduled week of classes ..................................25%

Withdrawal beyond third week ........None

Consolidated and activity fees are not refundable.

NEW YORK STATE RESIDENCY REQUIREMENTS

Students are assigned residency status when admitted to the College. Since residency determines tuition rates, students should know their classifications. If there is a question of status it is the responsibility of the student to prove residency. An “Application for Proof of Bona Fide Residency” is available in the Office of the Registrar. New students must apply through the Office of Admissions.

The Financial Aid Office administers federal and state funds, as well as those provided by special programs and the College itself. Federal funds may be disbursed only to those who maintain their academic standing and are not in default of a student loan or owe a refund on a federal grant. For the most recent information on application filing procedures, deadline dates, and eligibility criteria for the various programs, students are urged to contact the Financial Aid Office.

PAYMENT OF COLLECTION COSTS

Students who do not make full payment of their tuition, fees and other college bills and whose account is sent to a collection agency will be responsible for all collection costs, including agency fees, attorney fees, and court costs, in addition to whatever amounts are owed to the College. In addition, non-payment or a default judgment against a student’s account may be reported to a credit bureau and be reflected in credit reports.
The Financial Aid Office is located in the Administration Building, Room 104, and the telephone number is 212-650-5819.

Tuition is set by the University Board of Trustees and is subject to change without notice by their action. Students should arrange to pay their total tuition, fees and charges to complete their registration if they wish to be admitted to classes. Students who may be eligible for financial assistance or grants should consult with the Financial Aid Office as early as possible.

**MAJOR GRANTS**

**Assistantships/Fellowships**
A number of assistantships and fellowships, valued at a maximum of $4,000, are administered by the Financial Aid Office for the graduate departments. These academic merit-based awards usually involve 15 to 20 hours of work. Interested students should contact their departments.

The major source of financial aid for CUNY doctoral candidates is centered at The City University Graduate Center and with the individual departments in which the student is enrolled. Applications for fellowships and teaching and research assistantships should be directed to these sources.

**Tuition Assistance Program (TAP)**
TAP is a grant for full-time undergraduate and graduate students who are residents of New York State and who are U.S. citizens or eligible aliens. Graduate students may be eligible for grants from $75 to a maximum of $550 for the academic year.

**CAMPUS-BASED AID PROGRAMS**

Funds from the two federal programs — Federal Work Study (FWS) and Federal Perkins Loan— are awarded to eligible students who attend on at least a half-time basis (six credits). Graduate students who are U.S. citizens or eligible aliens may apply. These are not entitlement programs; the Free Application for Federal Student Aid (FAFSA) which is used to apply for both should be filed by April 1st for the following academic year.

**Federal Work-Study Program (FWS)**
Students are offered an opportunity to work on campus or at an approved off-campus public service or non-profit agency in the hope that they will gain educational and financial benefits through the FWS experience. During the academic year students work part-time; during the summer and vacation periods, part-time or full-time.

**Federal Perkins Loan**
Depending upon available funds, a student may receive a maximum of $4,000 for each year of graduate study. For details including repayment and interest rates, consult the Financial Aid Office.

**William D. Ford Federal Direct Loan (Subsidized and Unsubsidized)**
The Ford Federal Direct Loan Program enables matriculated students who are enrolled a minimum of half-time (6 cr.) to meet educational expenses. Graduate students may borrow a maximum of $8,500 per year (subsidized). Unsubsidized loans of a maximum of $10,000 are available to students who qualify. For details including repayment and interest rates, consult the Financial Aid Office.

**OTHER FINANCIAL AID**

**Short-Term Emergency Loans**
The College operates a small loan program that enables students to meet emergencies. These loans must be repaid during the semester and usually within two weeks of the receipt of such funds. Failure to repay on schedule can lead to debarment from classes and delay the processing of academic records. There is a $5 service charge. For further information, contact the Office of Student Affairs.

**OTHER SCHOLARSHIPS, PRIZES, AND AWARDS**

Many prizes, scholarships, and various kinds of commendations are awarded annually to graduate students for their achievements at the College. Departmental awards are listed with the departmental descriptions. For more information on these, see the appropriate dean or chair. Information is also available on centrally administered merit and need-based scholarships. A listing and common application are available on the College’s website or through the Office of Admissions.
LIBRARY

The City College library system includes:

- the Morris Raphael Cohen Library (North Academic Center)
- the Music Library (Shepard 160)
- the Ruderman Architecture Library (Shepard 408)
- the Science/Engineering Library (Marshak 29)
- the Art Slide Library (Compton Goethals 245A)
- the Architecture Slide Library (Shepard 303)
- iMedia (North Academic Center 5/220)

Cohen Library, built around an atrium in the North Academic Center, occupies five floors and houses Humanities, Social Science and Education materials. The collections, among the largest in the CUNY system, total more than 1,400,000 volumes, 826,000 microforms, 34,000 scores and recordings, 18,000 films and videos and 147,000 slides. Designated a federal depository in 1884, the library has 122,000 government documents. The Archives and Special Collections Division contains 1,650 linear feet of official records and historical material on the College in addition to rare books and special subject collections. Digital library holdings include 18,700 titles and 845 electronic subscriptions. The library serves instructional and research needs of undergraduate through doctoral levels and provides study areas, carrels and a “Library Café” for students and faculty.

The CUNY Plus on-line catalog provides access to library holdings both at City College and all the libraries in CUNY, and is available world-wide on the web. The City College Library web site (http://www.ccny.cuny.edu/library) provides quick and easy access to digital resources, both index and full text, for newspapers and journal articles in Engineering Information Village, ScienceDirect, JSTOR, MathSciNet, the American Chemical Society, the Avery Index to Architecture Periodicals and others; dissertations, ERIC documents, medical literature, and numerous online periodicals. The CUNY libraries web site (http://libraries.cuny.edu/resource.html) provides access to digital resources shared by the entire university, such as LEXIS-NEXIS, EconLit, NetLibrary and PsycInfo.

Library faculty provide information literacy education, instruction in research methodology and resource evaluation on multiple levels, from new student seminar classes through graduate courses. A listing of library faculty is located in Appendix G.

INFORMATION TECHNOLOGY AND COMPUTER SERVICES

City College is committed to providing all of its students with the opportunity to learn skills in using computers as practical tools, whether in the workplace or in advanced educational endeavors. Toward that end, the College is committed to making appropriate technology accessible to its student body.

The primary goal of Information Technology and Computer Services is to insure that students, faculty and staff who depend upon the College’s information technology services and resources have a robust, dependable and user-friendly operating environment in which to work.

The Computer and Information Technology Center represents academic computing at CCNY, an increasingly complex and heterogenous mix of technologies across many academic disciplines. As such, we continually evaluate our offerings and our role within the College as we seek beneficial opportunities for facilitating our faculty, departments and programs. There are over 50 computer labs (housing over 1000 computer systems) distributed throughout the campus dedicated to supporting our student’s rigorous academic computing needs. Underlying these computer systems is a fast, robust network with campus-wide gigabit connectivity (including targeted wireless access points) and an expandable ATM circuit to the Internet (currently operating at 1 gig/sec).

The primary, general use Computer Laboratory, located on the ground floor of the NAC, houses fifty Apple
Macintosh and sixty Windows-compatible computers available on a walk-in basis. This lab compliments a campus-wide distribution of computer labs designated to support instruction in specific disciplines, including the Economics and Psychology departments; the Humanities; the Robinson Center for Graphic Arts; the Library facilities; and the Center for Teaching and Learning. There are also many provisions for computing and information technology in the division of Science and schools of Architecture, Education and Engineering. These labs host a variety of software applications allowing students to conduct research and produce and present their academic assignments.

Computing skills workshops are under constant development to provide students and instructional staff with the means to learn the fundamentals of using computer applications. These are provided in a variety of topics to give the college body a range of options for accessing and producing files for use on both personal computers systems and on the Internet. Topics of instruction include word-processing, spreadsheets, basic database design, statistical analysis, and multimedia production.

Please visit the college website under Computing for topical information, including a complete listing of computing facilities and other pertinent information and services concerning information technology at CCNY.
The Division of Student Affairs is located in the Administration Building, Room 204, and the telephone number is 212-650-5426.

The primary mission of the Division of Student Affairs is to support the academic mission of the College in ways that enable students to complete their course of study most effectively. One of the most important factors in promoting student success is the quality of campus life. The division seeks to enhance the experience of students on the City College campus through rich student life programs and vital student activities that help students achieve their academic goals and develop as a whole person. Each student affairs office plays a vital role in the overall development of students. Through these services and programs, students are afforded opportunities to strengthen academic skills, develop leadership skills, access support services, increase their social skills, and enhance their career development as they make progress towards their personal and academic goals.

The Vice President for Student Affairs has overall responsibility for the division. Additional information on services and programs may be obtained from the office.

Office of Student Services

The Office of Student Services (OSS) provides programmatic and informational supports to help students further their academic and personal growth goals. This office serves as a clearinghouse for the Division of Student Affairs, where students are given help or guidance on different types of problems, i.e., how to navigate the College bureaucracy to resolve academic or personal dispute, where to get counseling within and without the institution; how to locate the College’s programs and resources that deal with a broad range of student financial and social concerns; and similar issues that students may encounter. Hence the goal is to provide clear and accessible information to allow students to feel empowered in their interactions with the institution.

To provide information electronically to current and prospective students, the Student Email Helpline, under the supervision of OSS and staffed solely by students, is available to receive queries at any time, seven days a week. The student staff responds (Monday through Friday) to inquiries in the order they are received. They may answer questions regarding academic and admissions procedures, college regulations, general program and course requirements, class schedules, curricula, etc. Those inquiries requiring responses from College officials are forwarded to appropriate faculty, staff or administrators.

The Student Email helpline address is support@ccny.cuny.edu. Access is also available through the College’s website, www.ccny.cuny.edu.

The Campus Ministry is housed in OSS. Students in need of spiritual guidance and counseling, or who wish to engage in discussions related to spiritual development may come to the Campus Ministry, located in Baskerville Hall, Room 204 (212-650-5866) for referrals.

The Office of Student Services is located in Wingate Hall, Room 107. The telephone number is 212-650-5370 and the fax number is 212-650-7369. The email address is student services@ccny.cuny.edu.

Office of Student Disability Services

The Office of Student Disability Services (SDS) is dedicated to providing students with disabilities equal access to the College curriculum. The office ensures that, upon request, qualified students with disabilities are provided reasonable and effective accommodations as mandated by law. SDS facilitates a range of academic adjustments, reasonable accommodations, and support services for students with disabilities.

Students who contact SDS and indicate that they have a disability or believe that they might qualify for services will be asked to make an appointment for an intake interview with SDS staff. During the intake interview, the staff member will discuss what services are available from SDS and other City College offices. In order to qualify for services, students must register with SDS by providing appropriate documentation from a qualified professional regarding the nature of their disability and functional limitations. However, though academic adjustments are mandated by law, the College is not required to alter demonstrably essential academic requirements of a course of study nor is the College mandated to lower or effect substantial modifications of reasonable academic standards.

Early planning is essential for many of the resources, adjustments and accommodations, so students are asked to contact SDS at the earliest possible date. (B-26; 212-650-5913 or 212-650-6910 for TTY/TTD).
Of Highly Effective Students” are provided to students in order to enhance their performance and provide a rich learning environment.

When necessary, students are referred to community-based health care clinics for more comprehensive treatment and services. These community clinics provide quality health care services for a nominal fee. In an effort to expand services not available for students at the WCC, an affiliation with New York City Technical College (NYCTC) in Brooklyn was established early in 2001 for free and low-cost ophthalmic services. Local community referrals are provided through arranged affiliations for ongoing medical care and for conditions not treated at the WCC site. There is a minimal fee for these services, including laboratory work and X-rays, provided outside the WCC. The fee is collected at the referral site.

Students clear their New York State Immunization Requirements, in accordance with Public Law 2165, at the WCC. The Measles, Mumps and Rubella Vaccination (MMR) is provided free of charge on clinic days for those students, including international students, who need to meet this requirement. Students with their immunization records intact can fax their records to the WCC at 212-650-8227. Additional forms must be returned to the WCC prior to registration.

Recently, New York State passed Public Health Law (PHL) 2167 addressing Meningococcal Meningitis. In compliance with PHL 2167, all New York State students, regardless of how many credits they take in college, must fill out a Meningococcal Meningitis response form within 30 days of registration or at the same time they send in their MMR compliance document. Students may download both forms from the WCC website at: http://origin.admin.ccny.cuny.edu/student-affairs/wellness/default.asp. Students can also fax these forms to 212-650-8227. The fax must include name, social security number (or assigned City College identification number) and birth date. Applicants are advised to confirm the receipt of the fax by calling 212-650-8222.

Information on providers of student health insurance as well as additional information concerning health, medical and counseling services may be obtained by calling the WCC (J-15: 212-650-8222).

**PSYCHOLOGICAL CENTER**

In association with the Psychology Department’s doctoral program in clinical psychology, the Psychological Center offers counseling by supervised graduate students. Access to the service is limited and is fee based (NAC 8/109; 212-650-5672).

**JOHN H. FINLEY STUDENT CENTER**

The Finley Student Center, located on the first floor of the North Academic Center (NAC 1/210; 212-650-5002), is a multi-purpose facility which can be used for student activities. It houses the offices of the Student Governments, the student-run newspapers, a radio station, a video studio, and the Student Ombudsperson’s office. It contains a game room, student lounge, ballroom, and several conference rooms for use by students and faculty.

This office assists the more than 100 student organizations on campus with chartering clubs, planning activities and leadership training. All students pay a student activity fee each semester. This fee is used for athletics and activities, and for supporting a myriad of organizations and programs related to students. Students also pay a technology fee, which is used to improve technology and access to technology. Elected undergraduate and graduate officers are chosen by their respective government to serve in a Student Association (known as the Student Services Corporation at CCNY), which plans and implements budgets and expenditures, with the advice and counsel of members of the faculty and the Division of Student Affairs. In addition, students have a role in decisions through representation on various college committees.
Intercollegiate Athletics
The College offers an extensive fourteen-team program of varsity competitive sports for men and women. The College fully subscribes to the Division III philosophy which emphasizes the participants rather than the spectators. The program is supported by an athletic fee, which is part of the mandatory student activity fee. No athletic scholarships are offered by Division III colleges. Membership on a team is open to all qualified undergraduate students in good academic standing who meet NCAA eligibility standards. Teams compete in various local, regional, national events, and leagues, with the primary affiliation being the CUNY Athletic Conference. For more information, contact the Athletics office (J-20; 212-650-8228).

Intramural Athletics and Recreational Sports
The Intramural Athletics and Recreation program provides The City College campus community with structured competitive athletic events, tournaments, and leagues as well as access to a wide variety of athletic and fitness facilities. The structured activities of the Intramural Athletics program generally take place during club hours on Thursdays. Some of the events that take place during a given semester include basketball, volleyball, badminton, soccer, and tennis.

The recreation program offers the campus community opportunities to work out with cardiovascular equipment and weight train in the Wingate Fitness Center, which opened in 1999. Individuals can also swim, play tennis, basketball, volleyball, badminton, soccer, frisbee, touch football, or merely jog. The programs emphasize enjoyment health and wellness, social interaction, camaraderie, physical activity, and the challenge of competition with one’s peers.

Information on the Athletics or Intramural and Recreation program can be obtained from Baskerville Hall 05 or Wingate Hall 3rd floor.

WHCR-FM
The College’s radio station, WHCR (90.3 FM), is a professionally managed community station. Through hands-on training at the station, students and community volunteers can learn many aspects of news gathering, reporting, programming and on-air broadcasting (NAC 1/108; 212-650-8171).

CAREER CENTER
The Career Center is dedicated to providing an extensive array of quality programs and services for the professional development and career advancement of its students. Programs and services are designed to help students prepare for the professional world of work through self-assessment, workshops and seminars and cooperative education and internship placements.

To assist students with career education and planning the Center offers workshops on résumé writing, letters of inquiry, job search techniques, networking for success, and interviewing skills. Individual counseling is available by appointment to students seeking assistance in defining and planning career goals. An eight-part series of workshops is offered each semester to help students explore work values, interests, skills and abilities. In addition, the Career Library offers an extensive collection of reference materials, directories, career-related literature, graduate and professional information, company/organization annual reports, and recruitment literature as well as terminals where students may search for jobs or internships, type a letter of inquiry or résumé, and explore internet job sites. Other services include videos on career and job search topics as well as the availability of sample resumes, cover letters, salary data market trends and GRE exam brochures.

The Career Center also oversees experiential programs, such as internships, cooperative education placements, and community/service learning opportunities designed to provide students with opportunities to apply classroom learning in a structured work environment.

Career placement programs include on-campus recruitment, career fairs, résumé referral services, résumé critiques and employment advising, and special events organized at the request of our participating employers.

The Center’s services, unless otherwise stated, are available to all City College students and alumni (NAC 1/116; 212-650-5326).

CHILD DEVELOPMENT AND FAMILY SERVICE CENTER
The Child Development and Family Service Center provides on-campus, quality child care/educational services to CCNY students, for children between 2 years and 10 months and 6 years of age. The center operates day and evening programs during the fall and spring semesters. The day program operates from 7:45 a.m.–5:30 p.m. and the evening program operates from 4:00 p.m.–9 p.m. Summer care is available Monday–Thursday for the same population. Breakfast, lunch and dinner are served during the fall and spring semesters. The current fee is $45.00 per week. To apply for enrollment, students should visit the center. Additionally, the center is a site for field placement students in Education, Psychology, Sociology, and Biomedical Education programs (Schiff House, 133rd Street & Convent Avenue; 212-650-8615).

VETERAN’S AFFAIRS
Students who have completed active military duty within the last ten years or who qualify for a reserve educational contract may be eligible for a monthly stipend from the Veteran’s Administration. The Office of the Registrar is responsible for processing veteran’s benefits.
CAFETERIA

A cafeteria serving a variety of hot and cold entrees, salads, and grilled foods is located on the second floor of the North Academic Center. Vending machines carrying a variety of snacks and drinks are located throughout the campus. (NAC, 2nd floor; 212-650-6771).

THE CITY COLLEGE BOOKSTORE

The CCNY bookstore stocks new and used textbooks, reference and general books, school supplies, computer software, sportswear, CCNY memorabilia, magazines, greeting cards and electronics. Major credit cards are accepted. The bookstore buys books back from students throughout the year. The bookstore is accessible to people with disabilities (NAC 1/103; 212-650-7109).
The College of Liberal Arts and Science
Graduate Programs in Liberal Arts and Science

The College of Liberal Arts and Science has long recognized the need and value of graduate studies for students, for the college, and for the community. The first course of study in the liberal arts and science leading to the earned master’s degree (Psychology) was introduced in 1944. Subsequently, a comprehensive survey confirmed the need for the expansion of graduate work. A Division of Graduate Studies was established in 1951 and a second master’s program (in International Relations) was inaugurated in that same year. As the need for additional programs developed, particularly after The City University came into being in 1961, the College extended its master’s offerings to include most of the disciplines in the arts and sciences, as well as several interdisciplinary programs.

The College of Liberal Arts and Science offers master’s degrees in approximately 20 fields of study. Several of these programs are offered in cooperation with one or more of the other senior colleges of the City University or with The City University Graduate School. In 1962, The City University introduced its first doctoral programs; since then many others have been instituted. The City College fully participates in these programs.

GOALS

The graduate programs offered by the College of Liberal Arts and Science emphasize the standards of excellence and scholarship historically associated with The City College. The work of the College is animated by the ideals of scholarship and research, and prepares highly qualified students for careers in the learned professions, in the performing and visual arts, speech, creative writing, for government service, for positions in private industry, labor and welfare agencies, and for further study and research.

Admissions Requirements

Admissions policies for the various departments within the College of Liberal Arts and Science are described below.

Anthropology (M.A.)

An undergraduate degree in Anthropology. Students without a major degree in Anthropology will be asked to take additional courses to make up any deficiencies. Preference will be given to students with active volunteer or paid jobs in service institutions where anthropological skills can contribute to their career. Letters of recommendation will be requested from supervisors as well as from professors in the undergraduate schools which they attended. Students at The City College may choose to enroll at the end of their sophomore year in the combined B.A./M.A. in Anthropology, if they have maintained a 3.0 grade average with at least a 3.2 in their major program. Transfer students may apply to the B.A./M.A. program if they have a grade point average of at least 3.3. This program requires fewer credits than if the two programs were taken separately.

Art (M.F.A.)

Bachelor of Fine Arts Degree (B.F.A.) from an accredited institution, or, for those holding other bachelor’s degrees, a substantial number of undergraduate credits in art, preferably at least twenty-eight credits or the equivalent in studio art, and twelve credits or the equivalent in art history. Exemptions from these requirements may be made at the discretion of the Departmental Graduate Committee and the Divisional Dean. The presentation by the applicant of a portfolio of creative work judged acceptable in quality by a faculty committee is also required. Applicants may be asked to appear for a personal interview by the Departmental Graduate Committee.

Art (M.A.)

A minimum of twelve undergraduate credits in art history (or the equivalent) beyond the introductory level. Applicants may be asked to appear for a personal interview by the Departmental Graduate Committee.

Biochemistry (M.A.)

A minimum of one-year courses in each of the following: calculus, physics, organic chemistry and physical chemistry in addition to a one-semester course in biochemistry. Where there are deficiencies in background, the candidate may be required to take
additional courses, without credit, for the removal of such deficiencies.

**Biology (M.A.)**
A minimum of twenty-four credits in advanced undergraduate work in biology or related subjects.

**Chemistry (M.A.)**
A minimum of one-year courses in each of the following fields: general, analytic, organic and physical chemistry, or their equivalents.

**Earth and Atmospheric Sciences (M.A.)**
(Geology)
Qualified students with bachelor’s degrees in geology, meteorology, geology, oceanography, mathematics, physics, chemistry, biology or engineering may apply. A minimum of one-year courses in college calculus, (differential and integral), physics, and chemistry are required.

**Economics (M.A.)**
The undergraduate record should demonstrate the ability to profit from graduate work. Where there are deficiencies in background, which would impede the ability of the student to profit from graduate work in economics, the Graduate Committee in Economics will require additional courses for the removal of such deficiencies.

**English (M.A.) (M.F.A.)**
(Creative Writing)
An undergraduate record that would qualify the applicant for admission to the master’s program in English, and, in addition, a sample of literary work consisting of the submission of 40-50 pages of fiction or several poems, and recommendations by two teachers or writers familiar with the work of the applicant.

**English (M.A.)**
(Literature; Language and Literacy)
An undergraduate major in English or American Literature, and other holders of undergraduate degrees at the discretion of the Graduate English Committee. An interview is required for the M.A. in Language and Literacy. This program is not currently accepting degree candidates.

**History (M.A.)**
A minimum of twelve credits beyond introductory level courses in history.

**International Relations (M.A.)**
Substantial background of undergraduate work in the social sciences, with special emphasis in the fields of economics, political science and history.

**Mathematics (M.A.)**
Eighteen credits in advanced mathematics courses and at least twelve more credits in additional advanced mathematics courses or in advanced science courses of a mathematical nature. Students who do not present higher analysis or advanced calculus courses deemed equivalent to Mathematics 32300, 32400 and 32500 will be required to complete this sequence immediately upon admission. Students who do not present a satisfactory course in linear algebra will be required to complete Mathematics 34600 or its equivalent during their first semester.

**Media Arts Production (M.F.A.)**
(Film and Video)
Undergraduate degree in film and video production preferred, with a minimum 3.0 average in the major. If the applicant’s undergraduate degree is not in the field, he or she must have completed courses in the areas of 16mm sync sound filmmaking, video production, editing, screenwriting and history/theory of film. Promising applicants who have a deficiency in a particular area will be required to take undergraduate courses in the department. A creative portfolio of film and/or video work must be submitted with the application.

**Music (M.A.)**
At least twenty-four credits in the field of music, including harmony and music history. The candidate must also be able to demonstrate (1) performing competence as an instrumentalist or vocalist, or the equivalent in composition or conducting; and (2) practical proficiency on the piano. Where there are deficiencies in background such as to impede the ability of the student to profit from graduate work, the Graduate Committee will require additional courses to be taken without credit for the removal of such deficiencies.

**Physics (M.A.)**
A sufficient number of courses in physics and mathematics to indicate the likelihood that the candidate will profit from graduate study. Where there are deficiencies in background, the candidate may be required to take additional courses for the removal of such deficiencies.

**Psychology (M.A.)**
Undergraduate work should include courses in general psychology, statistical methods, experimental psychology (a full year is recommended, but not required) and nine additional credits in psychology or cognate fields. There must be at least fifteen credits overall in psychology courses. Part of these requirements may be corequisites to graduate work. An interview may be required.

**Spanish (M.A.)**
An undergraduate major in Spanish. If general scholarship is superior but preparation in the literature of the specialization is found to be insufficient, or if the student has not majored in the field, the student may be admitted by approval of the Graduate Committee of the Department.

**Sociology (M.A.)**
A sufficient background in the social sciences or humanities to engage profitably in work on the graduate level. In addition, applicants must have completed at least one advanced undergraduate course in sociological theory and one course in statistics. Desirable fields of concentration, in addition to or in place of sociology, are anthropology, history, philosophy, psychology, government and economics. Students whose undergraduate majors have been in other fields, e.g., the physical sciences, may be admitted by special action of the Graduate Committee. Where there are serious deficiencies in background, the committee will recommend additional courses for the removal of deficiencies.
Department of Anthropology
(DIVISION OF SOCIAL SCIENCE)

Professor Arthur Spears, Chair • Department Office: NAC 7/112 • Tel: 212-650-6608

GENERAL INFORMATION

The City College offers the following master’s degree in Anthropology:

M.A. in Applied Urban Anthropology

DEGREE REQUIREMENTS

Required Courses

Anthropology:

B0100: Anthropological Theory and Method [not required of students who already have a B.A. in Anthropology] 3

B1000: Anthropological Perspectives on Contemporary Society 3

B1100: Global Organization of Work 3

B1201: Seminar on Contemporary Urban Problems I 3

B1202: Seminar on Contemporary Urban Problems II 3

B1300: Thesis 3

Elective Courses

B0200-B0900: Contemporary Urban Problems (up to 12) 3

Required Courses

Anthropology:

B0100: Anthropological Theory and Method [not required of students who already have a B.A. in Anthropology] 3

B1000: Anthropological Perspectives on Contemporary Society 3

B1100: Global Organization of Work 3

B1201: Seminar on Contemporary Urban Problems I 3

B1202: Seminar on Contemporary Urban Problems II 3

B1300: Thesis 3

Elective Courses

B0200-B0900: Contemporary Urban Problems (up to 12) 3

Statistics Requirement: Candidates must have taken one course in statistics and quantitative analysis at either the undergraduate or graduate level.

Thesis: A thesis is required based on an internship in a community agency or other service institution in the greater New York area. Information on these internships is provided by Professor Carol Laderman.

ADVISEMENT

Faculty mentors will work with students on an individual basis in the fields of educational anthropology, medical anthropology, nutrition, gerontology, conservation anthropology, and the anthropology of work.

Advisement Coordinator
Professor Carol Laderman
NAC 114; 212-650-7362

COURSE DESCRIPTIONS

B0100: Anthropological Theory and Method
Weekly seminar with readings and discussion on fundamental premises of the discipline, theoretical advances and methodological innovations. Major anthropologists and their contributions will be presented with ethnographic readings that illustrate their positions from the structural functionalism of Malinowski and Radcliffe-Brown to Margaret Mead and studies of urban and industrial societies. Open to students of other departments by permission of the instructor. 3 HR./WK.; 3 CR.

B0200: Nutrition and Society
B0300: Medical Anthropology
B0400: Gerontology
B0500: Conservation Archaeology
B0600: Anthropology of Education
B0800: Anthropology of Law
B0900: Anthropology of Sex Roles

B1000: Anthropological Perspectives on Contemporary Society
Comparative analysis of change in urban industrial society. Origins of contemporary society, intercultural contacts, development of plural cultures. Perspectives from social biology, historical archaeology, ethnography, social anthropology, and sociolinguistics. Open to students in other departments by permission of instructor. 3 HR./WK.; 3 CR.

B1100: Global Organization of Work
Comparative study of the organization of work in core industrial and developing economies. Ethnographies and autobiographies from rural and industrial societies will be compared to analyze changes in the work process. Open to students in other graduate programs by permission of instructor. 3 HR./WK.; 3 CR.

B1201-1202: Seminar on Contemporary Urban Problems I and II
Bi-weekly seminar combined with student placement in an agency or other institutional or research setting. Discussion of literature on problems relevant to student placements; student reports from public and private institutions; guest lectures. Pre- or coreq: Anthropology B1100. 2 HR./WK., PLUS CONF.; 6 HR. INTERNSHIP; 3 CR./SEM.

B1300: Thesis
The thesis will analyze a problem relevant to some agency or institutional function and will make proposals for solutions or for further planning. It will grow from a student’s internship work in consultation with the faculty advisor and perhaps the supervisor of the internship as well. The thesis must be at the level of a publishable article or professional report, and defended in an oral examination. 3 CR.

The City College offers the following master’s degree in Anthropology:

M.A. in Applied Urban Anthropology

DEGREE REQUIREMENTS

Required Courses

Anthropology:

B0100: Anthropological Theory and Method [not required of students who already have a B.A. in Anthropology] 3

B1000: Anthropological Perspectives on Contemporary Society 3

B1100: Global Organization of Work 3

B1201: Seminar on Contemporary Urban Problems I 3

B1202: Seminar on Contemporary Urban Problems II 3

B1300: Thesis 3

Elective Courses

B0200-B0900: Contemporary Urban Problems (up to 12) 3

Required Courses

Anthropology:

B0100: Anthropological Theory and Method [not required of students who already have a B.A. in Anthropology] 3

B1000: Anthropological Perspectives on Contemporary Society 3

B1100: Global Organization of Work 3

B1201: Seminar on Contemporary Urban Problems I 3

B1202: Seminar on Contemporary Urban Problems II 3

B1300: Thesis 3

Elective Courses

B0200-B0900: Contemporary Urban Problems (up to 12) 3

Statistics Requirement: Candidates must have taken one course in statistics and quantitative analysis at either the undergraduate or graduate level.

Thesis: A thesis is required based on an internship in a community agency or other service institution in the greater New York area. Information on these internships is provided by Professor Carol Laderman.

ADVISEMENT

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Advisement Coordinator
Professor Carol Laderman
NAC 114; 212-650-7362

COURSE DESCRIPTIONS

B0100: Anthropological Theory and Method
Weekly seminar with readings and discussion on fundamental premises of the discipline, theoretical advances and methodological innovations. Major anthropologists and their contributions will be presented with ethnographic readings that illustrate their positions from the structural functionalism of Malinowski and Radcliffe-Brown to Margaret Mead and studies of urban and industrial societies. Open to students of other departments by permission of the instructor. 3 HR./WK.; 3 CR.

B0200: Nutrition and Society
B0300: Medical Anthropology
B0400: Gerontology
B0500: Conservation Archaeology
B0600: Anthropology of Education
B0800: Anthropology of Law
B0900: Anthropology of Sex Roles

B1000: Anthropological Perspectives on Contemporary Society
Comparative analysis of change in urban industrial society. Origins of contemporary society, intercultural contacts, development of plural cultures. Perspectives from social biology, historical archaeology, ethnography, social anthropology, and sociolinguistics. Open to students in other departments by permission of instructor. 3 HR./WK.; 3 CR.

B1100: Global Organization of Work
Comparative study of the organization of work in core industrial and developing economies. Ethnographies and autobiographies from rural and industrial societies will be compared to analyze changes in the work process. Open to students in other graduate programs by permission of instructor. 3 HR./WK.; 3 CR.

B1201-1202: Seminar on Contemporary Urban Problems I and II
Bi-weekly seminar combined with student placement in an agency or other institutional or research setting. Discussion of literature on problems relevant to student placements; student reports from public and private institutions; guest lectures. Pre- or coreq: Anthropology B1100. 2 HR./WK., PLUS CONF.; 6 HR. INTERNSHIP; 3 CR./SEM.

B1300: Thesis
The thesis will analyze a problem relevant to some agency or institutional function and will make proposals for solutions or for further planning. It will grow from a student’s internship work in consultation with the faculty advisor and perhaps the supervisor of the internship as well. The thesis must be at the level of a publishable article or professional report, and defended in an oral examination. 3 CR.
B1400: Urban Language Issues
A survey of key language-related issues in urban communities. Students will receive an overview of linguistic analytical techniques and a firm grounding in socio-linguistic issues important for understanding urban American communities, e.g., multilingualism, bilingual education, language attitudes, and linguistic variation. 3 HR./WK.; 3 CR.

B1600: Black English: Structure and Use
Structural and historical relationship to other American dialects; standard and non-standard dialects; relationships to Caribbean Creole and African languages; speech events, e.g., sermons, signifying, playing the dozens; speech styles according to socioeconomic class, gender, sexuality, and age; educational implications. 3 HR./WK.; 3 CR.

B9800: Independent Study
Permission of the graduate advisor required. HOURS TO BE ARRANGED; 3 CR.

FACULTY

Carol Laderman, Professor
B.A., Hunter College; M.A., Columbia Univ., M.Phil., Ph.D.

M. A. Samad-Matias, Lecturer
B.A., Hunter College; M.A., New York Univ.

Diane Sank, Professor
B.S., Long Island Univ.; M.S., Univ. of Illinois; Ph.D., Columbia Univ.

Arthur K. Spears, Professor and Chair
B.A., Univ. of Kansas; M.A., Johns Hopkins Univ. (International Relations); M.A., Northwestern Univ. (Linguistics); Ph.D., Univ. of California (San Diego)

Diana Wall, Professor
B.A., The City College; M.A., New York Univ., Ph.D.

PROFESSOR EMERITUS

June Nash
GENERAL INFORMATION

The City College offers the following master’s degrees in Art:

M.F.A.
M.A.

DEGREE REQUIREMENTS FOR THE M.F.A.

Required Courses
B0100, B0200: Projects in Drawing I and II 6
B0300: Visual Concepts and Stylistic Traditions 3
B0400: Issues in Contemporary Art 3
B0500: Teaching and Professional Development 3
B0600: Thesis Preparation 3

Elective Courses
Studio courses in area of specialization 15
Studio electives 15
Art History and Theory Courses 6

Total Credits 54

Additional Requirements for the M.F.A.

At the discretion of the Graduate Committee, a maximum of six credits of graduate work in other departments may be substituted for elective courses.

End of Semester Reviews: The Graduate Committee and the department chair will review and evaluate the work of all candidates for the M.F.A. degree at the end of each semester.

Thesis Exhibition and Statement: In the final semester, candidates for the M.F.A. degree are required to demonstrate their professional competence by exhibiting a body of work and presenting a written statement about it, both of which will be reviewed and evaluated by the departmental Graduate Committee and the department chair.

Deposit of Slides: All M.F.A. candidates must provide the department with visual documentation of their work as part of the requirements for the degree.

Transfer Credits
At the discretion of the Graduate Committee, no more than twelve credits of graduate work in art may be transferred from institutions within the CUNY system. No more than six such credits may be transferred from other institutions.

Graduate Studios
Matriculated students in the M.F.A. Program are granted studios for 5 semesters. Graduate students who take longer than 5 semesters to complete their program must consider this and plan accordingly.

Advisors
M.F.A.: Professor M. Itami
M.A.: Professor H. Senie

DEGREE REQUIREMENTS FOR THE M.A.

Art History Specialization

Required Courses
A1000: Research Methods of Art History [if not taken as an undergraduate] 0-3
B7000: Museology 3
B7100, B7200: Museum Apprenticeship I and II 6
B7400: Museum Exhibition Analysis Seminar 3
B9000: Master’s Thesis Research 3

Elective Courses
Graduate courses in Art History or other relevant topics 12-15

Urban Museum Studies Specialization

Required Courses
A1000: Research Methods of Art History [if not taken as an undergraduate] 0-3
B7000: Museology 3
B7100, B7200: Museum Apprenticeship I and II 6
B7400: Museum Exhibition Analysis Seminar 3
B7600: Urban Museum Studies 3
B9000: Master’s Thesis Research 3

Elective Courses
Graduate courses in American studies, anthropology, English, history, art history and museum studies and other disciplines as appropriate 9-12

Total Credits for M.A. in Museum Studies or Urban Museum Studies Specialization 30

Additional Requirements for the M.A.

Thesis: In the Art History, Museum Studies, and Urban Museum Studies Specializations, candidates are required to complete a written thesis demonstrating competence in scholarly research in the fields of art history or museum studies.
Comprehensive Examination: Not required.

Foreign Language Proficiency: Candidates for the M.A. degree in Art History, Museum Studies or Urban Museum Studies specializations must demonstrate a reading proficiency in a foreign language approved by their graduate advisor. An examination in that language must be taken during their first year of graduate study.

Transfer Credit: At the discretion of the program director, no more than six credits of graduate work in art may be transferred.

M.A. in Art Education
See the School of Education section of this Bulletin.

FACILITIES

Art Gallery
The Art Department’s dedicated gallery space displays work of undergraduates, graduate students and professional artists, and specially curated exhibitions. Approximately 2000 sq. ft. in size, the gallery accommodates two- and three-dimensional art. At least one group exhibition of graduate student work is organized every academic year in the Art Department Gallery. The gallery is also the venue for each MFA candidate’s required thesis exhibition.

Ceramics
The facilities include a large open work area with 18 pottery wheels, a slab roller, an extruder, and a kiln room with three electric kilns. Various clay bodies are used for utilitarian, sculptural and architectural ceramics, with equal emphasis on clay’s multicultural traditions, e.g., Egyptian paste, majolica, raku, etc.

Electronic Design and Multimedia
The electronic design studio incorporates two general purpose computer labs, two specialized digital media labs, a print center and a design studio classroom, facilitating interaction between traditional and digital design production. The computer labs include: a multi-purpose lab for design, publishing and illustration; a multimedia lab for animation, interactive multimedia and web design; and two specialized labs focusing on digital video, 3-D animation and digital media integration. The electronic design studio is equipped with industry-standard computers configured for design and multimedia and running current graphics and multimedia software. With an open studio policy for currently enrolled students, the lab is available over 60 hrs./wk. under the supervision of the lab manager, faculty and lab assistants. This facility mirrors the real-world graphics environments found in industry in order to better prepare students for positions in the field. These facilities are normally available to students enrolled in courses in the specialization.

Painting and Drawing
The painting and drawing rooms are equipped with architectural-quality drafting tables and large easels. A studio area is set aside for work in encaustic and water-based media, and for the study of painting methods, materials and techniques. Each studio has wall space for critiques and large-scale projects. Model platforms, mat cutters, props and tools for the construction of painting supports are available.

Photography
The facility houses a large, group black/white darkroom, a color darkroom and processing lab, private darkrooms, a studio, a process camera room, and a mounting/finishing area. Equipment includes Beseler and Omega enlargers, a Colenta processor and a NuArc process camera. The David and Lenore Levy Collection of Contemporary Photography is available for student and faculty use. These facilities are normally available to students enrolled in courses in the specialization.

Printmaking
The studio is equipped for the teaching of intaglio, lithography, relief processes including woodcut and linocut, collagraph, carborundum aquatint, water-based silk-screen, photo-printmaking in etching, silkscreen and lithography and combinations of all the print media. There are three etching, one relief and two lithography presses, a 62” x 62” NuArc plate maker with a deep well blanket, plate cutter, large hot plate, aquatint box, large aluminum bed for lithographic plates, lithographic stones in a full range of sizes, queen size drying rack, numerous rollers of various durometers and dimensions, hydrobooth and hydroblaster for silk screen and a large copy camera to facilitate the production of oversize images. The integration of equipment for photographic processes with conventional printmaking equipment allows for the full range of printmaking experiences. These facilities are normally available to students enrolled in courses in the specialization.

Sculpture
Metal fabrication using mig welding, plasma cutting, plaster, stone, clay and wood carving, wood assemblage and construction are some of the techniques used to produce traditional and non-traditional three-dimensional art. Performance art and intermedia fabrications are designed and executed in an adjacent facility. A basic wood design shop with table saw, joiner, surfacer and band saws handles one-of-a-kind and production furniture. These facilities are normally available to students enrolled in courses in the specialization.

Slide Library
Consisting of over 100,000 slides of works from prehistoric times to the present, the collection includes painting, sculpture and architecture of Africa, the Americas, Asia, and Europe, as well as ceramics, ivories, metalwork, manuscripts, printmaking, photography, textiles, interior design and comparative materials.

DEPARTMENT ACTIVITIES

Art Department
The Department sponsors exhibitions, guest lectures and appearances by visiting artists throughout the academic year.
Student Art Society
The Graduate Art Students Society is the primary student organization. The group, open to all graduate students, participates in department activities and generally promotes and stimulates various activities and events at the College.

AWARDS AND SCHOLARSHIPS

The Therese McCabe Ralston Connor Awards
For the study of art and art history.

The Holly Popper Scholarship
For an outstanding female graduate of the CCNY Art Department to study in the College’s M.F.A. program.

Ralph Fabri Scholarship
For the outstanding M.F.A. thesis exhibition.

Seymour Peck Scholarships and Creative Awards in the Arts
To outstanding undergraduate and graduate majors in the arts.

COURSE DESCRIPTIONS

Courses Required of All M.F.A. Candidates

B0100, B0200: Projects in Drawing I and II
Investigation of various drawing media and techniques for the purpose of enlarging the student’s conceptual scope and professional skills. 4 HR./WK.; 3 CR. EACH

B0300: Visual Concepts and Stylistic Traditions
Analysis of the components of traditional styles and movements. Student reports, papers and discussion. Open to M.A. candidates by permission of the graduate advisor. 3 HR./WK.; 3 CR.

B0400: Issues in Contemporary Art
Investigation of the conceptual implications of contemporary movements in the visual arts. Student reports, papers and discussion. Open to M.A. candidates by permission of the graduate advisor. 3 HR./WK.; 3 CR.

B0500: Teaching and Professional Development
This course is designed to introduce the student to the practice of teaching studio art and professional practices in his/her field. Prereq.: 6 credits in his/her area of specialization. 4 HR./WK.; 3 CR.

B0600: M.F.A. Thesis Preparation
This course guides students in their preparation of both written theses and thesis exhibitions. Readings and analysis of writings about art by artists and others. Writing about artwork and documentation of the experience of making the work. This class must be taken during the last two semesters of the student’s residence in the M.F.A. program. 3 HR./WK.; 3 CR.

Elective Courses in Studio Art

B1100: Individual Projects in Painting
Intensive work under faculty supervision. Individual and group critiques. This course may be taken five times for credit. 4 HR./WK.; 3 CR. EACH

B1200: Individual Projects in Sculpture
Intensive work under faculty supervision. This course may be taken five times for credit. 4 HR./WK.; 3 CR. EACH

B1300: Individual Projects in Printmaking
Intensive work under faculty supervision. This course may be taken five times for credit. 4 HR./WK.; 3 CR. EACH

B1400: Individual Projects in Electronic Design and Multimedia
Intensive work under faculty supervision, of which a part shall be scheduled class hours. This course may be taken five times for credit. 4 HR./WK.; 3 CR. EACH

B1500: Individual Projects in Photography
Intensive work under faculty supervision. This course may be taken five times for credit. 4 HR./WK.; 3 CR. EACH

B1600: Individual Projects in Ceramic Design
Intensive work under faculty supervision. His course may be taken five times for credit. 4 HR./WK.; 3 CR. EACH

B8051-8099: Selected Topics in Studio Art
Advanced study in selected subjects outside of the regular curriculum. Course announcements will be made in the preceding semester. 4 HR./WK.; 3 CR. EACH

B8400-B8700: Independent Study in Studio Art
Enrollment with permission of the graduate advisor. HRS. TO BE ARRANGED; 3 CR. EACH

Courses in the History, Theory, and Criticism of Art

These courses may be taken by M.F.A. and Graduate Art Education students.

A1000: Research Methods of Art History
Working methods of the art historian. Techniques for obtaining primary and secondary source material, including use of traditional archival and bibliographical materials, electronic information systems, interviewing techniques, and photographic documentation. Introduction to different approaches to objects and their contexts. Development of a variety of writing modes. Field trips; class reports. 3 HR./WK.; 3 CR.

A6000: Egyptian Art and Architecture
Painting, sculpture, architecture and decorative arts of Egypt from pre-dynastic times through the Ptolemaic period. 3 HR./WK.; 3 CR.

A6020: Greek and Roman Art
Art of the Classical civilizations: Greece from the Geometric period through the Hellenistic era; the Etruscan contribution; Rome from the Republican period through late Imperial times. 3 HR./WK.; 3 CR.

A6100: Romanesque and Gothic Art of Medieval Europe
Art of the later Middle Ages: architecture, sculpture, manuscripts, stained glass, emphasis on French cathedrals, regional schools in emerging national states, and Byzantine influence on the West. 3 HR./WK.; 3 CR.

A6200: Italian Renaissance Art and Architecture
An overview of the painting, sculpture, and architecture created in Italy during the fourteenth, fifteenth, and sixteenth centuries. Discussion will focus on the needs and ambitions of private, civic, and ecclesiastical patrons as well as the creative responses of individual artists from Giotto to Michelangelo. 3 HR./WK.; 3 CR.

A6220: Northern Renaissance Art
An overview of painting, sculpture, and printmaking created in Northern Europe during the fourteenth, fifteenth, and sixteenth centuries. Trace the development of naturalism and humanism in France, Germany, and the Netherlands as well as the dialogue between Northern Europe and Italy during the Renaissance. Discussion will explore the needs and ambitions of private, civic, and ecclesiastical patrons as well as the creative responses of individual artists from Van Eyck to Bruegel. 3 HR./WK.; 3 CR.
A6300: Baroque and Rococo Art in Europe
Seventeenth and eighteenth century art in Italy, France, Spain, and Holland. Artists include Bernini, Poussin, Caravaggio, Artemisia Gentileschi, Velazquez, Rubens, Rembrandt and Vermeer. 3 HR./WK.; 3 CR.

A6400: Nineteenth Century Art in Europe
The art of western Europe, primarily France, including Romanticism, Realism, Impressionism and Post-Impressionism. 3 HR./WK.; 3 CR.

A6410: American Art: 1776-1900
Art of the United States from colonial times to the late nineteenth century; consideration of European influences and regional contributions in the development of American architecture, sculpture and painting. 3 HR./WK.; 3 CR.

A6420: History of Photography
The aesthetic, historical and technical development of still photography viewed as a major medium of artistic expression in the nineteenth and twentieth centuries. 3 HR./WK.; 3 CR.

A6430: Early Modern Art in Europe and the U.S.
The development of early modern art styles in France, Germany, Italy, Russia, and the U.S. including Fauvism, Cubism, Futurism, Constructivism, Expressionism, Dada and Surrealism. 3 HR./WK.; 3 CR.

A6440: Postwar Art in the U.S. and Europe
Art from 1945 through 1980 in the U.S. and Europe, including Abstract Expressionism, Pop Art, Minimal Art, Conceptual Art, the development of earthworks and public art, feminist and other issue-based art. 3 HR./WK.; 3 CR.

A6450: Modern Art in Latin America
An overview of the various currents of modernism that developed in Latin America from 1900 to 1945. Emphasis will be placed on the artistic production of certain countries, such as Mexico, Brazil, Argentina, Cuba, and Uruguay. 3 HR./WK.; 3 CR.

A6500: Art Since 1980
Art since 1980 taught from a global perspective. Includes visits to galleries, conversations with artists. Prereq.: A6440 3 HR./WK.; 3 CR.

A6510: Contemporary Art in Latin America
Artistic manifestations in post-World War II Latin America, including the work of diaspora artists and Latino/a artists in the United States. 3 HR./WK.; 3 CR.

A6600: Ancient Art of Meso-America, the Andes, and the Caribbean
A survey of sculpture, architecture, the town plan, and crafts in select pre-European cultures of the Caribbean Basin, the Andes and Meso-America including the Taino, the Inca, and the Aztecs. 3 HR./WK.; 3 CR.

A6610: North American Indian Art
A survey of select artistic traditions of native North American Indian art including Aleut and Inuit. Emphasis on artistic context as a synthesis of regional and cultural-historical phenomena. 3 HR./WK.; 3 CR.

A6700: Art of West Africa: From the Bissagos to the Cameroon Grasslands
A survey of traditions that generate the interface of visual and performance arts, place and architecture among the Akan, Bamana, Bamilike, Baule, Dan, Dogon, Edo, Fon, Moshi, Senufo, Yoruba, and their neighbors. The archaeology of “the Valleys of the Niger” is included. 3 HR./WK.; 3 CR.

A6710: Art of Central Africa: Central, East and Southern Africa from Gabon to Mozambique
Arts of chiefdoms and kingdoms of the equatorial forests and savannas from Equatorial Guinea to Mozambique. An interdisciplinary survey of traditions that generate the interface of visual and performance arts, place and architecture. Arts of the Chokwe, Fan, Konde, Kongo, Kuba, Kwele, Luba/Hemba, Nyamwezi, Mangbetu, Ndebele, Pende, Saremo, Songye, Tabwa, Zula, and their neighbors. The archaeology of Zimbabwe and the East African coast. 3 HR./WK.; 3 CR.

A6800: Islamic Art
Architecture and decorative arts of the Islamic world including Syria, Egypt, Persia, Turkey, Spain, and northern India. 3 HR./WK.; 3 CR.

A6810: Art of India, Southeast Asia, and Indonesia
Buddhist, Jain and Hindu art in India; Buddhist and Hindu art in Southeast Asia and Indonesia. 3 HR./WK.; 3 CR.

A6820: Art of China, Japan, and Korea
The art and architecture of China, Japan, and Korea from prehistoric times to the nineteenth century. 3 HR./WK.; 3 CR.

A6900: Art Criticism
Problems of description, analysis, interpretation, and evaluation of the art object as an aesthetic and cultural phenomenon in the context of historical approaches and styles; various systems and premises of critical analysis that have emerged from ancient to contemporary times. 3 HR./WK.; 3 CR.

Courses in Museum Studies
B7000, B7100, B7200, and B7400 are required of all Museum Studies students. They may be taken by M.F.A. and other M.A. candidates, with permission of the Graduate Advisor and Director of Museum Studies.

A7000: Museology
Introduction to history of museums and current issues. Four sessions taught by museum professionals in local institutions. 3 HR./WK.; 3 CR.

A7100, B7200: Museum Apprenticeship I and II
Supervised internships at local museums, galleries or other art institutions. TWO DAYS WORK PER WEEK EACH COURSE; 3 CR. EACH

B7400: Museum Exhibition Analysis Seminar
Discussion of approximately six current museum exhibitions, chosen to provide a unifying theme, such as reevaluating the retrospective. Each student will present a class lecture and museum tour evaluating the substance and installation of a major exhibition. Prereq: graduate standing or permission of the instructor. 3 HR./WK.; 3 CR.

A7500: Museum Education
Techniques and methods of museum education. Regular meeting in museums with working professionals. Prereq: graduate standing or permission of the instructor. 3 HR./WK.; 3 CR.

B7600: Urban Museum Studies
Introduction to the use of the urban environment and its history as a subject for museum interpretation. Prereq: graduate standing or permission of the instructor. 3 HR./WK.; 3 CR.

B8000-B8050: Selected Topics in Art History
Advanced study in selected subjects outside of the regular curriculum. Course announcements to be made in the preceding semester. 3 HR./WK.; 3 CR.

B9000: Master’s Thesis Research
Enrollment by permission of the graduate advisor. HRS. TO BE ARRANGED; 3 CR.

B9800, B9900: Independent Study in Art History
Enrollment by permission of the graduate advisor. HRS. TO BE ARRANGED; 3 CR. EACH
FACULTY

Becca Albee, Assistant Professor
B.A., Evergreen State College; M.F.A., Univ. of North Carolina Chapel Hill

David Burns, Assistant Professor
A.A.S., Parsons School of Design; B.A., Univ. of South Florida; M.F.A., Parsons School of Design

Colin Chase, Associate Professor and Chair
A.A.S., Fashion Institute of Technology; B.F.A., Cooper Union; M.F.A., Univ. of Michigan

Leopoldo Fuentes, Assistant Professor
B.F.A., California State Univ. (Los Angeles); M.F.A., Northwestern Univ.

Bruce Habegger, Assistant Professor
B.A., CUNY; M.A., The City College

Ellen Handy, Associate Professor
B.A., Barnard College; Ph.D., Princeton Univ.

Anna Indych, Assistant Professor
B.A., New York Univ, M.A., Ph.D.

Michi Itami, Professor
B.A., Univ. of California (Los Angeles); M.A., Univ. of California (Berkeley)

Catti James, Associate Professor

Anne Leader, Assistant Professor
B.A., Emory Univ.; M.A., New York Univ., Ph.D.

Sylvia Netzer, Professor
B.A., The City College; M.F.A., Columbia Univ.

George N. Preston, Professor
B.A., The City College; M.A. Columbia Univ., Ph.D.

Ina Saltz, Associate Professor
B.F.A., The Cooper Union

Harriet F. Senie, Professor
B.A., Brandeis Univ.; M.A., Hunter College; Ph.D., New York Univ.

Annette Weintraub, Professor
B.F.A., Cooper Union; M.F.A., Univ. of Pennsylvania

PROFESSORS EMERITI

Robert E. Borgatta
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Madeleine Gekiere
Irving Kaufman
Jacob Landy
Jay Milder
Seong Moy
Juan Nickford
Elizabeth O’Connor
Joan Webster Price
Annie Shaver-Crandell
William Spinka
Stanley Wyatt
Department of Biology
(DIVISION OF SCIENCE)

Professor Jane Gallagher, Chair • Department Office: Marshak 526 • Tel: 212-650-6800

GENERAL INFORMATION

The City College offers the following master’s degree in Biology:

M.A.

PROGRAMS AND OBJECTIVES

Areas of specialization include Animal Behavior, Neuroscience and Physiology, Cell and Molecular Biology and Genetics, and Ecology, Evolution and Systematics.

DEGREE REQUIREMENTS

A student may elect one of two routes to the M.A. Degree in Biology: either writing a thesis or passing a Comprehensive Examination.

Thesis Option

Required Courses

V9100: Colloquium (1 cr. each term) 2
B9901: Thesis Research 3
B9902: Thesis Research 3

Elective Courses

Graduate courses in an approved area of specialization minimum 12
Additional elective courses 10

Total Credits for Thesis Option 30

Comprehensive Exam Option

Required Courses

V9100: Colloquium (1 cr. each term) 2

Elective Courses

Graduate courses in an approved area of specialization minimum 12
Additional elective courses 20
(may include up to 6 credits of V9200: Tutorial, or V9201: Advanced Study)

Total Credits for Comprehensive Exam Option 34

Additional Requirements:

Elective courses are to be chosen in consultation with the advisor and are subject to the approval of the Departmental Graduate Studies Committee.

Thesis: Candidates must complete a thesis based on independent laboratory or field investigation and pass an oral defense of the thesis. The faculty member selected by the student as research sponsor subsequently will serve as advisor and chairman of an Advisory Committee of three.

This committee will serve in the preparation and approval of the thesis proposal, the thesis, and defense of the thesis.

Comprehensive Exam: Candidates not offering a thesis must pass a written and oral comprehensive examination during the final semester of study. A student who has applied to the doctoral program is permitted to take the first doctoral examination in lieu of the Comprehensive Exam.

TOEFL Requirements: Foreign students must submit a minimum TOEFL score of 550.

Foreign Language Proficiency: Not required.

Application Deadlines: Completed applications must be sent by Admissions to the Department no later than May 1 for the Fall Semester and Dec. 1 for the Spring Semester.

AFFILIATED PROGRAMS

City College has a long-standing affiliation with curators at the American Museum of Natural History for graduate education in systematics. Admission to the AMNH programs requires approval by AMNH curators as well as CCNY faculty. Interested students are encouraged to contact curators directly to discuss potential research projects.

ADVISEMENT

Students interested in entering the M.A. Program should contact:

Master’s Advisor
Department of Biology
The City College of New York
New York, NY 10031
Telephone: (212) 650-6800

Enrolled students should consult one of the following advisors:

M.A. Candidates
Professor Ralph Zuzolo
Ph.D. Candidates
Professor Shuba Govind

B2700: Principles of Ecology
Structure and function in ecological systems and the effects of human activities on their biotic and abiotic components. Required for landscape architects. Education students may register by permission of the Biology Department. Not open to students in the Science Division. 3 LECT. HR./WK.; 3 CR.

B4700: Botany for Landscape Architects
Study and identification of local flora and their possible use in urban landscaping. The structure, function, growth and propagation of plants will be considered to their natural habitats. Botanical gardens and arboreta will be visited. Required for landscape architects. Education students may register by permission of the Biology Department. Not open to students in the Science Division. 2 LECT., 2 LAB. OR FIELD HR./WK.; 3 CR.
ECOLOGY, EVOLUTION, AND SYSTEMATICS

B5800 Microbial Ecology
Interrelations of microorganisms with other organisms and the abiotic environment.
2 LECT. 4 LAB HR./WK., OR A FIELD TRIP; 4 CR.

V0503: Evolution
Study of the mechanism and processes of evolution. Theory, laboratory experimental results and the phenomena found in natural populations are described and discussed in relation to population genetics, speciation and megaevolution. Prereq: course in genetics, vertebrate or invertebrate zoology, botany or permission of instructor. 3 LECT. HR./WK.; 3 CR.

V0507: Fossil Record
3 LECT. HR./WK.; 3 CR.

V0603: Principles of Systematics
Lecture and discussion sections involving general principles of biological systematics, including fundamentals of nomenclature, phylogenetic theory, character analysis, and their use of relevant computer algorithms. Readings from the primary literature as well as text sources will be emphasized. 3 LECT. HR./WK., PLUS CONF.; 4 CR.

V0611/12: Systematics and Evolution of Insects and Spiders
Lectures emphasize basic knowledge and recent advances in the systematics, biogeography, morphology, behavior, and paleontology of these arthropods. Major families of the world will be emphasized. Labs involve fieldwork, personal collections, identifications, techniques, and small research projects. 2 LECT. HR./WK., 2 CR.; 4 LAB HR./WK., 2 CR.

V0733/34: Zoology and Phylogeny of Chordata (Mammals)
Lecture, laboratory. Origin, adaptive radiation, morphology, ecology and systematics of mammals. Discussion of the reptile-mammal transition emphasizing the fundamental characters of teeth, ear structure and tarsal bones. Survey of mammalian orders and practical work in laboratory on living families and local species, including field methods and preparation of specimens for study. Lecture and laboratory are integrated; the course cannot be taken in separate parts. Prereq: course in vertebrate comparative anatomy. 2 LECT. HR./WK., 2 CR.; 5 LAB HR./WK., 2 CR.

V0743/44: Zoology and Phylogeny of Chordata (Birds)
Lecture, laboratory, special topics in the evolution of birds. Prereq: permission of the instructor. 2 LECT. HR./WK., 2 CR.; 4 LAB HR./WK., 2 CR.

V0901/02: Population Genetics
Lecture, laboratory. The Hardy-Weinberg law, gene pools, gene frequencies, and gene migration. Prereqs: a course in genetics, a course in organic chemistry. 3 LECT. HR./WK., 3 CR.; 6 LAB HR./WK., 3 CR.

V0603/04: Community Ecology
Lecture, laboratory. Structural attributes, growth, and regulation of plant and animal communities. Prereq: a course in either ecology or field biology. 3 LECT. HR./WK., 3 CR.; 6 LAB HR./WK., 3 CR.

V6005/06: Population Ecology
Lecture, laboratory. An analysis of the structure and dynamics of plant and animal populations. Topics include density, growth, regulation, fluctuation of numbers, niche, dispersal systems, dispersion patterns, demographic techniques, and interactions between populations. 3 LECT. HR./WK., 3 CR.; 6 LAB HR./WK., 3 CR.

V6101/02: Ecology of Marine Plankton
Lecture, laboratory. Biology, productivity and trophic dynamics of marine plankton. Prereq: a course in biological oceanography, a course in organic chemistry. 3 LECT. HR./WK., 3 CR.; 6 LAB HR./WK., 3 CR.

V6200/01: Physiological Ecology
Comparative study of physiological mechanisms important in adaptation to different environments. Focus is on the biotic and abiotic factors in the habitat and the adaptations that determine an animal’s ability to survive. Prereq: a course in physiology or cell biology. 3 LECT. HR./WK., 3 CR.; 6 LAB HR./WK., 3 CR.

V6701/02: Biology of Fishes
Lecture, laboratory. 3 LECT. HR./WK., 3 CR.; 6 LAB HR./WK., 3 CR.

V9001: Seminar in Evolution
Topics relating to the general subject of evolution. 2 HR./WK., PLUS CONF.; 3 CR.

V9006: Seminar in Ecology
The conservation ecology seminar will focus on genetic problems and implications of wildlife management programs. Prereq: permission of the instructor. 3 HR./WK.; 3 CR.

V9012: Seminar in Zoogeography
Special topics are discussed and reviewed. Prereq: permission of the instructor. 2 HR./WK., PLUS CONF.; 3 CR.

V9030: Seminar in Ecology, Evolution, and Behavior
AMNH (Alternate weeks). 2 HR./WK.; 1 CR.

CELL AND MOLECULAR BIOLOGY AND GENETICS

B7400: Cell Microsurgery
Lecture, laboratory. The course is designed to teach the principles and operation of micromanipulators for experimental cell research. Prereqs: undergraduate background in cell biology or cell physiology or equivalent and permission of instructor. 6 LAB. HR./WK.; 3 CR.

V0005: Genetics
Prokaryotic and eukaryotic genetics; organization of DNA, replication, repair, mutagenesis, recombination, control of gene expression, genetic engineering and molecular techniques. Prereq: undergraduate genetics and molecular biology or biochemistry. 4 LECT. HR./WK.; 4 CR.

V0103: Microbial Genetics
Microbial genetic systems will be examined with respect to their contributions to the understanding of molecular mechanisms of recombination, repair of genetic material, and regulation of gene expression. Emphasis will be placed on the procedures and the role of the new biotechnology. Prereq: V0005 or equivalent. 3 LECT. HR./WK.; 3 CR.

V0803: Molecular Evolution
Principles of evolution at the level of DNA and proteins; gene families, concerted evolution of genes, codon bias, and other genetic processes will be discussed. 3 LECT. HR./WK.; 3 CR.

V1401: Cell Biology
Cells will be studied with special emphasis placed on organization, molecular structure/function relationships of organelles, and energetics and metabolism. Prereq: a course in organic chemistry and a course in biochemistry or permission of the instructor. 4 LECT. HR./WK.; 4 CR.

ANIMAL BEHAVIOR, NEUROSCIENCE, AND PHYSIOLOGY

V2101: Animal Physiology I
This course includes an introduction to physiology; cell structure and function of specialized cells; cellular metabolism; thermodynamics, kinetics and energetics; nutrition, feeding, digestion and metabolism; respiration; circulation; temperature; and locomotion. 4 LECT. HR./WK.; 4 CR.
V2102: Animal Physiology II
Physiological control mechanisms, including regulation of water and ions; rhythms and physiological states; growth, maturation and aging; self-recognition systems and adaptation to environmental extremes. 4 LECT. HR./WK.; 4 CR.

V2301: Neuroscience I
This course and V2302 comprise an introduction to the neurosciences. The first semester covers neuronal cell biology (structure and trophic functions), cellular neurophysiology (membrane physiology, action potentials), synapses (neurotransmitters and physiology), neuroendocrine mechanisms, local neuronal circuits (integrative anatomical organization of the vertebrate nervous system). The second semester will cover the sensory and motor systems, as well as neurochemical pathways. Receptor physiology and information processing are discussed in brief for the somatosensory system and in detail for the visual and auditory systems. The vertebrate motor systems are discussed with respect to spinal, supraspinal and cortical mechanisms. Prereq: students with no background in physiology must meet instructor before course begins. 4 LECT. HR./WK.; 4 CR.

V2302: Neuroscience II
Building upon materials covered in Neuroscience I, this course provides an introduction to sensory processing for several sensory systems, outlines the important developmental processes with a specific focus on the functional differentiation of the brain. 3 LECT., 1 CONF. HR./WK.; 4 CR.

V2403: Animal Behavior I
Lectures and discussions of selected major areas in modern animal behavior research. Included among the topics are conceptual issues in methodology, orientation and navigation, and development of behavior. A modern eclectic approach is emphasized. Students read and lead discussion of papers from the original literature. Prereq: an undergraduate course in animal behavior/comparative psychology or permission of the instructor. 3 LECT. HR./WK.; 3 CR.

V2404: Biological Basis of Animal Behavior Laboratory
Apprenticeship training in the laboratories of behavioral scientists. Prereqs: undergraduate laboratory course in animal behavior (Bio 46000 or equivalent) and permission of the instructor. 6 LAB HR./WK.; 3 CR.

V2407: Animal Behavior II
Lecture and discussion of the selected major areas in modern behavioral research. Topics include behavioral genetics, the evolution of behavior, and behavioral ecology. Prereq: an undergraduate course in animal behavior, evolution or ecology. 3 HR./WK; 3 CR.

V2505: Animal Communication
V2601/02: Comparative Animal Physiology
Study of the physiological mechanisms common to a wide variety of animals. Focus is on the underlying physiochemical processes and functions of organ systems. Prereq: a course in physiology or cell biology. 3 LECT. HR./WK., 3 CR.; 6 LAB HR./WK., 3 CR.

V9101: Colloquium in Ecology, Evolution and Behavior
AMNH (Alternate weeks). 2 LECT. HR./WK.; 1 CR.

GENERAL
B9700: Special Topics
3 LECT HR./WK., 3 CR.; 6 LAB HR./WK., 3 CR.

V4103/04: Radiation Biology
Lecture, laboratory. A broad unified coverage of the effects of ionizing radiation and the application of tracer techniques in biological systems at the molecular, cellular, organ, organism, and community levels. Pre- or coreq: Cell Physiology. 2 LECT. HR./WK., 2 CR.; 4 LAB HR./WK., 2 CR.

V7200: Biological Electron Microscopy
Preparation of materials and their examination by means of Transmission and Scanning electron microscopes. Techniques include methods of fixation and embedment for TEM; thin sectioning, staining, critical point drying, sputter coating, microscope operation, photography, and dark room procedures. Students will complete a project of their choosing to demonstrate their ability to use their new skills. 2 LECT., 4 LAB HR./WK., PLUS 3 HR. TBA; 4 CR.

V8101: Mathematical Biology
3 LECT. HR./WK.; 3 CR.

V8201: Biostatistics I
Univariate statistics of biological systems (theory and application). Topics include: probability, descriptive statistics, correlation, analysis of variance, and regression. Prereq: permission of instructor. 3 LECT., 6 LAB HR./WK.; 6 CR.

V9100: Colloquium
Recent developments and trends in the field of biology. Required of all candidates for the M.A. degree. 2 HR./WK.; 1 CR./SEM.

V9200: Tutorial
1-4 CR.

V9201: Advanced Study
Study in an area where formal course work is not given. Subject matter may vary from assigned current readings in a specialized area with reports to special laboratory or field work. Prereq: permission of instructor. 1-4 CR.

V9302: Molecular Biology Journal Club
1 CR.

V9303: Seminar Special Topics
Specialized seminars in diverse fields, depending upon the needs of specific students. 2 HR./WK., PLUS CONF.; 3 CR.

GRADUATE COURSES OPEN TO UNDERGRADUATES

The following graduate courses are available to undergraduate students who have completed the appropriate prerequisites. Permission to take these courses must be obtained from the Biology Department Graduate Deputy Chairman and course instructor.

V0901/02: Population Genetics
Lecture, Laboratory

V4103/04: Radiation Biology Lecture, Laboratory

V2800: Field Studies in Animal Behavior

V5303: Molecular Basis of Development

V6003/04: Community Ecology Lecture, Laboratory

V6005/06: Population Ecology

V6107/08: Marine Microbiology Lecture, Laboratory

V7200: Biological Electron Microscopy

V8101: Mathematical Biology

V8201: Biostatistics I

V2403: Animal Behavior II

V2407: Animal Behavior II

FACULTY

Mary Alpaugh, Assistant Professor
B.S., King’s College; Ph.D., Univ. of Houston

Robert P. Anderson, Assistant Professor
B.A., Kansas State Univ.; Ph.D., Univ. of Kansas

Amy Berkov, Assistant Professor
B.A., Univ. Colorado; Ph.D., CUNY
William M. O. Boto, Professor  
B.Sc., Makerere Univ.; M.Sc., Harvard Univ.; Ph.D., Univ. of Massachusetts Medical School

Rochelle Buffenstein, Professor  
B.S., Univ. Cape Town, Ph.D.

David Eastzer, Assistant Professor  
B.S., Cornell Univ.; M.S., The City College; Ph.D., Univ. North Carolina (Chapel Hill)

Jay A. Edelman, Assistant Professor  
A.B., Univ. of California, Ph.D.

Jane C. Gallagher, Professor and Chair  
B.S.–A.M., Stanford Univ.; Ph.D., Univ. of Rhode Island

Robert P. Goode, Professor  

Shubha Govind, Professor  
B.S., M.S., Delhi Univ.; Ph.D., Univ. Illinois (Urbana-Champaign)

Jerry Guyden, Professor  
B.A., North Texas State, M.S.; Ph.D., Univ. of California

Sally Hoskins, Professor  
B.S., Univ. of Illinois; Ph.D., Univ. of Chicago.

Karen Hubbard, Associate Professor  
B.A., Barat College; Ph.D., Illinois Inst. of Tech.

John J. Lee, Distinguished Professor  
B.S., Queens College; M.A., Univ. of Massachusetts; Ph.D., New York Univ.

Daniel Lemons, Professor and Dean, Center for Worker Education  
B.A., Goshen College; M.S., Portland State Univ.; Ph.D., Columbia Univ. Medical School

Jonathan B. Levitt, Associate Professor  
B.A., Univ. of Pennsylvania; M.A., New York Univ., Ph.D.

Christine Li, Associate Professor  
A.B. Barnard; M.S., Columbia; Ph.D., Harvard

Mark Pezzano, Assistant Professor  
B.S., William Paterson; Ph.D., CUNY

Robert Rockwell, Professor  
B.S., Wright State, M.S.; Ph.D., Queen’s Univ., Kingston (Canada)

Ofer Tchernichovski, Associate Professor  
B.Sc., Tel Aviv Univ.; DVM, The Hebrew Univ.; Ph.D., Tel Aviv Univ.

Tadmiri R. Venkatesh, Associate Professor  
B.S., Univ. of Mysore, India; M.S., Birla Institute of Technology and Science, India; Ph.D.

Joshua Wallman, Professor  
A.B., Harvard Univ.; Ph.D., Tufts Univ.

Ralph C. Zuzolo, Professor  
A.B., New York Univ., M.S., Ph.D.

PROFESSORS EMERITI  
Donald Cooper  
Lawrence J. Crockett  
Rose R. Feiner  
Joseph Griswold  
James Kendall  
Kumar Krishna  
Louis Levine  
Linda H. Mantel  
Olivia McKenna  
James A. Organ  
Robert A. Ortmann  
Gerald S. Posner  
Janis A. Roze  
Norman M. Saks  
Robert J. Shields  
Carol Simon  
William N. Tavolga  
John H. Tietjen  
Aaron O. Wasserman  
Stanley C. Wecker

AFFILIATED FACULTY  
George Barrowclough (American Museum of Natural History)  
Patricia Broderick (CUNY Medical School)  
David Calhoun (Chemistry Department)  
Fred Cooke (Queen’s University, Kingston, Canada)  
Joel Cracraft (American Museum of Natural History)  
Darrel Frost (American Museum of Natural History)  
David Grimaldi (American Museum of Natural History)  
Davi McCbeth (CUNY Medical School)  
Paula Mikkelsen (American Museum of Natural History)  
Carol Moore (CUNY Medical School)  
Ross Nehm (School of Education)  
Michael Novacek (American Museum of Natural History)  
Norman Platnick (American Museum of Natural History)  
Marcello Prendini (American Museum of Natural History)  
Randall Schuh (American Museum of Natural History)  
Mark Siddall (American Museum of Natural History)  
Nancy Simmons (American Museum of Natural History)  
Mark Steinberg (Department of Chemistry)  
Melanie Stiassny (American Museum of Natural History)  
Robert Voss (American Museum of Natural History)  
John Wahlert (Baruch College of CUNY)  
Ward Wheeler (American Museum of Natural History)
The City College offers the following master’s degree in Chemistry:

**M.A.**

**PROGRAMS AND OBJECTIVES**

The Chemistry Department, established in 1849, offers rigorous and up-to-date graduate level instruction and research training in the following areas:

- Analytical Chemistry
- Biochemistry
- Environmental Chemistry
- Inorganic Chemistry
- Organic Chemistry
- Physical Chemistry

The M.A. curriculum is flexible, and programs of study are available for students planning to go into industry, governmental service, the health-oriented professions, and secondary school education.

For students wishing to pursue advanced studies in the above areas, the Doctor of Philosophy degree is offered by The City University. The office of the Ph.D. program is at The City University Graduate Center, 365 Fifth Avenue, New York, N.Y. 10016.

**DEGREE REQUIREMENTS**

The Graduate Committee may waive any required course. Graduate courses from other departments may be taken if approved by the advisor.

### Chemistry Option

**Required Courses**

- Chemistry:
  - B1000: Inorganic Chemistry 5
  - B5000: Organic Mechanisms 5

**Elective Courses**

Twenty credits chosen from the following:

- A1100: Environmental Chemistry (3 cr.)
- A1101: Environmental Chemistry Lab (2 cr.)
- A1200: Environmental Organic Chemistry (3 cr.)
- A1400: Chemical Information Sources (1 cr.)
- A8200: Chemistry-Physics-Engineering Seminar I (1 cr.)
- A8300: Chemistry-Physics Engineering Seminar II (1 cr.)
- B3000: Polymer Chemistry (5 cr.)
- B5100: Organic Synthesis (5 cr.)
- B5200: Spectroscopy and Structure Proof in Organic Chemistry (5 cr.)
- B5300: Organometallics (5 cr.)
- B6000: Quantum Chemistry (5 cr.)
- B7200: Surface Chemistry and Colloids (5 cr.)
- B7300: Computers in Chemistry (5 cr.)
- B8900: Introduction to Research Methodology (5 cr.)
- B9100: Basic Lab Techniques (5 cr.)

**Total Credits** 30

**Additional Requirements:**

- **Thesis:** There is also the possibility of doing a thesis (offered as Chem B9901-B9905, 10 credits). The thesis must be approved by the Graduate Committee. Students choosing to do a thesis will take ten credits of elective Chemistry courses in addition to B9901-B9905.

**Biochemistry Option**

**Required Courses**

- CHEM A8005: Biochemistry II 3
- BICM 71010: Advanced Biochemistry I 3
- BICM 71020 Advanced Biochemistry II 3
- BICM 71110: Research Techniques in Biochemistry I 4

**Two of the following four:**

- BICM 72010: Basic Seminar in Biochemistry I (1 cr.)
- BICM 72020: Basic Seminar in Biochemistry II (1 cr.)
- BICM 81000: Seminar in Biochemistry (1 cr.)
- CHEM B9800: Seminar in Biochemistry (1 cr.)

**One of the following two:**

- CHEM B5000: Organic Mechanisms (5 cr.)
- BICM 75000: Bioorganic Chemistry (3 cr.)

**One of the following two:**

- BICM 77000: Physical Biochemistry (3 cr.)
- PHYS V3800: Biophysics (4 cr.)

**Elective Courses**

Two approved graduate courses in Biology (One course should be in molecular genetics) 8

**Total Credits** 29-32

**Additional Requirements**

**Thesis:** Students who wish to complete a thesis must obtain approval by the Graduate Committee.
Comprehensive Examination: A comprehensive examination is required of all students except those who have completed a thesis.

**ADVISEMENT PROCEDURES AND SERVICES**

All students wishing to pursue master’s work in Chemistry should consult with one of the advisors listed below:

**Chemistry**
Professor T. Bandoz
Marshak 1316; 212-650-6017

**Biochemistry**
Professor H. Schulz
Marshak 1333, 212-650-8323

**SEMINARS**

The Chemistry Department sponsors weekly seminars on topics of current interest. Advance abstracts of these seminars will be posted in the vicinity of Marshak 1024, and all interested students are invited to attend.

**AWARDS, SCHOLARSHIPS AND PRIZES**

Each year the department presents a number of awards to its outstanding students.

Ernest Borek Scholarship
Chemistry Scholarship
Albert and Frances Hochman Scholarship
Donald Sloan Scholarship
James A. Whittam Award

**COURSE DESCRIPTIONS**

**BASIC COURSES IN CHEMISTRY**

**A1100: Environmental Chemistry**

Intended to broaden the student’s understanding of chemical processes taking place in our environment. The relationship between atmospheric, soil and water chemistry will be underlined. This course draws upon general, analytical and organic chemistry experience. Fall semester only. 3 HR./WK.; 3 CR.

**A1101: Environmental Chemistry Lab**

Introduction to environmental analysis. Samples of water, air, soil, food, etc. will be obtained and analyzed both qualitatively and quantitatively for pollutants. The effects of these pollutants on the environment will be discussed and linked to urban problems. Analytical techniques will include titrations, separations (GC, HPLC, GC/MS) and polarography. 3 HR./WK.; 2 CR.

**A1200: Environmental Organic Chemistry**

Examination of processes that affect the behavior and fate of anthropogenic organic contaminants in aquatic environments. Chemical properties influencing transfers between hydrophobic organic chemicals, air, water, and sediments, based on a fundamental understanding of intermolecular interactions, will be studied. Mechanisms of important thermochemical and photochemical transformation reactions will also be briefly investigated. Spring semester only. 3 HR./WK.; 3 CR.

**A1400: Chemical Information Sources**

An introduction to the retrieval of chemical information. Topics covered: primary, secondary and tertiary literature, including the major abstract journals, data sources, compendia, patents, current awareness, and computer readable sources. Spring semester only. 3 HR./WK.; 1 CR.

**A8200: Chemistry-Physics-Engineering Seminar I**

Required for certain graduate students; emphasis on topics in physical chemistry, inorganic chemistry and organic chemistry. Fall semester only. 1 CR.

**A8300: Chemistry-Physics-Engineering Seminar II**

Required for certain graduate students; emphasis on topics in physical chemistry, inorganic chemistry and organic chemistry. Spring semester only. 1 CR.

**B1000: Inorganic Chemistry**

Theories of chemical bonding and molecular structure applied to inorganic compounds; stereochemistry; compounds of the non-transition elements; transition metal complexes. Spring semester only. 5 HR./WK.; 5 CR.

**B3000: Polymer Chemistry**

Fundamentals of polymer science; polymerization, solution properties, and solid state properties. 5 HR./WK.; 5 CR.

**B5000: Organic Mechanisms**

The basic methods of studying organic reaction mechanisms and their application to specific reactions. Fall semester only. 5 HR./WK.; 5 CR.

**B5100: Organic Synthesis**

A critical and mechanistic evaluation of synthetic methods. Spring semester only. Prereq: Chemistry B5000. 5 HR./WK.; 5 CR.

**B5200: Spectroscopy and Structural Proof in Organic Chemistry**

Principles and concepts in spectroscopic methods such as infrared and ultraviolet-visible spectrophotometry, proton and carbon nuclear magnetic resonance spectroscopy including techniques such as decoupling, 2-dimensional correlated spectroscopy, mass spectrometry and elemental analyses. 5 HR./WK.; 5 CR.

**B6000: Quantum Chemistry**

An introduction to quantum chemistry. A mathematical development of the theories which explain atomic and molecular behavior with applications to chemical bonding and spectroscopy. 5 HR./WK.; 5 CR.

**B7300: Computers in Chemistry**

Computer programming in Fortran with applications to numerical problems in Chemistry. This includes complex equilibria, chemical dynamics and molecular orbital calculations. Fall semester only. 5 HR./WK.; 5 CR.

**B8900: Introduction to Research Methodology**

An introduction to methods of doing research; students are required to submit a research notebook and a short paper. With approval, may be converted to the first half of thesis research. HRS. TBA; 5 CR.

**B9100: Basic Laboratory Techniques for Research in Physical, Analytical and Inorganic Chemistry**

Electronics, principles of instrumentation, application of some modern instruments, and instrumental techniques. Spring semester only. 2 LECT., 6 LAB. HR./WK.; 5 CR.

**BICM courses are offered through the Biochemistry Program of the Graduate School of the City University of New York.**

**A5900: Biochemistry I**

Chemistry and metabolism of the cell. Laboratory work will include spectrophotometry, chromatography, and isolation and analysis of lipids, proteins, enzymes, polysaccharides and nucleic acids. 3 LECT., 4 LAB HR./WK.; 4 CR.
A8005: Biochemistry II
Molecular basis of enzyme action, membranes (transport and signal transduction), protein structure, signal transduction, virology, bioinformatics, genomics, proteomics, molecular basis of replication, transcription of genetic information, immunology. Prereq: Chem A8005. 3 HR./WK.; 3 CR.

BICM 77000: Physical Biochemistry
Kinetics, thermodynamics and spectroscopy as applied to biochemical systems. 3 HR./WK.; 3 CR.

B71010: Seminar in Biochemistry
Presentation and discussion of current problems in biochemistry. Includes presentations of recent research findings by invited speakers and requires registered students to make at least one presentation based on published work or their own research results. 1 HR./WK.; 1 CR.

B71020: Seminar in Biochemistry II
Topics of current importance in biochemistry, including protein structure, enzymeology, immunology and regulation of metabolism. Prereq: Chem A8005. 3 HR./WK.; 3 CR.

B71100: Research Techniques in Biochemistry I
Laboratory work dealing with modern approaches in the solution of biochemical problems. The student will work in at least two research laboratories. Pre- or coreq: Chem A8005. 1 CLASS, 7 LAB. HR./WK.; 4 CR.

B71110: Research Techniques in Biochemistry II
Laboratory work in one biochemical research laboratory. Prereq: BICM 71100. 1 CLASS, 7 LAB. HR./WK.; 4 CR.

B71120: Research Techniques in Biochemistry II
Laboratory work in one biochemical research laboratory. Prereq: BICM 71110. 1 CLASS, 7 LAB. HR./WK.; 4 CR.

B9800: Seminar in Biochemistry
(see B9800)

ADDITIONAL COURSES

B5300: Organometallics
5 HR./WK.; 5 CR.

B7200: Surface Chemistry and Colloids
5 HR./WK.; 5 CR.

B8000: Special Topics in Chemistry
4 HR./WK.; 5 CR.

B8001: Special Topics in Inorganic Chemistry
5 HR./WK.; 5 CR.

B8002: Special Topics in Analytical Chemistry
5 HR./WK.; 5 CR.

B8003: Special Topics in Organic Chemistry
5 HR./WK.; 5 CR.

B8004: Special Topics in Physical Chemistry
5 HR./WK.; 5 CR.

B9901-B9905: Thesis Research
Students choosing thesis research will prepare a thesis under the personal guidance of a faculty advisor. The research must be completed in two years from the initial date of registration for the thesis course, continuing registration until completed. 10 CR.

BICM 81000: Seminar in Biochemistry
(see B9800)

DOCTORAL COURSES OPEN TO MASTER’S STUDENTS

Qualified students may take or substitute, with the approval of the Graduate Committee, courses available in the doctoral program in Chemistry. Those courses are described in the bulletin of The Graduate School of The City University of New York.

FACULTY

Daniel L. Akins, Professor
B.S., Howard Univ.; Ph.D., Univ. of California, Berkeley

Valeria Balogh-Nair, Professor
B.Sc., Univ. of Louvain (France), Ph.D.

Teresa Bandosz, Professor
B.S., M.S., Univ. of Mining Metallurgy (Cracow, Poland); Ph.D., Technical Univ. of Cracow

Ronald Birke, Professor
B.S., Univ. of North Carolina; Ph.D., M.I.T.

Vernon G. S. Box, Professor
B.Sc., Univ. of West Indies, Ph.D.

David H. Calhoun, Professor
B.A., Birmingham-Southern College; Ph.D., Univ. of Alabama

Ranajeeet Ghose, Assistant Professor
B.Sc., Presidency College (India); M.S., Yale Univ., Ph.D.

David K. Gosser, Professor
A.B., Cornell Univ.; M.S., Yale Univ., Ph.D.

Thomas Haines, Professor
B.S., The City College, M.A.; Ph.D., Rutgers Univ.

Urs Jans, Assistant Professor
Diploma in Chemistry, Swiss Federal Institute of Technology, Ph.D.

George John, Associate Professor
B.S., Univ. of Kerala (India), Ph.D.

Glen Kowach, Associate Professor
B.S., Univ. of Wisconsin, Madison; Ph.D., Cornell Univ

Mahesh Lakshman, Associate Professor
B.S., University of Bombay (India), M.S.; Ph.D., University of Oklahoma

Themis Lazaridis, Associate Professor
Diploma in Chemical Engineering, Aristotle Univ. (Greece); Ph.D., Univ. Of Delaware

John R. Lombardi, Professor
A.B., Cornell Univ.; M.A., Harvard Univ., Ph.D.

Neil McElvie, Professor
B.A., Cambridge Univ., M.A.; Ph.D., Columbia Univ.

Kevin Ryan, Assistant Professor
B.S., Providence College; M.S., Univ. of Rochester, Ph.D.

Horst Schulz, Professor
M.S., Technical Univ. Berlin, Ph.D.

Simon A. Simms, Associate Professor and Chair
B.S., The City College; Ph.D., Princeton Univ.

Mark L. Steinberg, Professor
B.A., Univ. of Michigan; Ph.D., Univ. of Pennsylvania

Maria Tamargo, Professor and Dean of Science
B.S., Univ. of Puerto Rico; M.S., John Hopkins Univ., Ph.D.
Maria-Luisa Tasayco, Associate Professor
B.S., Central Michigan Univ.; M.S., Purdue Univ.; Ph.D., State Univ. of New York, Stony Brook

Iban Ubarretxena-Belandia, Assistant Professor
B.Sc., Univ. of Basque Country (Spain); M.Sc., Univ. of Kent (UK); Ph.D., Univ. of Utrecht (The Netherlands)

Ira Alan Weinstock, Associate Professor
B.A., Williams College; M.A. Columbia Univ.; Ph.D., Massachusetts Institute of Technology

Zhonghua Yu, Assistant Professor
B.S., Univ. of Science and Technology (Hefie, China); Ph.D., Columbia Univ.

PROFESSORS EMERITI

John S. Arents
Theodore Axenrod
Francis E. Condon
Myer M. Fishman
Herbert Meislich
Jack I. Morrow
Stanley R. Radel
Henri Rosano
Charlotte S. Russell
Leonard H. Schwartz
Amos Turk
Michael Weiner
Arthur E. Woodward
The City College offers the following master's degree in Earth and Atmospheric Science:

**M.A. in Geology**

**PROGRAMS AND OBJECTIVES**

The Department of Earth and Atmospheric Sciences has developed a unique version of the Earth Systems Science (ESS) model, the proposed national curriculum in earth sciences. The focus of ESS is to integrate the chemical and physical principles which interlink earth processes and features. The integrated curriculum gives us the flexibility to offer research training in the following areas:

**Earth Systems Science**

**Environmental Studies**

**Remote Sensing/Geographic Information Systems**

Students who receive an M.A. from the EAS Department will be prepared for employment in environmental companies and government agencies, as well as for Ph.D. level studies in ESS, Geology, Environmental Sciences, Environmental Public Policy, or Terrestrial Ecology.

**EAS DEPARTMENTAL FACILITIES**

The EAS Department houses a Weather/Remote Sensing Laboratory with computer links to Unidata. The IBM RISC 6000 and Sun Sparc workstations permit access to national data banks and networked via direct satellite link to Internet sources. The Department also maintains well equipped hydrology, geophysics and geochemistry laboratories. Equipment includes Philips x-ray fluorescence and x-ray diffraction stations. Thermo flame and graphite furnace atomic absorption facilities, a Thermo Finnigan Trace DSQ Gas Chromatography/Mass Spectrometry station with chemical ionization and autosampler, a Glas-Col Soxhlet extraction system, Dionex Symmetry HPLC with gradient pump and UV detector, a Kodak Image Station 2000MM Multi-Modal high performance digital imaging system and related equipment for quantitative hydrology. The High Pressure Laboratory includes a 0-100,000 PSI Harwood Intensifier, a Honeywell temperature-regulating systems and a petrographic microscope laboratory. Additional equipment includes access to a ZEISS SEM with a Princeton Gammatech Energy Dispersive Analysis System and Phillips Transmission Electron Microscopes. The Geophysics Laboratory is equipped with a 24-channel Strataview engineering seismograph system, an EM-31 electromagnetic ground conductivity meter, a Syscal Kid Switch 24 automated resistivity system, an older Soldier resistivity meter, a Worden student gravimeter, and a GSM-19T proton precession magnetometer. EAS maintains a cloud laboratory at Steamboat Springs, Colorado that has been the resource for student meteorology projects for the last two decades.

**RESEARCH**

Qualified students are encouraged to become research assistants to faculty. Many are assisted in their research with support from the CCNY National Oceanic and Atmospheric Administration Center for Remote Sensing Science and Technology (CREST) and the CCNY National Aeronautical and Space Administration University Research Center for Optical Sensing and Imaging of the Earth and Environment (COSI), or through other resources provided by the faculty.

**DEPARTMENTAL ACTIVITIES**

The Planetary Society has meetings during club hours. Meetings include guest lecturers, environmental films, and field trips in the New York City area.

The American Meteorological Society is for students interested in meteorology and its applications. Weather station operation and visits to other weather stations are scheduled.

**REQUIREMENTS FOR THE MAJOR**

**Thesis Option**: Most candidates for the master’s degree complete 24 credits in Earth and Atmospheric Sciences in a program of study organized in cooperation with the graduate advisor and submit a thesis for a maximum of six credits. The thesis will consist of an independent theoretical, laboratory or field investigation supervised by a faculty advisor. The thesis option totals 30 credits.

**Credit Option**: Students selecting the credit option will be required to complete 36 credits of approved course work. The option will be selected with the consent of the student’s advisor and must be approved by the Graduate Studies Committee. Students
selecting the credit option must pass a written comprehensive examination during the final semester of study.

Additional Requirements
Any basic courses must be completed with at least a grade of B before the student is permitted to register beyond 15 credits, depending on the specialization.

All courses are to be chosen in consultation with the student’s advisor and are subject to the approval of the Departmental Graduate Studies Committee. A maximum of nine credits in A0000-level or advanced undergraduate courses may be taken toward the M.A. degree. A maximum of nine credits in other departments or divisions of the College or units of CUNY may be taken toward the degrees in Earth Systems Science.

Foreign Language Proficiency: Not required.

Basic Skills: All graduate students in the Department are expected to acquire basic skills in computer science and numerical data analysis.

Advisement
For general advisement for all program options:
Professor Jeffrey Steiner
Marshak 106; 212-650-6984.

Course Descriptions

A0000-Level Courses
No graduate student may take more than three A0000-level courses for credit.

A1300: Environmental Geochemistry
Shallow earth interactions in ESS emphasizing: groundwater geochemistry; elemental cycles linked to biological activity in the oceans; geochemistry and global climate cycles; geo-bioremediation; and applied analytical techniques including x-ray diffraction, potentiometric titrations, and aspects of UV/visible spectroscopy. 3 LECT., 1 LAB HR./WK.; 3 CR.

A2300: Subsurface Remediation
Application of scientific and engineering principles in the remediation of contaminated soils and groundwater. Topics include environmental regulations and toxicology, soil-vapor extraction and bioventing, air sparging, pump and treat, bioremediation, surfactant-enhanced extraction, and permeable reactive barriers. Class project involves design of remediation systems for a hypothetical site. Prereqs.: EAS 41300 and EAS 44600 or equivalent or permission of instructor. 3 HR./WK.; 3 CR.

A6700: Weather Analysis
Synoptic analysis of surface and upper-air meteorological observations, including satellite, radar, and aircraft measurements. Diagnostic calculations of vorticity, divergence and vertical motions in mesoscale, synoptic scale, and large scale weather systems. 5 HR./WK.; 4 CR.

A7200: Environmental Project
Advanced-level project utilizes field data to solve an urban environmental problem. Can be taken in the spring semester or in the summer. Also open to postgraduates in environmental fields, by permission. Can be applied to thesis credit. 4 WEEKS IN FIELD PLUS LAB. ANALYSES; 4 CR.

B0000-Level Courses

B1000: Structural Geology
Physical properties of rocks in different tectonic environments; deformation; petrofabric analysis. Geotectonics; orogenesis, earthquakes, interpretation of geologic maps and mapping techniques. 3 LECT., 2 LAB. HR./WK.; 4 CR.

B1100: Geotectonics
This course treats the processes that change the face of the earth. It includes the concepts of mantle convection and continental drift, leading to the modern theory of plate tectonics. The perspective is global and process-oriented, with examples from nearby active plate boundaries. The plate tectonic model explains global distributions of earthquakes, volcanoes, mineral deposits, and long-term climate patterns. 3 LECT. HR./WK. 3 CR.

B1400: Geophysics
This course covers the physical principles that govern the behavior and techniques used to infer the earth's internal structure, composition, and mineral resources. It provides earth scientists and engineers with the techniques to determine earth structures, locate environmental pollutants, and prospect for natural resources from remote locations. Topics include: Seismology, geochemistry, gravity, magnetic, and thermal properties of the earth. 3 LECT. HR./WK. 3 CR.

B2400: Igneous Petrology
Minerals in Earth Systems Science; principles of mineral stability and mineral associations; identification and recovery of earth resources. Mineral issues on human terms: toxic waste sites, climatology, and slope stability. Course introduces mineral optics and x-ray diffraction. 2 LECT., 4 LAB HR./WK.; 4 CR.

B4400: Global Environmental Hazards
Study of important, naturally occurring destructive phenomena, such as earthquakes, volcanic eruptions, landslides, and coastal flooding. Long-term causes and remediation of these problems. Topics will focus on consequences to urban environments. 3 HR./WK.; 3 CR.

B4500: Hydrology
Introduction to hydrological data, the hydrologic cycle. Precipitation, streamflow, evaporation, and runoff. Emphasis is on their interactions and processes. Prereq: Math 20300 or Math 20800, Physics 20800 or permission of the instructor. 2 LECT., 2 LAB HR./WK.; 3 CR.

B4600: Ground-Water Hydrology
Occurrence of ground water. Basic equations and concepts of ground water flow. Flow nets. Methods of ground water investigation. 2 LECT., 2 REC. HR./WK.; 3 CR.

B6500: Environmental Geophysics
Advanced work in the application of geophysics to environmental and engineering problems. Hands-on work and demonstrations of seismic, electrical, electromagnetic, and magnetic instruments and techniques. Survey design and execution. Computer analysis of survey results. Prereqs.: EAS B1400 or permission of instructor. 3 HR. LECT., DEMONSTRATION, OR GROUP FIELD WORK/WK.; 3 CR.

B6800: Physical Oceanography
Principles governing the atmosphere-coast-ocean interactions. The course utilizes the department’s Weather Station and Geosciences Computer Laboratory where oceanographic and atmospheric data are remotely sensed from space. The role of the world’s oceans to current global warming/cooling models will be examined. Topics also include: bathymetric features, origin of the hydrosphere, sea-level change, wave formation, temperature, salinity, and density of the ocean water. 3 LECT. HR./WK.; 3 CR.

B7000: Principles of Geochemistry
Deep earth involvement in Earth Systems Science: plutonium and volcanism; isotopic age dating; non-radiogenic isotope systems; and trace metal characteristics of evolving earth systems. Course includes petrography and x-ray fluorescence. 3 LECT. HR./WK.; 3 CR.

B8800: Climate and Climate Change
This course links processes and interactions of the atmosphere, ocean and solid earth and their impact on climate and cli-
mate change. Topics include the physical principles of climate; climates of the past and present; Ice Age theories; the Greenhouse Effect; and human impact on climate. Prereq: EAS 10600 or 10100; one semester of college math. 3 LECT., 2 LAB HR./WK.; 4 CR.

B9001, B9002: Selected Topics in Earth Systems Science
Current topics and problems with emphasis on aspects not treated in regular courses. Department permission required. 1-2 LECT. AND/OR LAB. HR./WK.; 1-2 CR./SEM.

B9103: Special Topics in Meteorology I
Review and critical analysis of selected research publications in meteorology. Students are expected to prepare and participate in discussions on topics of current interest. 1-3 HR./WK.; 1-3 CR./SEM.

B9205: Special Topics in Oceanography I
Reviews and critical analysis of selected research publications in oceanography. Students are expected to prepare and participate in discussions on topics of current interest. 1-3 HR./WK.; 1-3 CR./SEM.

B9500: Thesis Research
Preparation of a thesis under the guidance of a faculty mentor. HRS. TO BE ARRANGED. 1-3 CR./SEM. MAY BE TAKEN FOR TOTAL OF 6 CR.

B9600: Independent Study
Individual laboratory, field, or library investigation of a problem in Earth Systems Science. Approval of instructor required. 1-3 CR./SEM. UP TO 6 CR. CAN BE APPLIED TO MASTER’S DEGREE.

DOCTORAL COURSES OPEN TO MASTER’S STUDENTS
Qualified students may take or substitute, with the approval of the Graduate Committee, courses available in the doctoral program in Earth and Environmental Sciences. Those courses are described in the bulletin of The Graduate School of the City University of New York.

FACULTY

Stanley Gedzelman, Professor
B.S., The City College; Ph.D., M.I.T.
Edward Hindman, Professor
B.S., Univ. of Utah; M.S., Colorado State Univ.; Ph.D., Univ. of Washington
Patricia Kenyon, Associate Professor
B.S., Rensselaer Polytechnic Inst.; Ph.D., Cornell Univ.
Federica Raia, Assistant Professor
B.S., Univ. of Naples, Ph.D.
Jeffrey Steiner, Professor and Chair
B.S., Washington State Univ.; Ph.D., Stanford Univ.
Margaret Anne Winslow, Professor
B.S., Columbia Univ. M.A., M. Phil., Ph.D.
Pengfei Zhang, Assistant Professor
B.S. Univ. of Science & Technology of China; M.S., Montana Tech of the Univ. of Montana; Ph.D., Univ. of Utah
The City College offers the following master’s degree in Economics:

**M.A.**

**DEGREE REQUIREMENTS**

Students may pursue one of two options:
- Option A—No Thesis: 36 credits.

**Required Courses**

- **B0000:** Microeconomic Analysis 3
- **B1000:** Macroeconomic Analysis 3
- **B2000:** Statistics and Introduction to Econometrics 3
- **B2100:** Foundations of Empirical Research 3

**Elective Courses**

- **Option A—No Thesis**
  - Additional graduate courses 24
- **Option B—Thesis**
  - **B9900:** Thesis Research 3
  - Additional graduate courses 21

**Total Credits 36**

**Additional Requirements**

- **GPA:** Course work must be completed with a grade average of B or better.
- **Comprehensive Examinations:** Comprehensive examinations cover microeconomics, macroeconomics, and statistics.

**ADVISEMENT**

**Graduate Advisor**
Professor Mitchell Kellman
NAC 5/103A, 212-650-6203

**COURSE DESCRIPTIONS**

- **B0000: Microeconomic Analysis**
  Supply and demand; economics of households and firms; determination of product and factor prices under varying market structures. 2 HR./WK., PLUS CONF.; 3 CR.

- **B0100: Advanced Microeconomic Theory**
  General equilibrium theory, capital theory, welfare economics, mathematical models in microeconomics, game theory. 2 HR./WK., PLUS CONF.; 3 CR.

- **B1000: Macroeconomic Analysis**
  Factors determining level of national income, output and employment, business cycle theories and policies to stabilize employment and price level. 2 HR./WK., PLUS CONF.; 3 CR.

- **B1100: Advanced Macroeconomic and Monetary Theory**
  Monetary theory, macroeconomic models, growth theory, capital markets, business cycle theory. 2 HR./WK., PLUS CONF.; 3 CR.

- **B2000: Statistics and Introduction to Econometrics**
  Applications of statistical methods to economic research; description and inference; variance analysis and correlation; statistical induction and testing of hypotheses; time series; index numbers, simple regression analysis. 2 HR./WK., PLUS CONF.; 3 CR.

- **B2100: Foundations of Empirical Research**
  Econometrics and regression analysis, use of computers in empirical research in economics. Basic knowledge of computer language, operations research methods. 2 HR./WK., PLUS CONF.; 3 CR.

- **B3100: Public Finance**
  Sources of metropolitan area finance, desirable distribution of public services among different governments, revenue sharing, taxation effects on land use, cost-benefit analysis. Changing economic significance of government expenditures, taxation and debt management. Macro- and micro-criteria for financial operations. Administrative problems and intergovernmental relations. 2 HR./WK., PLUS CONF.; 3 CR.

- **B4000: Labor Economics**
  Problems and issues in wages, hours and working conditions; wage policy; relation of labor organizations to management decisions and economic change. 2 HR./WK., PLUS CONF.; 3 CR.

- **B4300: Economic Policies of Trade Unions**
  Evolution of trade unionism in the U.S. Analysis of union government, strategy, economic objectives and political action. 2 HR./WK., PLUS CONF.; 3 CR.

- **B5000: Industrial Organization and Control**
  Structure of the American economy; governmental policies aiming at preservation of competition in industrial markets and regulation of trade practices. 2 HR./WK., PLUS CONF.; 3 CR.

- **B5500: Administrative and Managerial Policy**
  The general management function. Organizational objectives and long-range forecasting. Implementation of organizational strategy for operations, control, expansion, recovery. Social responsibility of corporations. Term project required. Prereq: Eco B9514. 2 HR./WK., PLUS CONF.; 3 CR.

- **B6000: Introduction to Economic Development**
  Theories, models, and strategic factors of development, domestic and international policy. 2 HR./WK., PLUS CONF.; 3 CR.

- **B6100: Theories and Models of Economic Growth**
  Theories and models of economic growth under varying structural and behavioral assumptions. 2 HR./WK., PLUS CONF.; 3 CR.

- **B7100: International Economics**
  Gains from trade; theory and practice of protection; nature, disturbance, and adjustment of the balance of payments.
development of international economic institutions and the world economy. 2 HR./WK., PLUS CONF.; 3 CR.

**B7700: Banking and the Financial Services Industry**
Contemporary practices, policies and issues involving commercial banks, other depository institutions and non-deposit financial intermediaries. Prereq: Eco B9511. 2 HR./WK., PLUS CONF.; 3 CR.

**B7900: Advanced Financial Economics**
Expected utility maximizing, state preference theory, mean-variance analysis, capital asset pricing model, arbitrage pricing theory, pricing contingent claims and option pricing theory. Applications of agency theory and asymmetric information and game theory to finance. Prereqs: Eco B9510 and B2200. 2 HR./WK., PLUS CONF.; 3 CR.

**B8000: Advanced Options and Futures**
Option pricing models; Binomial approach. Black-Scholes models, extensions, applications, and empirical work. Determination of future prices, relationship between spot and future prices, economic function and contribution of futures markets. Prereqs: Eco B9510 and B9512. 2 HR./WK., PLUS CONF.; 3 CR.

**B8100: International Finance**
Macroeconomic theory and policy in the open economy. Issues associated with balance of payments disequilibrium, fluctuating currency values, international factor flows and international capital mobility. Extensions of the Keynesian model; monetary and fiscal policy for internal and external balance; macro policy coordination. Prereq: EcoB1000. 2 HR./WK., PLUS CONF.; 3 CR.

**B8400: International Business Economic Policy**
Theories and institutional background of current interdependent world economies. Foreign exchange markets, balance of payments problems, multinational enterprise, and international trade and investment. 2 HR./WK., PLUS CONF.; 3 CR.

**B9300: Area Seminar in Development**
A research seminar for candidates specializing in development, with particular reference to a specific region or area. Prereq: permission of instructor. 2 HR./WK., PLUS CONF.; 3 CR.

**B9501-B9522: Seminars**
Oral reports and written exercises will be required. HRS. TO BE ARRANGED; 3 CR.

**B9501: Economic Development and Economic History**

**B9502: Urban Economics**

**B9503: Labor**

**B9504: Statistics and Mathematical Economics**

**B9505: Geography**

**B9506: Economic Thought**

**B9507: International Economics**

**B9508: Microeconomic Analysis**

**B9509: Macroeconomic Analysis**

**B9510: Finance**
Overview of managerial finance: Capital budgeting techniques; capital structure and cost of capital; dividend policy; long and short term financing; working capital management, financial analysis, planning, and control; and mergers and acquisitions.

**B9511: Money and Banking**
Analysis of organization and operation of U.S. financial system: money and capital markets, commercial banking; relationship between financial and economic activity, including monetary and fiscal policy.

**B9512: Investments**
Meaning, measurements and relationship of risk. Portfolio analysis, alternative approaches to valuation, determination of asset values in open market, internal and external rates of return, objectives of investment decision. Prereq: Eco B9510.

**B9513: Managerial Economics**
Integration of microeconomics and quantitative methods so as to make sound managerial decisions.

**B9514: Organization and Management**
The modern corporation and its historic development: principal functions of management and its social role; structure of the management decision process; choice of management tools for analyzing decisions and coping with outcome uncertainty.

**B9516: Operations and Production**
Investigation of production systems; application of analytical techniques to product and process design, optimal plant location, efficient plant design, inventory and production systems.

**B9517: Marketing**
Distribution and sale of goods and services from production to final consumption; changing buying behavior; institutional structures; marketing channels; product life cycle; and merchandising.

**B9518: Government Regulation and Executive Decision Making**

**B9519: Introduction to SAS Statistical Package**
Drill applications to economic problems.

**B9520: Accounting Cycle**
Concepts and techniques of accounting for business transactions and preparation of financial statements.

**B9521: International Business**

**B9900: Thesis Research**
Individual research under faculty guidance. 3 CR.

**FACULTY**

**Maria C. Binz-Scharf,** Assistant Professor
M.A., Bocconi Univ.; Ph.D., Univ. of St. Gallen, Switzerland

**Nusret Cakici,** Professor
B.S., Istanbul Univ. M.B.A.; Ph.D., CUNY

**Peter Chow,** Professor
B.A., National Taiwan Univ.; M.S., Southern Illinois Univ., Ph.D.

**Gergana Danailova-Trainor,** Assistant Professor
B.S., Bilkent Univ. (Turkey); M.B.A., Univ. of Illinois at Urbana-Champaign; M.Phil., Columbia Business School

**Yochanan Shachmurove,** Professor
B.S., Bilkent Univ. (Turkey); M.B.A., Univ. of Illinois at Urbana-Champaign; M.Phil., Columbia Business School

**Ross Weiner,** Assistant Professor
B.A., Univ. of Massachusetts (Amherst), M.A., Ph.D.

**PROFESSORS EMERITI**

**Stanley L. Friedlander**

**William I. Greenwald**

**Eric Isaac**

**Marvin Kristein**

**Abraham Melezin**

**Edwin P. Reubens**

**Morris Silver**

**Gerald Sirkin**
The City College offers the following master’s degree in English:

**M.A. PROGRAMS AND OBJECTIVES**

Candidates for the degree choose one of three specializations:

- **Literature**
- **Creative Writing**
- **Language and Literacy**

**DEGREE REQUIREMENTS**

**Literature**

**Required Courses**
- Literature courses 27
- B2800: Thesis Research 3

**Total Credits** 30

**Additional Requirements**

- **Thesis:** Degree candidates must submit a publishable full-length manuscript, to be so judged by their mentor and at least one other member of the faculty.
- **Foreign Language Proficiency:** A reading knowledge of an appropriate foreign language is required. Students who pass a course in literary translation with the grade of A or B may apply for a waiver of the language exam at the office of the Dean of Humanities (NAC 5/225).

**Creative Writing**

**Required Courses**
- Literature courses 15
- Workshops in creative writing 12
- B3800: Thesis Tutorial 3

**Total Credits** 30

**Additional Requirements**

- **Thesis:** Degree candidates must submit a publishable full-length manuscript, to be so judged by their mentor and at least one other member of the faculty.
- **Foreign Language Proficiency:** A reading knowledge of an appropriate foreign language is required. Students who pass a course in literary translation with the grade of A or B may apply for a waiver of the language exam at the office of the Dean of Humanities (NAC 5/225).

**Language and Literacy**

**Required Courses**
- B6000: Introduction to Language Studies 3
- B6400: Theories and Models of Literacy 3
- B8100: Second Language Acquisition 3
- B8200: Teaching Adult Literacy 3
- Other Language and Literacy courses (in consultation with an advisor) 6
- Four Additional Electives 12

(Electives may be selected from English Department course offerings. Courses from other departments are subject to the program director’s approval. Credit-bearing internships count toward elective course credits.)

**Total Credits** 30

**Additional Requirements**

- No more than 12 approved graduate credits may be taken outside the Department of English. No more than six credits may be transferred from another college.
- Students demonstrating appropriate previous teaching experience may substitute three credits of elective for B5100 (Supervised Team Teaching).

**Foreign Language Proficiency:** A reading knowledge of an appropriate foreign language is required.

**ACTIVITIES**

**Publications**
- *Fiction*, edited by Professor Mark Mirsky, is published at The City College, and anyone is welcome to submit material. *Global City Review*, edited by Professor Linsey Abrams, encourages students to participate in its production. *Promethean* is the City College literary magazine.

**Readings**
- A series of readings of work by students in the program and by prominent authors is presented throughout the year.

**ADVISEMENT**

**Director of Graduate Programs**
- Professor Linsey Abrams
  - NAC 6/210; 212-650-6694

**Literature**
- Professor Norman Kelvin
  - NAC 6/210; 212-650-6694

**Creative Writing**
- Professor Linsey Abrams

**Language and Literacy**
- Professor Barbara Gleason
  - NAC 6/333A; 212-650-6329
### COURSE DESCRIPTIONS

#### MAJOR AUTHORS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B0000</td>
<td>Chaucer: The Canterbury Tales</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B0001</td>
<td>Chaucer II</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B0100</td>
<td>Shakespeare I</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B0200</td>
<td>Shakespeare II</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B0300</td>
<td>Milton</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
</tbody>
</table>

#### PERIOD COURSES IN ENGLISH AND AMERICAN LITERATURE

Courses in all major periods of English and American literature will be offered as seminars of specialized study. The exact emphasis of each seminar will vary from semester to semester. See regularly published description of graduate English offerings. Recent offerings include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B0700</td>
<td>The Sixteenth Century in England</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B0900</td>
<td>English Literature of the Restoration and Early Eighteenth Century</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B1000</td>
<td>English Romantic Poetry and Prose</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B1100</td>
<td>English Literature of the Nineteenth Century</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
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</tbody>
</table>

#### SEMINARS IN SPECIAL SUBJECTS

Seminars on a variety of special topics. Subjects will vary from semester to semester. See the description of graduate offerings.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1200</td>
<td>Literature of the Twentieth Century</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B1300</td>
<td>Twentieth Century Irish Literature</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B1400</td>
<td>American Literature from its Beginnings to 1890</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
</tbody>
</table>

#### COURSES IN AMERICAN STUDIES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7300</td>
<td>Studies in American Literature I</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
<tr>
<td>B7400</td>
<td>Studies in American Literature II</td>
<td>2 HR./WK., PLUS CONF.; 3 CR.</td>
</tr>
</tbody>
</table>

#### CREATIVE WRITING WORKSHOPS

Students may not register for more than one writing workshop per semester.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B3000</td>
<td>Workshop in Fiction</td>
<td>2 HR./WK., PLUS INDIVIDUAL CONF.; 3 CR.</td>
</tr>
<tr>
<td>B3200</td>
<td>Workshop in Poetry</td>
<td>2 HR./WK., PLUS INDIVIDUAL CONF.; 3 CR.</td>
</tr>
<tr>
<td>B3400</td>
<td>Workshop in Drama</td>
<td>2 HR./WK., PLUS INDIVIDUAL CONF.; 3 CR.</td>
</tr>
<tr>
<td>B3600</td>
<td>Workshop in Nonfiction</td>
<td>2 HR./WK., PLUS INDIVIDUAL CONF.; 3 CR.</td>
</tr>
<tr>
<td>B3800</td>
<td>Thesis Tutorial</td>
<td>3 CR.</td>
</tr>
<tr>
<td>B3901</td>
<td>Workshop in Translation</td>
<td>3 CR.</td>
</tr>
</tbody>
</table>
LANGUAGE AND LITERACY

B0500: History of the English Language and Modern Linguistic Theory
The history of the language, together with an introduction to recent theoretical developments in linguistics. 2 HR./WK., PLUS CONF.; 3 CR.

B5000: Introduction to Teaching Writing and Literature
Explorations of pedagogical theories and practical strategies for classroom use. 2 HR./WK., PLUS CONF.; 3 CR.

B5100: Supervised Team Teaching
Work with a master teacher of basic writing or ESL; auditing a basic writing course, teaching, preparing syllabi. 3 CR.

B5200: Thesis Research
Independent research for the Master's thesis under the supervision of a mentor. 3 CR.

B5300: Examining Reading and Writing Processes
Designed to make students more aware of reading and writing strategies. 2 HR./WK., PLUS CONF.; 3 CR.

B5400: TESOL: Materials and Testing
Approaches to the use and creation of instructional materials in the Teaching of English as a Second Language. 2 HR./WK., PLUS CONF.; 3 CR.

B5500: TESOL: Methods
Introduction to different methodologies in the field and the contribution of each to methods in second language instruction; focuses on reading, writing and speaking for second language students. 2 HR./WK., PLUS CONF.; 3 CR.

B6000: Introduction to Language Studies
An introduction to various current language issues. 2 HR./WK., PLUS CONF.; 3 CR.

B6100: Sociolinguistics
Variation in language from a social, linguistic and cultural orientation. 2 HR./WK., PLUS CONF.; 3 CR.

B6300: Contrastive Written Language
Focuses on the relationship between language background and production of written text, with particular emphasis on contrastive analysis, discourse analysis, and second language learning. 2 HR./WK., PLUS CONF.; 3 CR.

B6400: Theories and Models of Literacy
Current theories and models of literacy in various linguistic communities and cultures, with particular emphasis on contrasts between orality and literacy in cognitive, linguistic and social dimensions. 2 HR./WK., PLUS CONF.; 3 CR.

B8000-8500: Special Topics in Language and Literacy
VARIABLE CREDITS, 1-4.

FACULTY

Salar Abdoh, Assistant Professor
B.A., U.C. Berkeley; M.A. City College
Linsey Abrams, Professor
B.A., Sarah Lawrence College; M.A. The City College
Felicia Bonaparte, Professor
Carla Cappetti, Professor
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Glady Carro, Associate Professor
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Mikhal Dekel, Assistant Professor
Tel Aviv School of Law; M.A., The City College; Columbia University, Ph.D.
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B.A., New York University
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B.A. Univ. of Pennsylvania; M.F.A., The City College; M.A.T., Harvard Univ.; Ed.D., Teacher’s College (Columbia Univ.)
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B.A., Univ. of Arizona, M.A.; Ph.D., Stanford Univ.

PROFESSORS EMERITI

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Ilona Anderson
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Saul N. Brody
Jerome Brooks
David P. Buckley
Roger Boxill
Arthur K. Burt
Alice Chandler
Morton Cohen
Madeleine P. Cosman
James A. Emanuel
Barbara Fisher
Byrne R. S. Fone
Arthur Ganz
Robert Ghiradella
Arthur Golden
Frederick Goldin
Ralph Gordon
Theodore Gross
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William Herman
Mary V. Jackson
Frederick R. Karl
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Mark Mirsky, Professor
Geraldine Murphy, Associate Professor
B.A., Boston Univ.; M.A., Columbia Univ., Ph.D.
Paul Oppenheimer, Professor
Emily Raboteau, Assistant Professor
B.A., Yale Univ.; M.F.A, New York Univ.
Fred Reynolds, Professor and Dean of Humanities and the Arts
B.A. Midwestern State Univ.; M.A., M.A. (Speech), Univ. of Oklahoma, Ph.D.
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B.A., Univ. of Kansas; M.A., Univ. of Illinois, Ph.D.
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B.A., The City College; M.A., Yale Univ., Ph.D.
David Unger, Instructor
B.A., Univ. of Massachusetts (Amherst); M.F.A., Columbia Univ.
H. Aram Veeser, Associate Professor
B.A., Columbia Univ., M.A., Ph.D.
Michele Wallace, Professor
B.A., The City College, M.A.; Ph.D., New York Univ.
Barry Wallenstein, Professor
B.A., New York Univ., M.A., Ph.D.
Joshua Wilner, Professor and Chair
B.A., Cornell Univ.; M. Phil., Yale Univ., Ph.D.

Department of English 55
Valerie Krishna
Patricia Laurence
Daniel Leary
Irving Malin
Karl Malkoff
Philip Miller
Samuel Mintz
Robert K. Morris
Stephen Merton
Nathaniel Norment, Jr.
William L. Payne
Beatrice Popper
Edward Quinn
Betty Rizzo
Irving Rosenthal

Earl Rovit
Paul Sherwin
Robert Silber
Frederic Tuten
Geoffrey Wagner
Arthur Waldhorn
Barbara Bellow Watson
Robert Wilson
John D. Yohannon
Department of Foreign Languages and Literatures

(DIVISION OF HUMANITIES AND THE ARTS)

Professor Juan Carlos Mercado, Chair • Department Office: NAC 5/223 • Tel: 212-650-6731

GENERAL INFORMATION

The City College offers the following master’s degree in Foreign Languages and Literatures:

M.A. in Spanish

PROGRAMS AND OBJECTIVES

The M.A. degree in Spanish is offered by The City College. The M.A. Program in French is now part of a consortium based at Hunter College, the administrative center for the program. For information, contact the Foreign Languages and Literatures Department of Hunter College, 695 Park Avenue, New York, NY 10021.

DEGREE REQUIREMENTS

Required Courses
V0100: History of the Spanish Language 3
V0300: Introduction to Methods of Research 3
Graduate Electives 27
Total Credits 33

The graduate electives (27 credits) are to be taken from among the courses offered by the department. With the permission of the Departmental Graduate Committee, a maximum of nine graduate credits may be taken in another Department or Division of the College.

Additional Requirements

Essay in Lieu of Thesis: A term essay approved by two members of the graduate faculty is required.

Comprehensive Examination: A written comprehensive examination is required.

Foreign Language Proficiency: Students must demonstrate their ability to read, write and speak Spanish. In addition, they must show a reading knowledge of a second foreign language by passing the Foreign Language Qualifying Examination.

ADVISEMENT

It is essential that all students consult with the Director of the M.A. Program in Spanish, at the beginning of each semester.

COURSE DESCRIPTIONS

V0100: History of the Spanish Language
Traces the development of the Spanish language from its Latin origins to the present. The course provides a survey of historical grammar with emphasis on phonology and morphology and/or the evolution of Spanish in the Americas. 2 HR./WK. PLUS CONF.; 3 CR.

V0300: Introduction to Methods of Research
Aims to develop proficiency in literary and bibliographical research through traditional and on-line methods. The course offers an overview of recent critical theories and requires library assignments applied to an individual research project. 2 HR./WK. PLUS CONF.; 3 CR.

V0600: Spanish Morphology and Syntax
An advanced review of Spanish morphology and syntax with the purpose of allowing graduate students to explore analytically the structure of the Spanish language. The course will make frequent comparisons and contrasts between the target language and English grammatical structures. 2 HR./WK. PLUS CONF.; 3 CR.

V0700: Spanish Stylistics
Analyzes the language used in literary texts through a study of representative Hispanic authors. The course will also consider how different patterns of style affect the writing and reading of a text. 2 HR./WK. PLUS CONF.; 3 CR.

V1000: Medieval Epic and Lyric Poetry
Survey of prose, poetry and theater of the Middle Ages in the Iberian Peninsula from the earliest literary manifestations to the end of the 15th Century. 2 HR./WK. PLUS CONF.; 3 CR.

V2000: Spanish Novel of the Golden Age
Study of the representative works characterizing the various narrative traditions that developed in Spain during the 16th and 17th centuries in light of their ideological and sociocultural contexts. 2 HR./WK. PLUS CONF.; 3 CR.

V2200: Cervantes
Explores Cervantes’ *Don Quixote* taking into account his life, ideology, as well as the philosophical, social and aesthetic contexts in which the author produced his masterpiece. 2 HR./WK. PLUS CONF.; 3 CR.

V2400: Poetry of the Golden Age
Analysis of the work of the most representative Spanish poets from the late 15th century through the 17th century taking into account the philosophical and aesthetic currents in vogue at the time. 2 HR./WK. PLUS CONF.; 3 CR.

V2500: Theatre of the Golden Age
Examination of the evolution of Spanish theater emphasizing theory of drama in the works of Lope and Calderón as well as their influence on other playwrights of the period in the Iberian Peninsula and the Americas. 2 HR./WK. PLUS CONF.; 3 CR.

V3100: Enlightenment and Romanticism in Spain
A review of the impact of French Enlightenment and European Romanticism on Spanish thought and literature through
readings of representative Spanish works from several genres. 2 HR./WK. PLUS CONF.; 3 CR.

V4200: Spanish Novel of the Nineteenth Century
Study of the development of the Spanish novel from Romanticism though Realism and Naturalism. Particular attention will be given to works of key figures of the period such as “Clarín” and Galdós. 2 HR./WK. PLUS CONF.; 3 CR.

V5200: Contemporary Spanish Drama
Review of the most influential trends of the 20th century world drama that affected the Spanish stage and its major playwrights. 2 HR./WK. PLUS CONF.; 3 CR.

V5600: Contemporary Spanish Novel
Analysis of the representation of Spanish history and culture in fiction. Issues such as identity, change and authoritarianism will be explored through the examination of major novels. 2 HR./WK. PLUS CONF.; 3 CR.

V5800: Contemporary Spanish Poetry
Analysis of recent poetic trends taking into account the influence of key voices from the “Generación del 27.” Reading of representative works by major writers. 2 HR./WK. PLUS CONF.; 3 CR.

V6000: Spanish-American Colonial Literature
Study of major literary figures and issues of the period in their cultural context and in light of how contemporary issues and critical debates have affected our perception of the colonial world. 2 HR./WK. PLUS CONF.; 3 CR.

V6400: Romanticism in Spanish-American Literature
Survey of the major trends in Spanish-American literature of the 19th century with emphasis on “romanticismo,” “costumbrismo,” and the transition to “realismo” and “naturalismo.” Readings of representative works of major writers and genres. 2 HR./WK. PLUS CONF.; 3 CR.

V6600: Spanish-American Novel I
Analysis of the Spanish American novel in the first half of the 20th century, including the “novela de la tierra,” “indigenismo” and the “novela psicológica.” Readings of representative works of major writers and trends. 2 HR./WK. PLUS CONF.; 3 CR.

V6800: Spanish-American Novel II
Study of the development of the Spanish-American novel beginning with the “Boom” to present-day trends. Readings of representative works of major writers. 2 HR./WK. PLUS CONF.; 3 CR.

V7000: Modernism in Spanish-American Poetry
Study of the writings of Martí, Nájera, Darío and other great figures of “modernismo,” and their impact on Hispanic literature in Europe and the Americas. 2 HR./WK. PLUS CONF.; 3 CR.

V7200: Contemporary Spanish-American Poetry
Examination of poetic trends through the reading of representative works of Huidobro, Guillén, Mistral, Neruda and Paz, among others. 2 HR./WK. PLUS CONF.; 3 CR.

V7400: Spanish-American Essay
Study of the essay as a major genre in the development of Spanish-American social thought. Readings of representative works from the period of Independence through the 20th century. 2 HR./WK. PLUS CONF.; 3 CR.

B7600: Spanish-American Theatre
Study of representative plays reflecting significant literary trends and social developments in contemporary Spanish America. 2 HR./WK. PLUS CONF.; 3 CR.

B7700: Spanish-American Short Story
Examination of the short story emphasizing its literary, cultural, and social impact. Reading of representative works from the period of Independence through the current century. 2 HR./WK. PLUS CONF.; 3 CR.

B7800: Seminar in Spanish-American Literature
Study of topics such as “indianista” and “indigenista” novels, the novel of the Mexican Revolution, and literary trends reflecting popular culture. 2 HR./WK. PLUS CONF.; 3 CR.

B9800-B9805: Special Topics in Language and Literature
3 HR./3 CR.

B9900: Hispanic Literature of the United States
Focus on contemporary Cuban-American, mainland Puerto-Rican and Mexican-American literature with an emphasis on poetry and narrative. Underscores how the literary production of the minority group reflects its place in mainstream American Society. 2 HR./WK. PLUS CONF.; 3 CR.
The City College offers the following master’s degree in History:

**M.A.**

**DEGREE REQUIREMENTS**

Requirements for the M.A. degree in History are as follows:

**Required Courses**

- B0000: Historical Methods and Historiography 3
- B2925: The Historian and the Computer 3
- B9900: Thesis Research 3

**Elective Courses**

Approved graduate courses in History 21

**Total Credits** 30

**Additional Requirements**

Students will be required to have a concentration in both a major and a minor area, to be determined in consultation with the departmental graduate advisor.

Up to twelve credits of course work in other graduate programs may be accepted for the degree in History. Approval for such courses must be secured in advance from the Graduate History Committee.

**Thesis:** Required for the M.A. Degree.

**Comprehensive Examination:** A three-hour written comprehensive examination will cover each of the student’s two fields of concentration.

**Foreign Language Proficiency:** The student will be expected to demonstrate a reading knowledge of an approved foreign language before completing fifteen credits of graduate work.

**Secondary School Teaching**

Students wishing to teach History in secondary schools must be certified in the area of Social Studies. Certification requirements are listed under the Secondary Education department listings in this bulletin. Please consult Professor Susan Semel, Department of Education. History M.A. candidates must consult with the History departmental advisor about their programs.

**ADVICEMENT**

It is essential that all students consult with the Director of Graduate Studies, Professor David Johnson (NAC 5/119; 650-7474), before beginning work in the program and each semester thereafter.

The following selection represents courses offered in recent semesters, and it is intended to provide an indication of typical offerings. A publication describing the graduate program is available in December for spring semesters and in May for fall semesters.

**B0000: Historical Methods and Historiography**

Focus on the rise of social history in contemporary historiography. Approaches to the subject include the contributions of the British Marxists, the French Annales school, social-scientific historians, and women’s historians. Readings will cover United States, Latin America, Africa, Asia and Europe. (Required for all students.) 2 HR./WK.; 3 CR.

**B2925: The Historian and the Computer**

A “hands-on” course in using computers in historical research: accessing information, analyzing historical data, and word processing. No experience in computers necessary. (Required for all students.) 3 HR./WK.; 3 CR.
Studes in American History

B0401: The Colonial and Revolutionary Period to 1783
European discovery and exploration of America; origins and peopling of the English colonies; colonial life; imperial innovations and American protest; the Revolution.

B0402: The New Nation, Slave and Free, 1783 to 1840
Republicanism and the democratization of politics, industrialization of an American working class, social reform and the making of the middle class, westward expansion and the removal of the Native Americans, sectional conflict and slave culture.

B0403: The Era of Civil War and Reconstruction, 1840-1877
The causes and consequences of the American Civil War, focusing especially on the reasons for sectional conflict, emancipation, the role of Abraham Lincoln, the conflict over Reconstruction and the new status of emancipated slaves.

B0404: The Response to Industrialization to 1900
The political, economic and social phases of the development of the United States from Reconstruction to the First World War. Populism and Progressivism; the industrialization of society and the emergence of the labor movement.

B0405: The United States in the Twentieth Century
America and World War I, the roaring twenties, the Depression and New Deal, Roosevelt’s leadership, World War II, and the beginnings of the Cold War.

B0406: Immigration and Ethnicity in American Life
Topical and chronological treatment of the American immigration experience, with emphasis on the ghetto, culture and community, patterns of work, social mobility, assimilation, the relation of class and ethnicity, and America’s reception of immigrants. Comparative analysis of different ethnic groups.

B0408: African-American History from Emancipation to the Present
The post-slavery experience of African-Americans: the creation and destruction of a black peasantry, the growth of a black working class, and the resulting change in black politics and culture.

B0411: A Social History of American Architecture
Beginning with the architecture of late medieval Europe, this course will trace architectural ideology and its interaction with material reality up to the present, focusing on both vernacular and professional work in order to examine the social objectives and values of those who constructed the physical environment.

B0412: The American Legal Tradition
Examines the basic features of English Common Law, then shifts to America to explore how our nation (1) dealt with this inheritance and (2) formed its own legal structure. A broad range of topics, with emphasis upon eighteenth and nineteenth century legal developments.

B0413: History of American Foreign Relations
Traces the interrelationship between basic domestic forces and their manifestation in the objectives of United States foreign policy. Emphasis on Puritanism, Messianism, the rise of corporate capitalism, and twentieth century attempts to shape the American imperium.

B0415: History of New York City
Several problems in the history and culture of New York City: slavery and the city’s origins as a multi-ethnic mercantile community, post-revolutionary commercial port; rise of working class; the Harlem Renaissance; social welfare and planning in the twentieth century. Emphasis on reading in original sources.

Studies in Latin American History

B0501: Colonial Latin America
A study of the impact and meaning of colonial rule in Latin America and the Caribbean, focusing on the interaction between European goals and institutions, and indigenous American and African strategies of socio-cultural survival.

B0502: Modern and Contemporary Latin America
Contemporary economic, social and political problems of Latin America and the Caribbean studied in historical perspective. Themes include: foreign economic and political intervention; labor systems and patterns of land ownership; class, ethnic and racial relations; the politics of reform, revolution and authoritarianism.

Studies in Asian History

B0601: Traditional Civilization of China
The early formation of the Chinese State, the intellectual foundation that has sustained its long history, the shaping of the Confucian way of life, and the cultural sophistication and its decline on the eve of the modern world.

B0602: Modern China
Change and continuity in the Chinese tradition across the nineteenth and twentieth centuries. The encounter with the West, social and political disruptions, efforts to industrialize, and especially the evolution and outcome of the Chinese revolution will be stressed.

B0604: Traditional Civilization of Japan
Japanese history from its origins to the nineteenth century, i.e., the “classic” Heian period, “medieval” Kamakura to Sengoku periods and the “early modern” Tokugawa world. Topics: Japan’s contacts and borrowings from other civilizations, especially China; Shinto and Buddhism; women and the family; the rise and transformation of bushi or warriors; artistic traditions.

B0605: Modern Japan
Survey of the building of the modern Japanese state, society and economy from 1868 to the present, with focus on continuity and change, the social costs of rapid industrialization and the emergence of Japan in the global economy.

B0606: Traditional Civilization of India
The history and culture of Indian civilization before modern times; major emphasis will be on its formation and classical age, its continuity and change, and the coming of Islam.
B0607: History of Modern India
Surveys the elements which have shaped the characteristic institutions of India; the disintegration of the Mogul empire and the rise of the British to dominance; political, economic, cultural, and social developments during the British period and the changes wrought by the republic.

Studies in African History

B0703: Africa and the Modern World
A social history of Africa from the nineteenth century to the present, with emphasis on state formation, impact of historical circumstances, national sentiment, and Hereros and Hutus in Africa. Emphasis on historical circumstances, national sentiment, and Hereros and Hutus in Africa. Emphasis on nineteen and twentieth centuries.

B0904: Modern Imperialism
Comparative History

B0901: Comparative History of Revolutions
A study of major modern revolutions, stressing the literature and problems of each, for the purpose of learning to what extent they follow similar patterns. New and unusual insights for historical inquiry, prompted by a comparative approach.

B0903: Nationalism in the Modern World
The meaning, origin, development, and growing significance of nationalism in the nineteenth and twentieth centuries. Nationalism discussed as (1) a stabilizing and destabilizing factor, (2) a challenge to multi-national empires, and (3) a major factor in the anti-colonial movements.

B0904: Modern Imperialism
The building of empires during the nineteenth and twentieth centuries in the name of national and international principles as well as economic and political interests. The extension of power over weaker regions by England and France, the U.S.A., the U.S.S.R. and China. Rivalries among imperial powers.

B0905: The Theory and Practice of Genocide in the Twentieth Century
Comparison of several instances of systematic mass killings, including Armenians, European Jews, Kurds, American Indians, and Hereros and Hutus in Africa. Emphasis on historical circumstances, national sentiment, the state apparatus, and the contemporary implications of genocide.

COLLOQUIA AND SEMINARS

All courses 2 hr./wk., plus conf.; 3 cr.

B2301: A History of Dutch Architecture
The climatic, topographical and cultural underpinnings of Dutch design from seventeenth century "Golden Age" to the present. Emphasis on nineteenth and twentieth century developments, particularly social housing, the "Amsterdam School" and the "Nieuwe Bowen," as well as prominent contemporaries like Van Eyck and Hertzberger, and younger practitioners like Alberts and Somers. The "polder" system and today's towns, municipal and regional planning also discussed. Slides, lectures, discussions and readings.

B2302: The Age of Enlightenment
The eighteenth century's project of applying reason to experience and to the improvement of social existence. Main topics: retrieval of exotic cultures; meditation on happiness and pleasure; problem of luxury; discovery of the market; secular society and its history; the French Revolution; reform and violence.

B2303: Major Developments in Western European History Since 1918
Emphasis on overall trends as well as specific national developments in Western Europe. After considering the Versailles Peace Conference, attention directed to Western Europe between the two World Wars: the Weimar Republic, France, British economic and imperial problems, Fascist Italy, Nazi Germany, and the small states. The remote and immediate causes, events and results of World War II are treated, as well as developments since 1945.

B2304: The Third Reich
Hitler, Nazism and Nazi Germany. Topics include: social, political and economic preconditions to the Nazi takeover; anti-Semitism; cultural and artistic policies of Nazi Germany; the churches; the film industry; varieties of resistance; concentration camps; the conquest of Europe; mass murder; fall of the Third Reich.

B2402: American Frontiers: Race, Religion and Culture
The expansion of the U.S. as a cultural process—a meeting of various peoples—through a series of case studies: the English and Indians in New England; Africans and Europeans in the South; Dutch, Indians and Americans in New York, and the Anglos, Mexicans and Indians of the Southwest. Themes include: European colonization, rise of slavery, commercialization of agriculture, and development of ethnic and regional identities.

B2403: Organic Architecture: Henry Hobson Richardson, Louis Sullivan and Frank Lloyd Wright
Searching for an indigenous architecture based on nature, these three put United States design on the international map from the 1870s to the 1950s, all of them representing an architectural philosophy alien to modernisms. Their confrontations with social issues such as urbanization, corporate power, and the nature of the family. Their role in transferring American architecture from the artist’s salon to the arena of cultural reform. Slides, discussions, readings by and about the architects.

B2404: Markets and Mansions: the Material World of Nineteenth Century Americans
The commercialization of culture in Nineteenth century U.S. through an examination of historical artifacts. These objects, such as silk portraits, popular prints and books, and vernacular houses. Studies in the context of historical change, using theories of material culture.

B2406: American Diplomatic History
Research on selective problems in American foreign relations since 1898. An examination of some aspects of the increasing role of the United States in international affairs. Prereq: a year of American history at the college level, including at least one course in the recent history of the United States.

B2502: Seminar: Latin America in World Affairs
Treats the growth of Latin America’s world contacts, with special emphasis on the twentieth century and the Latin American viewpoint. Economic, political, religious, social, and diplomatic matters considered.

B2701: A Social History of Modern South Africa
From the mineral revolution, 1871 to the present. Focus on the special forces that created modern South Africa, with special attention to the creation of the black working class, the decline/collapse of the Black peasantry, the evolution of the privileged white working class and Afrikaner ideology, the introduction of East Indian and Chinese labor, and the evolution of social movements of women, workers, squatters, and peasants to resist the apartheid system.
B2903: Classics of Historical Writing and Thought
A review of the major phases of historiography followed by consideration of some of the thinkers that influenced these developments, e.g., Machiavelli, Rousseau, Marx.

B2906: Seminar: Imperialism in World Affairs
Research in selected case studies of imperialist contacts and conflicts; patterns of control; native acquiescence and discontent; achievements and failures.

B2907: Seminar: Nationalism in International Relations
A comparative study of national developments and nationalist trends during the nineteenth century as background for the contemporary policies of the major powers.

B4100-5900: Independent Studies
Sequence of directed readings and tutorials, available only with the Chair's permission. Interested students should inquire, usually after having completed 15 credits.

B9900: Thesis Research
The thesis is required for the M.A. degree. Each candidate will prepare a thesis under the guidance of a faculty advisor. Arrangements for thesis work should commence as soon as the candidate has completed 15 graduate credits. Completion of the foreign language requirement is advisable prior to starting work on the thesis. (Required of all students.)

FACULTY

Harriet Alonso, Professor
B.S., New York Univ.; M.A., Sarah Lawrence; Ph.D., SUNY (Stony Brook)

Beth Baron, Professor
B.A., Dartmouth College; M.A., Univ. of London; Ph.D., Univ. of California (Los Angeles)

Susan K. Besse, Associate Professor
Certificat, Institut d'Etudes du Developpement, Geneva, Switzerland; B.A., Smith College; Ph.D., Yale Univ.

Barbara Brooks, Associate Professor
B.A., Yale Univ.; Ph.D., Princeton Univ.

Frank D. Grande, Associate Professor
B.A., The City College; M.A., Columbia Univ.; D.Phil, Oxford

Venus Green, Associate Professor
B.A., Hunter College; M.A., Columbia Univ., Ph.D.

Danian Hu
B.S. (CE), Beijing Jiaotong Univ.; M.A., Case Western Reserve Univ.; Ph.D., Yale Univ.

Henry Huttenbach, Professor
B.A., Gonzaga Univ.; Ph.D., Univ. of Washington

David Jaffee, Professor
B.A., Harvard Univ., M.A., Ph.D.

David Johnson, Associate Professor
B.A., Univ. of Sussex, England, M.A., Univ. of London, Ph.D.

Ravi Kalia, Professor
B.A., Univ. of Delhi, M.A.; Ph.D., Univ. of California (Los Angeles), M.B.A.

Andreas Killen
B.A., Reed College (English); M.A., New York Univ., Ph.D.

James I. Lewis, Lecturer
B.A., American Univ.; M.A., Washington Univ., Ph.D.

Barbara Naddeo, Assistant Professor
B.A., Univ. of Chicago; Ph.D. Princeton Univ.

Gerardo Renique, Associate Professor
B.S., Universidad Nacional Agraria (Peru); M.A., Columbia Univ., Ph.D.

Clifford Rosenberg, Assistant Professor
B.A., Carleton College; M.A., Princeton Univ., Ph.D.

Richard Skolnik, Professor
B.A., Dartmouth College; M.A., Yale Univ., Ph.D.

Darren Staloff, Associate Professor and Chair
B.A., The City College; M.A., Columbia Univ., Ph.D.

Judith Stein, Professor
B.A., Vassar College; Ph.D., Yale Univ.

Robert C. Twombly, Professor
B.A., Harvard Univ.; M.A., Univ. of Wisconsin, Ph.D.

J. F. Watts, Professor
B.S., SUNY (Oneonta); M.A., Univ. of Missouri, Ph.D.

PROFESSORS EMERITI

Bernard Bellush
Fred L. Israel
Lawrence Kaplan
Radmila Milentijevic
Dante A. Puzzo
Conrad M. Schirokauer
George Schwab
Herbert A. Strauss
Walter Struve
Arthur E. Tiedemann
Martin Waldman
Joel H. Wiener
Irwin H. Yellowitz
Oscar Zeichner
International Relations Program

(DIVISION OF SOCIAL SCIENCE)

Professor Bruce Cronin, Director • Program Office: NAC 4/136 • Tel: 212-650-5844

The City College offers the following master’s degree in International Relations:

M.A.

PROGRAMS AND OBJECTIVES

The program covers the following areas:

International Relations
International Economics
International Organization
Diplomacy
Foreign Policy of Selected Regions

DEGREE REQUIREMENTS

Required Courses
One of the following: 3
ECO B8400: International Economic Policy (3 cr.)
IR B6927: International Political Economy (3 cr.)

International Relations:
B4100: Seminar in International Relations 3
B6100: Theory of International Relations 3
B6200: International Organization 3
B6300: International Law 3
B6800: Research Methods 3
B9900: Thesis Research 3

Elective Courses
Additional graduate courses 9

Total Credits 30

Additional Requirements
Three classes should be chosen from the graduate level courses offered in International Relations or Economics.

Courses may also be taken, by permission, at the Graduate School of CUNY.

Thesis: Required.

Foreign Language Proficiency:
Students must demonstrate reading proficiency in a language approved by the graduate advisor.

ADVISEMENT

Professor Sherri Baver, Political Science
Professor Vince Boudreau, Political Science
Professor Jacqueline Braveboy-Wagner, Political Science
Professor Bruce Cronin, Political Science
Professor Jorgen Dedring, MPIR
Professor John Harbeson, Political Science
Professor David Johnson, History Dr. Jean Krasno, Colin Powell Center
Professor Perezi Kamunanwire, Black Studies
Professor Mitchell Kellman, Economics
Professor Jean Krasno, Political Science
Professor Gergana Trainor, Economics

COURSE DESCRIPTIONS

Economics

B8400: International Economic Policy
Focuses on the analytic foundations underlying international economic policymaking with particular attention to competitiveness, the institutions affecting them, foreign exchange markets, and major trade policies of various countries. 2 HR./WK. PLUS CONF.; 3 CR.

International Relations

B2502: Latin America and the Caribbean in World Affairs
Examines inter-American relations and the foreign policies of selected countries in the region. It also explores various themes such as democratization, populism, military authoritarianism, economic development and the relationship of Latin America and the Caribbean with the United States. 2 HR./WK. PLUS CONF.; 3 CR.

B4100: Seminar in International Relations
Explores issues in the practice of international relations by applying various theories and approaches to contemporary global issues. In doing so, the course examines concepts such as hegemony, the post-Cold War system, nationalism, sovereignty, the “democratic peace,” and globalization. 2 HR./WK. PLUS CONF.; 3 CR.

B6100: Theories of International Relations
Offers an introduction to contemporary theories and concepts in the discipline of international relations. In particular, the course examines the competing paradigms offered by realism, liberalism, globalism, the English School, and constructivism. The course is designed to advance students’ knowledge of international relations by focusing on the ways in which theory can help them grasp the complexities of relationships among states and other international actors. 2 HR./WK. PLUS CONF.; 3 CR.

B6200: International Organization
Analyses the major global and regional organizations and institutions that provide for cooperation among states, with an emphasis on the United Nations system. In particular, the course examines how these organizations attempt to address problems of peace and security, economic and social development, human rights, and humanitarian assistance. 2 HR./WK. PLUS CONF.; 3 CR.

B6300: International Law
Examines the role and function of public international law in regulating the relations among sovereign states. Among other areas, the course focuses on the rights and duties of states, multilateral

GENERAL INFORMATION

The City College offers the following master’s degree in International Relations:

M.A.

PROGRAMS AND OBJECTIVES

The program covers the following areas:

International Relations
International Economics
International Organization
Diplomacy
Foreign Policy of Selected Regions

DEGREE REQUIREMENTS

Required Courses
One of the following: 3
ECO B8400: International Economic Policy (3 cr.)
IR B6927: International Political Economy (3 cr.)

International Relations:
B4100: Seminar in International Relations 3
B6100: Theory of International Relations 3
B6200: International Organization 3
B6300: International Law 3
B6800: Research Methods 3
B9900: Thesis Research 3

Elective Courses
Additional graduate courses 9

Total Credits 30

Additional Requirements
Three classes should be chosen from the graduate level courses offered in International Relations or Economics.

Courses may also be taken, by permission, at the Graduate School of CUNY.

Thesis: Required.

Foreign Language Proficiency:
Students must demonstrate reading proficiency in a language approved by the graduate advisor.

ADVISEMENT

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Professor David Johnson, History Dr. Jean Krasno, Colin Powell Center
Professor Perezi Kamunanwire, Black Studies
Professor Mitchell Kellman, Economics
Professor Jean Krasno, Political Science
Professor Gergana Trainor, Economics

COURSE DESCRIPTIONS

Economics

B8400: International Economic Policy
Focuses on the analytic foundations underlying international economic policymaking with particular attention to competitiveness, the institutions affecting them, foreign exchange markets, and major trade policies of various countries. 2 HR./WK. PLUS CONF.; 3 CR.

International Relations

B2502: Latin America and the Caribbean in World Affairs
Examines inter-American relations and the foreign policies of selected countries in the region. It also explores various themes such as democratization, populism, military authoritarianism, economic development and the relationship of Latin America and the Caribbean with the United States. 2 HR./WK. PLUS CONF.; 3 CR.

B4100: Seminar in International Relations
Explores issues in the practice of international relations by applying various theories and approaches to contemporary global issues. In doing so, the course examines concepts such as hegemony, the post-Cold War system, nationalism, sovereignty, the “democratic peace,” and globalization. 2 HR./WK. PLUS CONF.; 3 CR.

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Offers an introduction to contemporary theories and concepts in the discipline of international relations. In particular, the course examines the competing paradigms offered by realism, liberalism, globalism, the English School, and constructivism. The course is designed to advance students’ knowledge of international relations by focusing on the ways in which theory can help them grasp the complexities of relationships among states and other international actors. 2 HR./WK. PLUS CONF.; 3 CR.

B6200: International Organization
Analyses the major global and regional organizations and institutions that provide for cooperation among states, with an emphasis on the United Nations system. In particular, the course examines how these organizations attempt to address problems of peace and security, economic and social development, human rights, and humanitarian assistance. 2 HR./WK. PLUS CONF.; 3 CR.

B6300: International Law
Examines the role and function of public international law in regulating the relations among sovereign states. Among other areas, the course focuses on the rights and duties of states, multilateral
treaties, sovereignty, human rights, the laws of warfare, the use of force, refugees, and international criminal tribunals.
2 HR./WK. PLUS CONF.; 3 CR.

**B6600: Internship**
Students may earn three credits for an internship with an international organization, non-governmental organization, government agency or policy think tank involved in the practice of international relations. Those doing so must get permission from the Program Director and work seven hours at the agency. The student must provide to the MPIR office a letter from the agency/organization confirming his or her appointment and outlining his or her duties. Prerequisite: B4100, B6100, B6200, B6300 and permission of the program director. 3 CR.

**B6800: Research Methods**
Provides an introduction to social science research and writing as it applies to the study of international relations. This course helps prepare students to write their master’s thesis. As part of this class, each student develops a research proposal for his or her thesis. Prerequisite: At least 18 cr. completed prior to beginning the course. Prerequisite: successful completion of 18 credits including IR B6100, B4100, B6200, B6300. 2 HR./WK. PLUS CONF.; 3 CR.

**B6915: Asia in World Affairs**
Explores the political dynamics that define Asia as a region, with a particular focus on the East Asian areas of China, Japan, South Korea and Singapore. Topics include the rise of nations and the formation of modern states, the impact of imperialism, political economy, and the growing role of China and Japan in world politics. 2 HR./WK. PLUS CONF.; 3 CR.

**B6917: Africa in World Affairs**
Analyses the political relations among black African states and between such states and the Western powers. Topics include: imperialism, slavery, and colonialism; wars of independence; inter-state relations and economic cooperation; and the role of international organizations in promoting human rights and the resolution of conflicts. 2 HR./WK. PLUS CONF.; 3 CR.

**B6918: The Practice of Diplomacy**
Examines how international relations are conducted at the dawn of the 21st century, from both a theoretical and empirical perspective. In doing so, the course provides students with an understanding of the principles that underlie the practice of diplomacy in bilateral and multilateral settings and the concrete tools and processes utilized by diplomats in the course of their work. 2 HR./WK. PLUS CONF.; 3 CR.

**B6920: The Middle East in World Affairs**
Analyzes the relations among Middle East states and between the region as a whole and the rest of the world. The course pays special attention to the Israeli-Palestinian conflict, relations among Arab states and the role of the United States and Europe in the region. 2 HR./WK. PLUS CONF.; 3 CR.

**B6925: Peacemaking and Negotiation**
Examines efforts by regional and international organizations to facilitate negotiation and peacekeeping in the pursuit of international peace and security. It covers the period from the U.N.’s first inception up to current operations in the field, focusing on the Middle East, Africa, Central America, the former Yugoslavia, Cambodia, East Timor, and elsewhere. 2 HR./WK. PLUS CONF.; 3 CR.

**B6927: International Political Economy**
Explores the theories that attempt to explain the dynamics of the international economy, and examines the institutions that provide for cooperation in facilitating international trade, monetary exchange, and investment. It pays particular attention to the role of the World Trade Organization, the World Bank, the International Monetary Fund, and U.N. development agencies. Finally, it examines the debates around globalization. 2 HR./WK. PLUS CONF.; 3 CR.

**B6928: Human Rights in World Politics**
Explores the development and implementation of human rights norms within the international system. It also discusses the debates surrounding the concept of human rights in world politics and investigates efforts by states, international organizations, and non-governmental organizations to implement such norms at the national, regional and international levels. 2 HR./WK. PLUS CONF.; 3 CR.

**B6930: Europe in World Affairs**
Examines the role of the European community and its major states in world politics. In particular, the course explores the development of European politics from the Napoleonic period in the early nineteenth century through the creation of the European Union in the late twentieth century. Topics will include interstate war, security, economic integration and political relations among the states. 2 HR./WK. PLUS CONF.; 3 CR.

**B9800: Independent Study**
Students may pursue a program of independent study under the direction of a faculty member, with the approval of the Program Director. Such a program may not be pursued in lieu of a course that is already offered by the program. 1-3 CR.

**B9900: Thesis Research**
Prerequisite: successful completion of 24 credits including IR B6100, B4100, B6200, B6300, B6800 and approval of the program director.
The City College offers the following master’s degree in Mathematics:

M.A.

PROGRAMS AND OBJECTIVES

Candidates for the M.A. degree in Mathematics choose one of the following specializations:

Pure Mathematics
Probability and Statistics

PREREQUISITES

Students who have not completed higher analysis or advanced calculus courses deemed equivalent to Math 32300, 32400, and 32500 will be required to complete this sequence immediately upon admission; students who have not completed a satisfactory course in linear algebra will be required to complete 34600 or its equivalent during their first semester. No credit toward the master’s degree is given for any of these courses.

DEGREE REQUIREMENTS

Candidates for the M.A. degree in Mathematics must choose one of the following two options:

Option A: Pure Mathematics

Required Courses
Three B0000-level courses in Pure Mathematics  12

Elective Courses
Additional graduate courses in Mathematics  6-12

Graduate courses in other mathematically based disciplines*  0-12

Total Credits  30

Option B: Probability and Statistics

Required Courses
Three B0000-level courses in Probability and Statistics  12
Two graduate courses in Computer Science*  6

Elective Courses
Additional graduate courses in Mathematics  6-12
Graduate courses in other mathematically based disciplines*  0-6

Total Credits  30

*Prior approval for such courses must be secured from the Graduate Mathematics Advisor.

Additional Requirements
Thesis: None required.
Comprehensive Examination: A written or oral examination is required on all or part of the work counting toward the degree unless waived by the Graduate Advisor.
Foreign Language Proficiency: None required.

ADVICEMENT

Professor Thea Pignataro
NAC 8/133; 212-650-5157
E-mail: tpignataro@ccny.cuny.edu

SCHOLARSHIPS

The Dr. Barnett and Jean Hollander Rich Mathematics Scholarships
Awarded annually to talented graduate students who have demonstrated superior ability in mathematics.

COURSE DESCRIPTIONS

Option A: Pure Mathematics

A3200: Theory of Functions of a Complex Variable
A rigorous treatment of complex variables. Cauchy-Riemann equations, conformal mapping, elementary, entire, meromorphic, multiple-valued functions, Cauchy integral theorems, series expansion. 4 HR./WK.; 4 CR.

A3400: Theory of Functions of a Real Variable
Lebesgue measure and integration on the real line, differentiation of real functions and the relation with integration, classical LP spaces. 4 HR./WK.; 4 CR.

A3500: Partial Differential Equations, Integral Equations, Boundary Value Problems
First order equations, shock waves, classification and canonical forms of higher order equations, characteristics, the Cauchy problem for the wave equation, Huygens’ principle, the heat equation, Laplace’s equation, the Dirichlet and Neumann problems, harmonic functions, eigenvalue expansions, Green’s functions. 4 HR./WK.; 4 CR.

A4300: Set Theory
Axioms of Zermelo-Fraenkel set theory; relations, functions, equivalences and orderings, cardinal numbers and cardinal arithmetic; well-ordered sets, ordinal numbers, transfinite induction and recursion, the Axiom of Choice and the Continuum Hypothesis. 4 HR./WK.; 4 CR.

A4400: Mathematical Logic
The propositional calculus, the sentential calculus, normal forms, first order theories, consistency, categoricity, decidability, Godel’s Completeness Theorem, the Loewenheim-Skolem Theorem. 4 HR./WK.; 4 CR.
A4900: Introduction to Modern Algebra
Groups, rings, fields. 4 HR./WK.; 4 CR.

A6100: Differential Geometry
The theory of curves and surfaces in three-dimensional space: frames, fundamental forms, geodesics, curvature of surfaces, surface area, surfaces with boundary, the Gauss-Bonnet Theorem, introduction to Riemannian metrics. 4 HR./WK.; 4 CR.

A6300: Topology
A course in general topology. Sets of points on the real line and in general abstract spaces, relations between sets of points and between a set and the space containing it, operations with sets, open sets, countability, compactness, connectedness, maps, continuity, metric spaces, general topological spaces. 4 HR./WK.; 4 CR.

B3200: Theory of Functions of a Complex Variable II
A continuation of Math A3200, including such topics as analytic continuation, conformal mapping, Dirichlet problem, meromorphic functions, entire functions, Picard’s Theorem, elliptic functions. Prereq: Math A3200. 4 HR./WK.; 4 CR.

B3400: Theory of Functions of a Real Variable II
Abstract measure and integration theory, abstract Lebesgue measure and integral, signed measures, Radon-Nikodym derivative, L spaces, product spaces, Daniell integral. Special topics such as Stieltjes integrals, Denjoy integral, Haar measure, measure rings, applications to probability. Prereq: Math A3400. 4 HR./WK.; 4 CR.

B3500: Partial Differential Equations II
First order quasi-linear and nonlinear equations, Cauchy-Kowalewsky Theorem, well-posed problems, Cauchy problem for hyperbolic systems, the wave equation in n-dimensions, boundary value problems for elliptic equations, Laplace’s equation, parabolic equations, heat equation. Prereq: Math A3500. 4 HR./WK.; 4 CR.

B4900: Introduction to Modern Algebra II
Field extensions, Galois theory, vector spaces and modules, category theory, special topics. Prereq: Math A4900. 4 HR./WK.; 4 CR.

B6300: Topology II
An introduction to algebraic topology, following a review of general topology. Homomorphism, compactness, connectedness, arcwise connectedness, new topological properties in terms of groups, homotopy, homotopy classes, fundamental group, homology groups, simplexes, boundaries, cycles, barycentric subdivision, excision theorem, exact sequence, complexes. Prereq: Math A4900 and A6300. 4 HR./WK.; 4 CR.

Option B: Probability and Statistics

A7700: Probability Theory II
Special topics in probability such as stochastic processes, Markov chains. 4 HR./WK.; 4 CR.

A7800: Mathematical Statistics II
The multivariate normal distribution, multiple and partial correlation, regression and least squares, the analysis of variance. 4 HR./WK.; 4 CR.

B6800: Combinatorial Analysis
Permutations, combinations, generating functions and recurrence relations, inclusion and exclusion, applications to matching theory, linear and dynamic programming, Polya’s theory of counting, introduction to graph theory and coloring theory. 4 HR./WK.; 4 CR.

B7600: Advanced Topics in Statistics
The general decision problem, decision-making principles, application to hypothesis testing and estimation, minimax and Bayes solutions, utility theory, sequential procedures. 4 HR./WK.; 4 CR.

B7700: Stochastic Processes
Markov chains, limit theorems, renewal equations, random walks, Brownian motion, branching processes, queuing theory. Prereq: Math A7700. 4 HR./WK.; 4 CR.

Group II
Courses in this group will be offered on the basis of student interest. These courses may be substituted for courses in the same subject area listed under Group I.

B1100: Selected Topics in Pure Mathematics
Topics to be chosen from the areas of algebra, analysis, topology, geometry, and logic. 4 HR./WK.; 4 CR.

B1200: Selected Topics in Classical Analysis
Topics to be chosen from applied mathematics and related fields. Typical subjects are: asymptotic methods, wave propagation, mathematical biology. 4 HR./WK.; 4 CR.

B1300: Selected Topics in Probability and Statistics
Topics to be chosen from the areas of probability, statistics, game theory, combinatorial analysis, etc. 4 HR./WK.; 4 CR.

B9800: Independent Study
A program of independent study under the direction of a member of the Department, with approval of the Assistant Chair. VARIABLE CREDIT.

PH.D. LEVEL COURSES

With the approval of the Graduate Advisor students may register for Ph.D. level courses. Refer to the bulletin of The City University Graduate School for a description of courses and prerequisites.

FACULTY

Ethan Akin, Professor
B.S., The City College; Ph.D., Princeton Univ.

Joseph Bak, Associate Professor
B.A., Yeshiva Univ., M.A., Ph.D.

Jacob Barshay, Professor
A.B., Princeton Univ.; M.A., Brandeis Univ., Ph.D.

Gilbert Baumslag, Distinguished Professor
B.S., Univ. of Witwatersrand (South Africa), D.Sc.; Ph.D., Univ. of Manchester (England)

Mark Brown, Professor
B.S., The City College, M.S.; Ph.D., Stanford Univ.

Isaac Chavel, Professor
B.A., Brooklyn College; M.S., New York Univ.; Ph.D., Yeshiva Univ.

Vicki Chuckrow, Associate Professor
B.S., The City College; M.S., New York Univ., Ph.D.

Sean Cleary, Associate Professor
A.B., Cornell Univ.; Ph.D., Univ. of California (Los Angeles)

Jacob Eli Goodman, Professor
A.B., New York Univ.; A.M., Columbia Univ., Ph.D.

Edward Grossman, Professor and Chair
A.B., New York Univ., Ph.D.

Alberto Guzman, Professor
B.S., The City College; M.S., Univ. of Chicago, Ph.D.

Raymond Hoobler, Professor
A.B., Oberlin College; M.A., Univ. of California (Berkeley), Ph.D.

Karel M. Hrbacek, Professor
B.A., Yeshiva Univ., M.A., Ph.D.

Gilbert Baumslag, Distinguished Professor
B.S., Univ. of Witwatersrand (South Africa), D.Sc.; Ph.D., Univ. of Manchester (England)

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Karel M. Hrbacek, Professor
RNDr., Charles Univ. (Prague)

Jay Jorgenson, Professor
B.A., The City College, M.S.; Ph.D., Stanford Univ.

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RNDr., Charles Univ. (Prague)

Jay Jorgenson, Professor
B.S., Univ. of Minnesota; M.S., Stanford Univ., Ph.D.

Lee Kaminetzky, Associate Professor
B.S.E., George Washington Univ.; M.S., New York Univ., Ph.D.

Stanley Kaplan, Professor
B.A., Cornell Univ.; Ph.D., Harvard Univ.

Ralph D. Kopperman, Professor
A.B., Columbia Univ.; Ph.D., M.I.T.
Zeph Landau, Assistant Professor
A.B., Harvard Univ., A.M.; Ph.D., Univ. of California at Berkeley

Michael Marcus, Professor
B.S., Princeton Univ.; M.S., M.I.T., Ph.D.

Daniel Mosenkis, Lecturer
B.S., The City College; M.S., Univ. of Wisconsin

Stanley Ocken, Professor
A.B., Columbia Univ.; M.A. Princeton Univ., Ph.D.

Thea Pignataro, Associate Professor
B.S., Polytechnic Inst. of New York; M.A., Princeton Univ., Ph.D.

Rochelle Ring, Associate Professor
B.S., The City College; M.S., New York Univ., Ph.D.

David Schwinger, Lecturer
B.A., Queens College; M.A., Columbia Univ.; M.B.A., New York Inst. of Technology

Niel Shell, Professor
B.S., Polytechnic Inst. of New York, M.S., Ph.D.

Vladimir Shpilrain, Professor
M.A., Moscow State Univ., Ph.D.

William Y. Sit, Professor
B.A., Univ. of Hong Kong; M.A., Columbia Univ.; M.Sc., The City College; Ph.D., Columbia Univ.

PROFESSORS EMERITI

Harry W. Appelgate
Sherburne F. Barber
Harvey Cohn
Morton Davis
Michael Engber
John Landolfi
Jonah Mann
John Miller
Bernard Sohmer
Fred Supnick
Norman R. Wagner
The City College offers the following master’s degree in Media and Communication Arts:

**M.F.A. in Media Arts Production**

**ADMISSION REQUIREMENTS**

Applicants to the M.F.A. program in Media Arts Production must have a B.A. or B.F.A. degree with a minimum 3.0 (B) grade point average in the major. Undergraduate training in film and video must include courses in the following subjects or the equivalent: film theory and history; screenwriting; two semesters of advanced film and video production (including “hands on” courses in 16mm camera, lighting and sound); one semester each of film editing, video editing, and digital post-production; directing for fiction film video; and documentary production. Candidates who lack some of the prerequisite courses, but who show promise based on their portfolio materials may be required to take specific undergraduate courses to make up for deficiencies.

**ADVISEMENT**

Professor David Davidson  
M.F.A. Director  
Shepard 286, 212-650-7235

**DEGREE REQUIREMENTS**

**Required Courses**

**Media and Communications Arts:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B0100</td>
<td>Independent Media Arts—Idea, Structure and Realization</td>
<td>3</td>
</tr>
<tr>
<td>B2100</td>
<td>Camera I</td>
<td>3</td>
</tr>
<tr>
<td>B2200</td>
<td>Camera II</td>
<td>3</td>
</tr>
<tr>
<td>B3000</td>
<td>Digital Production</td>
<td>3</td>
</tr>
<tr>
<td>B5000</td>
<td>Editing I</td>
<td>3</td>
</tr>
<tr>
<td>B5100</td>
<td>Editing II</td>
<td>3</td>
</tr>
<tr>
<td>B5300</td>
<td>Sound Design</td>
<td>3</td>
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<tr>
<td>B6100</td>
<td>Media Arts Management</td>
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<td>B7100</td>
<td>Seminar in Independent Media Arts</td>
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<tr>
<td>B9100</td>
<td>Thesis Project I—Production</td>
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</tr>
<tr>
<td>B9200</td>
<td>Thesis Project II—Post-Production</td>
<td>6</td>
</tr>
</tbody>
</table>

**One of the following concentration sequences:**

**Sequence 1 (Fiction):**

- B3100: Fiction Screenwriting I (3 cr.)  
- B3200: Fiction Screenwriting II (3 cr.)  
- B6200: Directing Fiction (3 cr.)

**Sequence 2 (Documentary):**

- B2900: Research and Writing for Documentary I (3 cr.)  
- B3300: Research and Writing for Documentary II (3 cr.)  
- B6300: Producing and Directing the Documentary (3 cr.)

**Total Credits:** 51

Students may also choose to take an additional elective course, B9803: Independent Study, with the permission of the M.F.A. Director.

**COURSE DESCRIPTIONS**

**B0100: Independent Media Arts—Idea, Structure and Realization**

Examines the major developments in independent film, video and multimedia production and written theories and critical analysis that have resulted. Particular attention is given to media arts since 1960 and its role in questioning and reshaping American cultural identity. Prereq: MCA/M.F.A. status. Coreq.: B2100, B3100. 3 HR./WK.; 3 CR.

**B2100: Camera I**

The first of a two-semester sequence of workshops in image gathering for broadcast video and 16mm film. Through a series of production exercises, students master skills in operation of professional film and video cameras, pictorial composition for complex shots, lighting, exposure control, relationship to the director, selection of film stocks, and filtration. Prereq: MCA/M.F.A. status; coreq: B0100, B3000, B2900 or B3100. 3 HR./WK.; 3 CR.

**B2200: Camera II**

The second course in a two-semester workshop sequence in image gathering for broadcast video and 16mm film. Students build on the foundation of skills mastered in Camera I, executing increasingly more complex production exercises. Topics include moving camera, filtration for special effects, interfacing with the sound department, shooting film for video transfer, shooting video for film transfer, liaison with the laboratory, managing the professional crew, high definition television and digital video. Prereq: B2100 coreq: B3200 or B3300, B6100, B6200 or B6300. 3 HR./WK.; 3 CR.

**B2900: Research and Writing for Documentary I**

The first of a two-course sequence in conceptualizing, researching, writing and presenting an idea for a documentary film or video. Workshops focus on representational models, documentary and mass culture, testing the viability of the initial impulse, research strategies, crafting the idea into visual story, legal and ethical issues in documentary, and the filmic techniques available to the documentarian. Classes are augmented by a rigorous screening schedule of seminal documentaries. Prereq: MCA/MFA status. Coreq: B0100, B2100, B3000. 3 HR./WK.; 3 CR.

**B3100: Fiction Screenwriting I**

Focuses on researching and writing the narrative thrust of the thesis production regardless of genre or production format. Course covers various types of writing for film, video and hypermedia. Candidates are required to develop the story or concept proposal for their thesis production. Prereq: MCA/M.F.A. Status; coreq: B0100, B2100, B3000. 3 HR./WK.; 3 CR.
B3200: Fiction Screenwriting II
Required of students whose thesis projects will be fiction or cross-genre based. Students work on refining thesis screenplays by analyzing their story's tension devices, dialogue, action lines, and the visual components of the story. Each student will complete a screenplay of between thirty and sixty pages depending on the requirements for thesis production. Prereq: B3100; coreq: B2200, B5000, B6100. B6200. 3 HR./WK.; 3 CR.

B3300: Research and Writing for Documentary II
Conceptualizing, researching, developing, and writing advanced projects in documentary and cross-genre work with documentary elements. Required for students whose thesis projects will be in documentary or cross-genre with significant documentary elements. Prereq: B2900, coreq: B2200, B5000, B6100, B6300. 3 HR./WK.; 3 CR.

B3000: Digital Production
Using new technologies of cinema, digital video cameras and computer editing, this class lays the groundwork for the completion of short works. Prereq: MCA/MFA status. Coreq: B1000, B2100, B2900, or B3100. 3 HR./WK.; 3 CR.

B5000: Editing I
Skill-based course providing a thorough introduction to digital non-linear editing. Students use the techniques learned in the first half of this course to edit and refine their own projects in the second half. Additional non-editorial features of Final Cut Pro are covered to an intermediate level. Lectures, screenings and discussions augment the practical experience with elements of design and theory. Prereq: B3000; coreq: B2200, B5000, B2900 or B3100, B6200 or B6300. 3 HR./WK.; 3 CR.

B5100: Editing II
Students master editing techniques as demonstrated in screening and analysis of creative work in a variety of genres. This project-oriented class allows students to learn and apply advanced picture, graphic and sound capabilities of the AVID Media Composer to editing exercises in fiction, documentary, and cross-genre work. Prereq: B5000; coreq: B5200, B9100. 3 HR./WK.; 3 CR.

B5300: Sound Design
Exploration of the aesthetics and practice of audio as a creative element in film and video production. Through a series of exercises, students learn to shape the aural environment of voice, music and sound effects to support the dramatic intent of a particular piece. Prereq: B3000. Coreq: B9200, B7100. 3 HR./WK.; 3 CR.

B6100: Media Arts Management
Concepts and procedures necessary for organizing and completing thesis productions. This planned management course examines the pre-production, production, and post-production processes and assists candidates in preparing deliverables for an organized production. Prereq: B3000.; coreq: B5000, B3300 or B3200, B6200 or B6300. 3 HR./WK.; 3 CR.

B6200: Directing Fiction
Required of candidates whose thesis project will be fiction-based regardless of format. Emphasis is on interpreting the screenplay, use of metaphor, rhythm, development of inner monologues, and shaping performance for camera. Candidates will direct scenes from screenplays developed in Fiction Screenwriting II. Prereq: B3000.; coreq: B2200, B2300, B5000, B6100. 3 HR./WK.; 3 CR.

B6300: Producing and Directing the Documentary
An advanced workshop examining the unique combination of skills required for the Director/Producer of documentary and cross-genre work with documentary elements. Students carry out exercises that hone skills in logistics and aesthetics of creative documentary that test the assumptions of the documentary proposals they create in Researching and Writing Documentary II. Required for students whose thesis projects will be reality-based. Prereq: B3000; coreq: B2200, B6100, B3300, B5000. 3 HR./WK.; 3 CR.

B7100: Seminar in Independent Media Arts
The capstone course of the program. Students and faculty evaluate the current state of media arts production, and potential roles for our graduates in that domain. Sessions are augmented by guest seminars conducted by working media artists from all areas of the independent community. Prereq: B9100; coreq: B5300, B9200. 3 HR./WK.; 3 CR.

B9100: Thesis Project I—Production
The first part of producing the thesis project. Proposals previously submitted by candidates and approved by the M.F.A. Faculty Committee will begin production. Projects are expected to be original and represent a contribution to the field of media arts. Prereq: B6100; coreq: B5100. 9 HR./WK.; 9 CR.

B9200: Thesis Project II—Post Production
Culminating course required of all candidates in the major. Candidates complete their thesis production and present at the annual student media arts showcase. Productions are expected to be original and represent a contribution to the field of media arts. Prereq: B9100; coreq: B7100, B3300. 6 HR./WK.; 6 CR.

B9803: Graduate Independent Study
Advanced research and project development at the graduate level under the supervision of a faculty mentor. This course will be offered to students in the MFA in Media Arts Production program for projects, which fall outside of the requirements for existing MFA courses, but are relevant to a student’s specialization in the program. Only projects that will not put a burden on the program’s equipment pool will be considered. Registration is only permitted by the Department’s MFA Committee approval of a written proposal. Interested students should consult their program advisors on guidelines for creating proposals. Prereq: MCA/MFA Status. 3 HR./WK.; 3 CR.

FACULTY

Jerry Carlson, Associate Professor
B.A., Williams College; M.A., Univ. of Chicago, Ph.D.

Campbell Daglish, Assistant Professor
B.A., Univ. of Colorado; B.F.A., Yale School of Drama

David Davidson, Professor
B.A., Univ. of Illinois; M.F.A., New York Univ.

Andrzej Krakowski, Professor
M.F.A. (Equiv.), Polish State Film School, American Film Institute.

Herman Lew, Assistant Professor
B.A., California State Univ. (Los Angeles); M.F.A., New York Univ.

Babak Rassi, Assistant Professor
B.A., George Mason Univ., M.F.A., Florida State Univ.

Andrea Weiss, Associate Professor
B.A., State Univ. of New York at Binghamton; Ph.D. (American History), Rutgers’s Univ.
The City College offers the following master’s degree in Music:

**M.A.**

The graduate program is designed to award the Master of Arts degree to those interested in acquiring the academic foundation for careers in classical and jazz performance, music history, theory composition and teaching.

**DEGREE REQUIREMENTS**

**Requirements for All Students**

- **V0000: Bibliography and Research Techniques** 3 HR./WK.; 3 CR.
- **V2100, V2200: Structures of Music I, II** 4 HR./WK.; 2 CR.
- **V6000-6800: Seminar in Style Criticism** 6 HR./WK.; 2 CR.

Students specializing in Jazz Performance are required to take only one semester of Style Criticism.

**Specialization Requirements**

**Music History**

- **B1900: Thesis Research** 3 HR./WK.; 3 CR.
- Courses in Group III (Composition/Theory) 2-5 HR.

**Theory**

- **B1900: Thesis Research** 3 HR./WK.; 3 CR.
- **V7000: History of Music Theory** 3 HR./WK.; 3 CR.
- Courses in Group II (History) 0-3 HR.
- Courses in Group III (Composition/Theory) 8-11 HR.

**Composition**

- **V3100: Composition (4 semesters)** 8 HR.
- **V3200: Composition Thesis** 1 HR.
- Courses in Group II (History) 3-6 HR.
- Courses in Group III (Composition/Theory) 2-5 HR.

**Total Credits** 30 HR.

**Classical Performance**

- **V8100: Private Instruction (4 semesters)** 8 HR.
- **V8200: Recital** 1 HR.
- **V8300, V8400: Ensemble (4 semesters)** 4 HR.
- **V8000: Seminar in Performance Practice** 3 HR.

**Jazz Performance**

- **V8100: Private Instruction (4 semesters)** 8 HR.
- **V8200: Recital** 1 HR.
- **V2300: Structures of Music III** 2 HR.
- **V6900: Seminar in Jazz History** 3 HR.
- **V8400: Ensemble (4 semesters)** 4 HR.

**Total Credits** 32 HR.

**Additional Requirements**

The Graduate Committee may waive or modify some of these required courses for students with equivalent training. In addition, up to 6 credits may be taken in related fields with permission of the Department.

**Thesis:** Students majoring in Music History and in Theory submit a thesis based on original research. Students majoring in Composition submit an original composition of substantial length together with a detailed explanation of its structure and devices. Guidelines for the format of theses are available from the Director of Graduate Studies.

**Recital:** Students majoring in Performance present a full-length recital, accompanied by an essay concerning an aspect of their recital program.

**Comprehensive Examinations:** The examinations cover history, theory, source materials, and style analysis.

**Foreign Language Requirement:** Proficiency requirements may be met in one of the following: French, Italian, German or Spanish.

**ADVICEMENT**

Graduate students meet with the Director of Graduate Studies, Professor Shaun O’Donnell (Shepard 82C; 212-650-7683; sodonnell@ccny.cuny.edu) at registration each semester to review their progress and to plan their programs.

**COURSE DESCRIPTIONS**

**Group I. Required Courses**

**V0000: Bibliography and Research Techniques**

The study and evaluation of sources and bibliographical methods. 3 HR./WK.; 3 CR.

**V2100: Structures of Music I**

Survey of harmony, voice leading, counterpoint, and form in common practice tonal music. 3 HR./WK.; 2 CR.

**V2200: Structures of Music II**

An introduction to the theory and analysis of post-tonal music. This seminar explores 20th-century repertoire and secondary literature by contemporary theorists. Prereq.: Mus V2100. 3 HR./WK.; 2 CR.

**V2300: Structures of Music III**


**Group II. Courses in History and Critical Research**

**V6000-6800: Special Topics in the History of Music /Music History Seminars**

Seminars in various historical periods of music. Specific topics offered in a given
semester will vary according to the needs of students and the availability and interest of faculty. 3 HR./WK.; 3 CR.

V6900: Jazz History Seminar
An in-depth examination of the work of a seminal artist, or time period, critical to the development of jazz. 3 HR./WK.; 3 CR.

V7000: History of Chamber Music
Examination of the evolution of various chamber music combinations from the Baroque trio sonata to modern times. Emphasis on the stylistic history of the string quartet. 3 HR./WK.; 3 CR.

V7200: The Musical Experience
The essence of music as viewed from the perspective of the science, the social sciences, and the humanities. An examination of the role music plays in the human experience. 3 HR./WK.; 3 CR.

V9100: Tutorial
Independent study under guidance of a faculty member. Hours and credits vary.

**Group III. Courses in Composition and Theory**

V3100: Composition
Individual projects. MAY BE TAKEN UP TO 4 TIMES. 2 HR./WK.; 2 CR.

V3200: Composition Thesis
Preparation of the substantial musical composition required for the degree. Work to be done under the guidance of a faculty advisor, whose approval is required prior to registration. Prereq: three semesters of Music V3100. May be taken along with a fourth semester of V3100. 1 HR./WK.; 1 CR.

V5200: Advanced Counterpoint
Composition of tonal and/or modal counterpoint according to style models. Analysis of tonal and/or modal counterpoint. 3 HR./WK.; 3 CR.

V5300: Analytic Techniques of Tonal Music
Concentration on tonal pitch structures in analysis and/or composition. 3 HR./WK.; 3 CR.

B2800: Advanced Orchestration
Modern practices in scoring. Projects in orchestrating original works. Arranging and scoring of piano and vocal materials for special groups. 3 HR./WK.; 3 CR.

B3100: Advanced Score Reading and Conducting
Playing from score using old clefs, transposition. Preparing piano reductions from orchestral scores. Developing baton techniques to deal with the problems of 20th century music. Rehearsal techniques for work with instrumental and vocal groups at various levels of proficiency. 3 HR./WK.; 3 CR.

**Group IV. Courses in Performance**

V8101: Private Instruction in Piano or Voice, and Performance Seminar
One-hour lesson per week plus participation in two-hour weekly seminar. May be taken only by graduate students with a specialization in performance. May be taken four times. 3 HR./WK.; 2 CR.

V8103: Private Instruction on Instrument
One-hour lesson per week. May be taken only by graduate students with a specialization in performance. May be taken four times. 1 HR./WK.; 2 CR.

V8200: Recital
Recital performed at the College. The program will be chosen in consultation with the faculty advisor, and approved by the graduate advisor during the semester prior to that in which the recital is performed. Historical-analytical background material will be prepared by the student prior to the performance. This course stands in lieu of Music B1900 (Thesis Research) as a requirement for students with a specialization in performance. 1 CR.

V8300: Chamber Music
Rehearsal and performance preparation of works from the 18th century through 20th century repertoire. For instrumental performance majors only. May be taken up to four times. 2 HR./WK.; 1 CR.

V8400: Ensemble
Rehearsal and performance participation in various ensembles, according to major instrument. For performance specialization only. MAY BE TAKEN UP TO FOUR TIMES. 3 HR./WK.; 1 CR.

**Group V. Thesis**

See also V3200, V8200

B1900: Thesis Research
Preparation of the thesis or composition required for degree candidates with specializations in Musicology and Theory. Work to be done under the guidance of a faculty advisor, whose approval is required prior to registration. HRS. TO BE ARRANGED; 3 CR.

**Ph.D. Courses**

Courses with V numbers may be credited toward the Ph.D. in Music for students matriculated at The City University Graduate School. For further information on the Ph.D. in Music, refer to the Bulletin of The City University Graduate School.

**FACULTY**

Daniel Carillo, Assistant Professor
B.A., The City College, M.A.

Alison Deane, Associate Professor
B.M., Manhattan School of Music, M.M.

David Del Tredici, Distinguished Professor
B.A., Univ. of California (Berkeley); M.F.A., Princeton Univ.

John Graziano, Professor
B.S., New York Univ.; B.A., The City College; M.M., Yale Univ., M.Ph., Ph.D.

Barbara R. Hanning, Professor
B.A., Barnard College; Ph.D., Yale Univ.

Michael Holober, Assistant Professor
B.A., SUNY (Oneonta); M.M., SUNY (Binghamton)

Stephen Jablonsky, Associate Professor and Chair
B.A., The City College; M.A., New York Univ., Ph.D.

Paul Kozel, Associate Professor
B.Mus., Cleveland State Univ.; M.A., The City College

Shaun O’Donnell, Associate Professor
B.A., Queens College, M.A.; Ph.D., CUNY

John Pattucci, Associate Professor
Jonathan Perl, Assistant Professor
B.F.A., CUNY; B.A., SUNY Purchase

Jonathan Pleslak, Assistant Professor
B.A., Davidson College; M.A., Univ. of Michigan (Music Theory), M.A. (Music Composition), Ph.D.

Scott Reeves, Associate Professor
B.M., Indiana Univ., M.M.

Janet Steele, Assistant Professor
B.M., Univ. of Iowa; M.M., Yale Univ.

**PROFESSORS EMERITI**

David Bushler
Ronald L. Carter
Constantine Cassolas
William D. Gettel
Fritz Jahoda
Joel Lester
Ruth H. Rowen
Jack Shapiro
Edgar Summerlin
Henrietta Yurchenco

**ARTISTS-IN-RESIDENCE**

The Vanguard Jazz Orchestra
Musicians’ Accord
The City College offers the following master’s degree in Physics:

M.A.

## DEGREE REQUIREMENTS

### Required Courses

<table>
<thead>
<tr>
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<th>Credits</th>
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<tr>
<td>V0100</td>
<td>Mathematical Methods in Physics</td>
<td>4</td>
</tr>
<tr>
<td>V1100</td>
<td>Analytical Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>V1500-1600</td>
<td>Electromagnetic Theory</td>
<td>8</td>
</tr>
<tr>
<td>V2500-2600</td>
<td>Quantum Mechanics</td>
<td>8</td>
</tr>
</tbody>
</table>

### Elective Courses

6

Total Credits: 30

### Additional Requirements

No more than nine credits taken in 60000-level courses (see Physics 55100-55500, 58000, 58100 in the Undergraduate Bulletin) may be counted toward the graduate degree. Nine credits may be taken in graduate courses in subjects other than Physics, upon approval of the Graduate Committee.

- **Thesis:** Not required.
- **Comprehensive Examination:** A written comprehensive examination is required unless waived by the Graduate Committee.
- **Foreign Language Requirement:** Not required.

## TRANSFER TO PH.D. PROGRAM

Students in the Master’s Program at The City College can usually transfer to the Ph.D. program by taking and passing the “First Examination.” See the Graduate Advisor.

## GENERAL INFORMATION

The City College offers the following master’s degree in Physics:

M.A.

## DEGREE REQUIREMENTS

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- **Thesis:** Not required.
- **Comprehensive Examination:** A written comprehensive examination is required unless waived by the Graduate Committee.
- **Foreign Language Requirement:** Not required.

## ADVISEMENT

**Graduate Advisor**

Prof. Timothy Boyer

Marshak 331; 212-650-5585

## COURSE DESCRIPTIONS

### MASTER’S LEVEL COURSES

#### U3500: Modern Physics I (same as Physics 55100)

3 HR./WK.; 3 CR.

#### U4500: Solid State Physics (same as Physics 55400)

3 HR./WK.; 3 CR.

#### V0100: Mathematical Methods in Physics

Topics in complex variables; methods for ordinary and partial differential equations; Green’s functions; eigenfunction expansions; integral transforms; integral equations; tensor analysis; group theory; higher algebra; numerical methods. All master’s students will generally be required to take Physics V0100. 3 HR./WK., PLUS CONF.; 4 CR.

#### V1100: Analytical Dynamics

The Lagrangian formulation, including Hamilton’s principle; Lagrange’s equations; central force motion; Kepler problem, scattering; rigid body motion; transformation matrices. Eulerian angles, inertia tensor. The Hamiltonian formulation including canonical equations; canonical transformations; Hamilton-Jacobi theory. Small oscillations. Continuous systems and fields. Relativistic dynamics. All master’s students will generally be required to take V1100. Prereq or coreq: Physics V0100. 3 HR./WK., PLUS CONF.; 4 CR.

#### V1500-1600: Electromagnetic Theory

Electrostatics, magnetostatics, and boundary value problems; Maxwell’s equations; multipole radiation from accelerated charges; scattering theory; special theory of relativity. Prereq or coreq: Physics V0100. All master’s students will generally be required to take V1500-1600. 3 HR./WK., PLUS CONF.; 4 CR./SEM.

#### V2500-2600: Quantum Mechanics


#### V3800: Biophysics

Introduction to the structure, properties and function of proteins, nucleic acids, lipids and membranes. In depth study of the physical basis of selected systems including vision, nerve transmission, photosynthesis, enzyme mechanism and cellular diffusion. Introduction to spectroscopic methods for monitoring reactions and determining structure including light absorption or scattering, fluorescence NMR and X-ray diffraction. The course emphasizes reading and interpretation of original literature. 3 HR./WK., PLUS CONF.; 4 CR.

#### V4100: Statistical Mechanics

Probability theory, ensembles, approach to equilibrium, quantum and classical ideal and non-ideal gases, cooperative phenomena, density matrices, averages and fluctuations, and other selected topics, such as the time-temperature Green’s functions, non-zero temperature variational and perturbation methods. Prereq: Physics V2500. 3 HR./WK., PLUS CONF.; 4 CR.

#### V4500: Solid State Physics

Principles of crystallography; crystal structure; lattice vibrations, band theory,
defects; study of ionic crystals, dielectrics, magnetism, and free electron theory of metals and semiconductors. Topics of current interest such as high temperature superconductivity, quantum Hall Effect, and fullerenes will be included, depending on interest. Prereq: Physics V2500. 3 HR./WK., PLUS CONF.; 4 CR.

V7100, 77200: Graduate Physics Laboratory I, II
The concepts and tools of experimental physics. Basic analog apparatus and digital electronics; the use of minicomputers for data acquisition, the control of experiments and data analysis; discussion of intrinsic noise and error analysis. Execution of several advanced experiments, including statistics of radioactive decay, Raman spectroscopy, temperature dependence of resistivity, and others. The second semester of this course is W5901. 2 LECT., 2 LAB. HR./WK.; 4 CR.

DOCTORAL COURSES OPEN TO MASTER’S STUDENTS

The City College is the major participant in the University Ph.D. program in Physics. A set of graduate courses is offered at City College, as well as extensive research facilities for experimental and theoretical research. Both master’s and undergraduate students often take part in these research efforts. For more details please see the Bulletin of The Graduate School of the City University of New York.

Some of the courses offered regularly on the advanced level include:

W1200: Continuum Mechanics
4 CR.

W2005-2600: Quantum Field Theory
4 CR./SEM.

W3400: Theory of Relativity
4 CR.

W4500-4600: Quantum Theory of Solids
4 CR./SEM.

W5100-5900: Selected Topics in Advanced Physics
4 CR.

FACULTY

Adolf A. Abrahamson, Professor
B.A., New York Univ., M.S., Ph.D.
Robert R. Alfano, Distinguished Professor
B.S., Fairleigh Dickinson Univ., M.S.; Ph.D., New York Univ.
Joseph L. Birman, Distinguished Professor
B.S., The City College; M.S., Columbia Univ., Ph.D.
Timothy Boyer, Professor
B.A., Yale Univ.; M.A., Harvard Univ., Ph.D.
Ngee-Pong Chang, Professor
B.S., Ohio Wesleyan Univ.; Ph.D., Columbia Univ.
Victor Chung, Professor
S.B., M.I.T., S.M.; Ph.D., Univ. of California (Berkeley)
Harold Falk, Professor
B.S., Iowa State Univ.; Ph.D., Univ. of Washington
Swapan K. Gayen, Associate Professor
B.Sc.(Honors), Univ. of Daaca, M.Sc.; M.S., Univ. of Connecticut, Ph.D.
Joel Gersten, Professor
B.S., The City College; M.A., Columbia Univ., Ph.D.
Daniel M. Greenberger, Professor
B.S., M.I.T.; M.S., Univ. of Illinois, Ph.D.
Marilyn Gunner, Professor
B.A., SUNY (Binghamton); Ph.D., Univ. of Pennsylvania
Michio Kaku, Professor
B.A., Harvard Univ.; Ph.D., Univ. of California (Berkeley)
Joel Koplik, Professor
B.S., Cooper Union; Ph.D., Univ. of California (Berkeley)
Matthias Lenzner, Associate Professor
M.S., Friedrich-Schiller-Universität; Ph.D., Jena Germany
Michael S. Lubell, Professor and Chair
A.B., Columbia Univ.; M.S., Yale Univ., Ph.D.
Herman Makse, Assistant Professor
Licenciatura (Physics), Univ. of Buenos Aires; Ph.D., Boston Univ.
Carlos Andres Meriles, Assistant Professor
B.S., FaMAF, Universidad Nacional de Cordoba, Argentina, Ph.D.
Vangal N. Muthukumar, Associate Professor
Ph.D., Institute of Mathematical Sciences (India)
V. Parameswaran Nair, Professor
B.S., Univ. of Karawala; M.Sc., Syracuse Univ., Ph.D.
Vladimir Petricevic, Associate Professor and Deputy Chair
Dipl. EE., Univ. of Belgrade; M.S. Miami Univ.; Ph.D., CUNY
Alexios P. Polychronakos, Professor
Dip. E.E., National Technological Univ. of Athens; M.Sc., California Institute of Technology, Ph.D.
Myriam P. Sarachik, Distinguished Professor
A.B., Barnard College; M.S., Columbia Univ., Ph.D.
David Schmelzer, Professor
B.Sc., Hebrew Univ.; M.Sc., Technion, D.Sc.
Mark Shattuck, Associate Professor
B.A., Wake Forest Univ., M.S.; Ph.D., Duke Univ.
Frederick W. Smith, Professor
B.A., Lehigh Univ.; Ph.D., Brown Univ.
Jiufeng J. Tu, Assistant Professor
A.B., Harvard Univ., A.M.; M.S., Cornell Univ., Ph.D.
Sergey A. Vitkalov, Assistant Professor
M.S., Moscow Institute of Physics and Technology; Ph.D., Institute of Solid State Physics, Russian Academy of Sciences

PARTICIPATING FACULTY

Richard N. Steinberg, Associate Professor
B.S., SUNY Binghamton; M.S., Yale Univ., Ph.D.

PROFESSORS EMERITI

Michael Arons
Joseph Aschmer
Alvin Bachman
Robert Callender
Herman V. Cummings
Erich Erbach
Hiram Hart
Martin Kramer
Robert M. Lea
Seymour J. Lindenbaum
Harry Lustig
William Miller
Marvin Mittleman
Leonard Roellig
David I. Shelupsky
Harry Soodak
Peter L. Tea
Martin Tiersten
Chi Yuan
The City College offers the following master’s degree in Psychology:

M.A.

ADMISSIONS

The Psychology Department offers a rigorous M.A. program in general psychology. Students may enter the program with an undergraduate major either in Psychology or in another field. Acceptance is based on assessment of the student’s overall record and promise. At the same time, special attention is given to the student’s performance in undergraduate courses in statistics and experimental psychology; students who have earned less than a B in either of these courses, or who have not taken them, are advised to contact the graduate advisor before applying.

ADVICEMENT

Professor Vivien Tartter, M.A. Prog. Dir.
NAC 7/120; Tel: 212-650-5709

DEGREE REQUIREMENTS

Students may complete the degree in one of two ways: with a thesis (B9900) and 28 additional credits or without a thesis with 40 credits.

Required Courses
V0100: Advanced Experimental Psychology I 4
V0500: Statistical Methods in Psychology I 3

One course from among the following three areas: *
1. Biological Foundations: Psychopharmacology, Physiological Psychology, Neuropsychology or Sleep
2. Cognitive Psychology: Cognition, Perception, or Language and Thought
3. Tests and Measurements or Psychometrics

*Students who submit official verification that they scored at the 65th percentile, or better, on the Psychology section of the Graduate Record Exam are exempt from this requirement. The GRE substitutes for the requirement, not credits.

The grade point average for graduate courses taken at City College must be at least 3.0.

Thesis Option: Students choosing the thesis option are required to enroll in B9900 for which they receive 3 credits with no grade when they complete their thesis. Most students enroll in B9900 for two semesters to develop their thesis plans and complete the proposal. They are required to complete 31 credits for their degree. A maximum of 12 credits may be transferred from other graduate institutions.

Non-Thesis Option: Students not completing a thesis must complete 40 graduate credits, including V0500, V0100 and 3 credits from among one of the biological foundations, cognitive and testing areas (or the GRE substitutions). The other degree requirements are identical as for the thesis students. Up to 15 graduate credits are eligible for transfer from other approved institutions.

Total Credits 31-40

REGISTRATION

All students should have their courses approved by the M.A. Program Director every semester. Failure to do so may result in the student being deregistered, either because of the lack of background or because the course is oversubscribed with properly registered students.

Pre-registration for the following semester is generally held toward the end of each semester. Students should check with the department for the dates.

Students wishing to take credits outside the department need approval from the M.A. Graduate Director. Courses with grades less than B are not eligible for transfer credit.

COURSE DESCRIPTIONS

V0000: History of Psychology
The historical development of modern psychology. Among the topics to be considered are: (1) psychological problems as they developed in philosophy; (2) psychological problems as they developed in natural science; (3) the early psychological systematists; (4) modern schools of psychology. 3 HR./WK.; 3 CR.

V0100: Advanced Experimental Psychology I
Lectures deal with experimental methodology and research design, and with related problems such as the ethics of psychological experimentation. Laboratory work includes independent research, which may be conducted individually or by a group of students. Required for M.A. students. 2 LECT., 4 LAB. HR./WK.; 4 CR.

V0500: Statistical Methods in Psychology I
Probability and statistical inference; estimation of parameters in survey research;
analysis of variance and designs for experimental research; correlation methods for psychometrics. Required for M.A. and Ph.D. students. 2 REC., 2 LAB. HR./WK.; 3 CR.

V0600: Statistical Methods in Psychology II
A continuation of Psychology V0500. Also, multivariate analysis of correlation matrices and the use of computers for data analysis. Required for Ph.D. students. 2 REC., 2 LAB. HR./WK.; 3 CR.

V1000: Advanced Physiological Psychology
Considers the interrelation of structure and behavior of the organism, and the physiological background of various psychological processes. The structure and function of the nervous system are surveyed. Various problems relating to the concept of "reflex," the organization, development and coordination of motor activities, and the physiological basis of emotions are discussed in detail. 3 HR./WK.; 3 CR.

V1200: An Introduction to Neuropsychology
This course will provide an overview of the field of neuropsychology, focusing on what is known about the functional organization of brain systems. No prior knowledge of psychophysiology or cognition is required but would be helpful. 3 HR./WK.; 3 CR.

V1402: Psychopharmacology
Science of drugs and their actions. Study of neuronal membranes and potentials, synaptic communication, neurotransmitters, receptor pharmacology, brain chemical circuits, neuroendocrine systems, hormones and neuropeptides. Primary is the goal of providing mental health professionals with a core knowledge of the biological bases and treatment of individuals with mental and addictive disorders. (Rationale: Neuropsychology is a fast growing area of Psychology. This course will provide students in a general M.A. program with some exposure to the field). 3 HR./WK.; 3 CR.

V2000: Developmental Psychology I
The development of children, from infancy to adolescence, will be discussed from a wide variety of theoretical perspectives, including Piagetian, psychoanalytic, behavioral, and cross-cultural viewpoints. 3 HR./WK.; 3 CR.

V2500: Developmental Psychology-The Later Years
Psychology of maturity, with emphasis on the later years. Social and cultural determinants of aging. Age-related changes in biological structure and function, perceptual processes, psychomotor skills, cognition, learning, and memory. Emotional and social adjustment during the later years. Maintaining the effectiveness of the older adult. 3 HR./WK.; 3 CR.

V3000: Psychology of Learning
Analysis of contemporary research and theory in the area of behavior modification. 3 HR./WK.; 3 CR.

V4200: Health Psychology
This course is an introduction to health psychology. Health psychology brings the corpus of psychological knowledge to bear on understanding physical health. Many prevalent diseases are under the control of the individual both in terms of risk behaviors elevating the probability of disease and with respect to adherence to health promoting behaviors or treatment regimens that aim to control, reduce, or eliminate the disease cause agents. Health psychology is concerned with understanding the psycho-behavioral factors that explain physical disease. It also focuses on designing, implementing, and evaluating preventive interventions to reduce or eliminate the behaviors that place the individual at risk for poor health. Prereq.: Psy. 70500. 3 HR./WK.; 3 CR.

V4600: Advanced Social Psychology
Among the topics to be covered are: methodology; social motivation; social or person perception; group processes; and attitude change. 3 HR./WK.; 3 CR.

V5301: Family Psychology
The course explores family structure and process. An effort is made to study historical and cultural factors and contemporary changes in the family. Theoretical models will be examined in some detail as a basis for clinical and research evaluation. 3 HR./WK.; 3 CR.

V5500: Psychopathology I
Covers the entire field of clinical expression of psychodynamics of the total personality as demonstrated in various forms of the psychoses and neuroses. It stresses the evolution of modern psychiatric thought. It will be substantially supported by demonstrations of patients at a psychiatric hospital and clinic. The first semester will stress the functional psychoses. 3 HR./WK.; 3 CR.

V6100: Measurement of Abilities
Topics covered include the psychometric principles of testing and assessment, with an emphasis upon intelligence testing and the measurement of cognitive abilities. Hands-on experience with psychodiagnostic tests in a workshop format is an integral part of the course. 2 LECT., 2 LAB. HR./WK.; 3 CR.

V6602: Theories of Individual Psychotherapy
Theories of individual psychotherapy from behavioral, client centered, cognitive, gestalt, existential and psychoanalytical perspectives are contrasted using written materials and films. The central place of value and cultural perspective is emphasized. Prereq: Abnormal Personality or permission of the instructor. 3 HRS./WK.; 3 CR.

V7500: Psychopathology of Childhood
An introductory course designed to explore issues of normal and pathological emotional development during the school age years. Review of basic psychoanalytic notions of development during this period; classical analytic as well as object relations in attachment theories will be discussed. A number of specific syndromes and their possible etiologies; depression, additional situational disturbances, personality disorder, borderline syndromes and childhood schizophrenia will also be reviewed. Discussion of major diagnostic classifications systems, including DSM-III and the GAP manual. Prereq: permission of the instructor. 3 HR./WK.; 3 CR.

B9700: Special Topics in Psychology
Prereq: approval of the appropriate faculty sponsor. HRS. TO BE ARRANGED; 3 CR.

B9800: Tutorial
Prereq: approval of the appropriate faculty sponsor. HRS. TO BE ARRANGED; 3 CR.

B9900: Psychological Research and Seminar
Psychological research and seminar for candidates for the M.A. degree who are engaged in thesis research. Offered each semester. Required for M.A. students. HRS. TO BE ARRANGED; 3 CR.

COLLOQUIA
All master’s students are expected to attend colloquia regularly and to participate in reports of research.

PH.D. ELECTIVES
In addition to the M.A. Program, The City College houses two Ph.D. programs: the Clinical Psychology Program and the Experimental Cognition Program. The following is a list of Ph.D. courses normally open to M.A. students. Students must have written permission from the M.A. Graduate Director and the individual course
instructor, obtained either in writing or through the e-permit system.

**V3800: Cognitive Psychology**
This course focuses on how a person utilizes limited mental processing capacity. Topics include the analysis, interpretation, storage and retrieval of sensory input in such forms as fantasies, daydreams, imagery. Required for Ph.D. Experimental Cognition students. 2 HR./WK. PLUS CONF.; 3 CR.

**V5200: Language and Thought**
This course investigates some of the higher mental processes such as fantasy, affect, problem solving, concept formation, creativity and psycholinguistics. Required for Ph.D. Experimental Cognition students. 2 HR./WK. PLUS CONF.; 3 CR.

**FACULTY**

**John S. Antrobus, Professor**
B.A., Univ. of British Columbia; M.A., Columbia Univ.; Ph.D.

**Deborah Coates, Professor**
B.S., Univ. of Redlands; M.S., Univ. of Southern California; Ph.D., Columbia Univ.

**William Crain, Professor**
A.B., Harvard Univ.; Ph.D., Univ. of Chicago

**Diana Diamond, Associate Professor**
B.A., Wesleyan Univ.; M.A., Univ. of Massachusetts, M.S., Ph.D.

**William Fishbein, Professor**
B.S., New York Univ., M.A.; Ph.D., Univ. of Colorado

**Tiffany Floyd, Assistant Professor**
B.A., SUNY (Binghamton); M.A., Temple University, Ph.D.

**Peter Fraenkel, Associate Professor**
B.A., Boston Univ.; Ph.D., Duke Univ.

**Anderson J. Franklin, Professor**
B.A., Virginia Union Univ.; M.S., Howard Univ.; Ph.D., Univ. of Oregon

**Hilary Gomes, Associate Professor**
B.S., Georgetown Univ.; M.A., City College; Ph.D., The Graduate School of CUNY

**Elliot Jurist, Professor**
B.A., Harford College; Ph.D. (Philosophy) Columbia Univ.; Ph.D., CUNY

**William King, Professor and Chair**
B.A., Rutgers Univ.; M.A., Univ. of Colorado, Ph.D.

**Arthur D. Lynch, Associate Professor**
B.A., Univ. of Texas, Ph.D.

**Glen Milstein, Assistant Professor**
B.A., Brandeis Univ.; Ph.D., Teachers College (Columbia Univ.)

**Cynthia A. Primeau, Associate Professor**
B.A., SUNY (New Paltz); M.A., Teachers College, Columbia Univ., Ed.D.; Ph.D., CUNY

**Ruth Ellen Proudfoot, Associate Professor**
A.B., Radcliffe College; Ph.D., New York Univ.

**Margaret Rosario, Associate Professor**
B.A., Princeton Univ.; Ph.D., New York Univ.

**Jeffrey J. Rosen, Professor**
B.A., George Washington Univ.; M.A., Clark Univ., Ph.D.

**Millicent Roth, Professor**
B.A., Brooklyn College, M.S.W., D.S.W., New York Univ.

**Brett Silverstein, Professor and Dean, Division of Social Science**
B.A., State Univ. of New York (Stony Brook); Ph.D., Columbia Univ.

**Arietta Slade, Professor**
B.A., Sarah Lawrence College.; Ph.D., New York Univ.

**Ellen E. Smiley, Associate Professor and Acting Deputy Provost**
B.S., Denison Univ.; A.M., Univ. of Illinois, Ph.D.

**Arthur J. Spielman, Professor**
B.A., The City College; Ph.D., CUNY

**Vivien C. Tartter, Professor**
B.A., Brown Univ., M.A., Ph.D.

**Stephen Thayer, Professor**

**Steven B. Tuber, Professor**
B.A., Yale; M.A., Univ. of Michigan, Ph.D.

**Paul Wachtel, Distinguished Professor**
A.B., Columbia Univ.; M.S., Yale Univ., Ph.D.

**Lissa Weinstein, Assistant Professor**
B.A., SUNY (Stony Brook); M.A., The City College; Ph.D., CUNY

**Ann Marie Yali, Assistant Professor**
B.A., Eckerd College; M.A., SUNY (Stony Brook), Ph.D.

**PROFESSORS EMERITI**

Kenneth B. Clark
Eugene L. Hartley
Douglas C. Kimmel
Herbert Nechin
Lawrence Nyman
Vera Paster
Irving H. Paul
John J. Peatman
Lawrence Plotkin
Getrude R. Schmeidler
Jerome Siegel
Ann Rees
Harold Wilensky
The City College offers the following master’s degree in Sociology:

**M.A.**

**DEGREE REQUIREMENTS**

**Required Courses**
- V0100: Development of Sociological Theory 3
- B1001: Quantitative Methods 3
- B1002: Qualitative Methods 3

**Elective Courses**
Graduate courses in both theoretical and applied Sociology 21

**Total Credits** 30

**ADDITIONAL REQUIREMENTS**

The student may take six credits of relevant graduate work at other schools, subject to the approval of the Chair of the Graduate Committee.

**Thesis:** Required.

**Comprehensive Examination:** The candidate must pass a written comprehensive examination.

**Statistics:** Demonstration of proficiency in statistics.

**Language Requirement:** Proficiency in the use of one relevant language may be substituted for the statistics requirement.

**ADVICEMENT**

Graduate students must see the graduate advisor each semester to review their progress and plan their programs.

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**COURSE DESCRIPTIONS**

- **V0100: Development of Sociological Theory**
  Critical examination of the major treatises and schools in the development of sociological theory from Comte to the 20th century theorists. 2 HR./WK. PLUS CONF.; 3 CR.

- **B1001: Quantitative Methods**
  Appraisal of the concepts and methods used in quantitative research. Discussion of the applications of quantitative techniques, including computer analysis for large-scale survey data. Examples from published research will be used to examine the adequacy of research design as well as the relevance of particular techniques. Prereq: an introductory course in statistics, or research. 2 HR./WK. PLUS CONF.; 3 CR.

- **B1002: Qualitative Methods**
  Concepts and methods of qualitative research will be discussed for their relevance and utility in sociological analysis. Representative studies will be examined for the adequacy of their procedures and techniques, as well as the kind of knowledge which they provide. Prereq: an introductory course in statistics, or research. 2 HR./WK. PLUS CONF.; 3 CR.

- **B1100: Seminar in General Sociological Analysis**
  A comparative overview of various current models of sociological analysis, including functionalism, ethnomethodology, and evolutionary schools. 2 HR./WK. PLUS CONF.; 3 CR.

- **B1200: Seminar in Social and Cultural Anthropology**
  Principles and problems of anthropology in interdisciplinary focus. Development of anthropological concepts and propositions and their use in the several social sciences. 2 HR./WK. PLUS CONF.; 3 CR.

- **B2100: Seminar in Marriage and the Family**
  Marriage and the family as social institutions. Changing family forms in Western civilization. Demographic trends and family size. The modern family and its relation to the total society. Marriage and divorce. Selected problems for discussion and research. Offered in cooperation with the School of Education. 2 HR./WK. PLUS CONF.; 3 CR.

- **B4100: Comparative Social Systems**
  Description and classification of whole societies viewed as dynamic social systems in the relevant environmental setting, geographic and historical. Case studies will be selected from the American Indian, African, Oceanic, Asiatic, and European fields. The course is designed to prepare students for an understanding of their own contemporary society. 2 HR./WK. PLUS CONF.; 3 CR.

- **B6100: Seminar: Problems in Criminology**
  Criminology and criminal law. Problems in the measurement and statistical analysis of crime; typologies of offenders. Eighteenth and nineteenth century backgrounds of criminological thought; contemporary theories of criminality. Analysis of selected behavior systems in crime recidivism and problems of prediction. Offered in cooperation with the School of Education. 2 HR./WK., PLUS CONF.; 3 CR.

- **B8000: Deviant Behavior**
  Societal, legal, moral, religious and sociological definitions of deviant behavior. Current approaches to dealing with the deviant. Deviance as role behavior. 2 HR./WK. PLUS CONF.; 3 CR.

- **B8100: Sociology of Politics and Collective Behavior**
  The social bases of political participation and ideology will be explored within the context of modern industrial society. The problem of establishing, maintaining and dissolving political institutions will be examined as well as the relationships between the legitimacy and the effectiveness of political institutions. The social origins of democracy, authoritarianism, and totalitarianism. New approaches to the study of mass movements and collective behavior. 2 HR./WK. PLUS CONF.; 3 CR.
B8300: Sociology of Generations
Socialization processes occurring and associated with infancy, childhood, adolescence, student status, and various stages of adulthood. Secularization of various benchmarks in the life cycle. Special characteristics of each age group, their potential for intergenerational conflict and accommodation, and their relationship to social institutions. Contemporary modifications of age-graded experiences by social structure. 2 HR./WK PLUS CONF.; 3 CR.

B3200: Research
Individualized research on specific projects, under the direction of a graduate professor. Conferences to be arranged. Approval of a faculty member and Chair of Graduate Committee required. (MAXIMUM OF 6 CREDITS.) 3 CR./SEM.

B5100: The Metropolitan Community
An examination of the varied communities that make up the city and their impact upon society based on theories of urbanization and urban life. Included are different religious groups, gays, racial minorities and a variety of social classes. There is special focus on how the groups interact with each other. 2 HR./WK. PLUS CONF.; 3 CR.

B5200: The People of the City of New York
An analysis of the many subgroups that live in New York City. This includes but is not limited to African and Hispanic Americans, Italians, Jews, Irish, etc. Focus on how the city developed historically, its spatial structure, expansion, political, social and economic life. 2 HR./WK. PLUS CONF.; 3 CR.

C0000: Series
Courses given on special issues in sociology, on a rotating schedule, such as public policy, ethnic issues, drug and alcohol problems, etc. 2 HR./WK. PLUS CONF.; 3 CR.

Courses offered in other graduate programs are available to graduate students in Sociology with permission of the Graduate Sociology Committee.

FACULTY

Ibtihaj Arafat, Professor
B.S., Oklahoma State Univ., M.S., Ph.D.

Mehdi Bozorgmehr, Associate Professor
B.S., California State Univ.; M.A., San Diego State Univ.; M.A., Univ. of California (Los Angeles) Ph.D.

Marina Wikramanayake Fernando, Associate Professor
B.A., Univ. of Ceylon, Sri Lanka; M.A., Univ. of Wisconsin, Ph.D.

Gabriel Haslip-Viera, Associate Professor and Chair
A.A.S., SUNY(Farmingdale); B.A., The City College M.A., Columbia Univ., Ph.D.

William Helmreich, Professor
B.A., Yeshiva Univ., M.A.; Ph.D., Washington Univ. (St. Louis)

Ramona Hernandez, Associate Professor
B.A., Lehman; M.A., New York Univ.; Ph.D., CUNY

Lily M. Hoffman, Associate Professor
B.A., Cornell Univ.; M.A., Univ. of Michigan; Ph.D., Columbia Univ.

Perezi Kamunanwire, Lecturer
B.A., Columbia Univ., M.I.A.

Philip Leonhard, Associate Professor
B.A., The City College; Ph.D., CUNY

Iris Lopez, Associate Professor

Kathleen M. McCahery, Lecturer
A.B., Immaculata College; M.A., New York Univ.

Chudi P. Uwazurike, Associate Professor
B.A., Univ. of Nigeria; M.A., Lagos Univ.; Ph.D., Harvard Univ.

PROFESSORS EMERITI

Steven Goldberg
Gerald Handel
F. William Howton
Baidya Nath Varma
Charles Winick
Betty Yorburg
School of Architecture, Urban Design and Landscape Architecture
The School of Architecture, Urban Design and Landscape Architecture

Professor George Ranalli, Dean • Professor Peter Gisolfi, Chair • Department Office: Shepard 103 • Tel: 212-650-7118

GENERAL INFORMATION

The School of Architecture, Urban Design and Landscape Architecture offers the following graduate degrees:

M. Arch.
M.L.A.*
M.U.P. (Urban Design)

PROGRAMS AND OBJECTIVES

The School offers programs leading to professional degrees in the following areas:

Architecture (Program Director – Professor Andrew Zago)
Landscape Architecture (Program Director – Professor Achva Benzinberg Stein)
Urban Design (Program Director – Professor Michael Sorkin)

Additional information about programs in Architecture may be found in the Bulletin of Undergraduate Programs.

Master of Architecture I

Students are admitted to the Master of Architecture I program after completing a liberal arts education. The curriculum is dedicated to investigating the union of architectural form and thought. It understands architecture as the meeting ground between public and private expression and sees the city as its preeminent site. The program seeks to import mastery of the fundamental skills and ideas necessary for the practice of architecture in the 21st Century. The principal medium for this is the design studio. Nourished by courses in technology, environment, history, and theory, students will undertake problems of growing complexity over the three years of the program.

The required Master’s curriculum covers the full range of topics—from basic design to structures and environmental systems, to history, philosophy, and the ethics of profession—necessary for students starting their architectural studies “from scratch.” Beginning with the investigation of form-making in the abstract, with the nature of the architectural program, and with the media of architectural representation, projects progressively integrate questions of landscape, the social organization of space, the characteristics of institutional form, the morphology and typology of city space, construction, and environmental technology.

The program includes both required courses and a substantial number of electives. These latter may be taken both from within the School and from any of the institutions in the CUNY system, including the Graduate Center. Students can use these options both to reinforce work in the studio and to pursue their own special interests within the field. Widespread inquiry is encouraged: the program is firm in its belief that excellence of form is built on a foundation of excellence in ideas.

Projects may also explore the far boundaries of the discipline of architecture, participating in the research behind its continuing reinvention.

Students will have the opportunity to take a number of elective courses in areas of their own special interest. These may be selected from among those offered in the three programs of the School as well as from other institutions in the CUNY system, including the Graduate Center. Students are strongly encouraged to seek these points of conjuncture between architecture and related disciplines that are most meaningful to their individual development as practitioners.

Masters of Landscape Architecture I

This graduate option is a six-semester program for students with a degree in a discipline other than landscape architecture and leads to a first professional degree (M.L.A.). An accredited professional degree is required to sit for the licensure examination and to practice landscape architecture. The program objective is to prepare degree candidates with the knowledge and skill required in the practice of Landscape Architecture. Practice involves the application of art and science in the process of shaping the visual and material resources of the earth’s surface for the aesthetic and social benefit of people, while maintaining an ecological imperative to minimize irreversible intrusions impacting the natural environment. It requires the development and use of professional judgment and skill in managing the process of change associated with the creation of place in urban, suburban and natural landscapes.

* pending registration by the New York State Department of Education
Masters of Landscape Architecture II

The second graduate program option is a two-semester program for students with a first professional undergraduate degree in Landscape Architecture (B. or BS. Landscape Architecture), leading to a graduate or second professional degree (M.L.A.). The program is of particular interest to those seeking a more extensive understanding of urban landscape architectural practices and for those interested in the opportunity to teach in a university setting.

Urban Design

Applicants to the Urban Design program should hold a professional degree in either architecture or landscape architecture. Applicants from other backgrounds will be considered only in exceptional circumstances and on demonstration of a high level of design ability.

This program is focused on the design of new forms for the city and urban life. Committed to experiment, it seeks to investigate the effects on and prospects for the city arising from contemporary transformations in technology, culture, lifestyles, environment, economic organization, governance, and architecture. Drawing on the unparalleled resources of City University and the City of New York, the program aims to stimulate analytical rigor formal creativity in a variety of media. The program seeks to play an active and ameliorative role in shaping futures for New York and cities around the world through both formal research and direct engagement with communities.

The program is designed to be completed in two full-time, sequential semesters. At its core is the design studio, taught by the Director, which moves, in a two semester sequence, from an abstract consideration of urban morphologies and systems to a realistic, large-scale, project sited in New York City. The studio also travels annually to observe a city under unusual stress. To date these have included Nicosia, Havana, and Johannesburg. The curriculum also includes varying courses taught by distinguished CUNY and visiting faculty devoted to urban history, theory, analysis, and to natural and social urban ecologies.

ADMISSIONS

Applications for admission to all graduate programs may be obtained from the School of Architecture, Landscape Architecture, and Urban Design. All applications must include a curriculum vitae, three letters of recommendation from persons familiar with the applicant's intellectual and design abilities, an academic transcript, a 500 word essay describing the applicant's interest in architecture or urban design (as appropriate), an appropriate portfolio of creative work, and a non-refundable application fee.

Although not required, applicants who are able to do so should schedule an interview with the Director of the program. Applicants are strongly advised that the program curriculum includes rigorous reading and writing requirements. Students whose first language is not English must submit current TOEFL scores.

The deadline for the receipt of applications is January 1 (M.U.P.), January 15 (M.Arch. I and II), and January 30 (M.L.A. I and II) and applicants will be notified of admissions decisions by April 30.

ACCREDITATION

The M. Arch., M.L.A. and the M.U.P. have been registered by the New York State Education Department. The M.U.P. is considered the equivalent of a Master of Architecture for architectural registration purposes in the State of New York. The M.Arch., M.L.A. and the M.U.P. are also accredited, as are other graduate programs at The City College, by the Middle States Association of Colleges and Secondary Schools.
**Semester 2**

84100: Advanced Architectural Design Studio II 9
73200: Origins of Contemporary Architecture 3
Urban Design or Landscape Elective 3

**Semester 3**

Thesis (Optional) 9
Electives 9

**REQUIREMENTS FOR THE M.L.A. DEGREE**

**Master of Landscape Architecture I**

**First Professional Degree**

**Semester 1**

MLA 61100: Landscape Architecture Studio I 6
MLA 61200: History/Theory of Landscape Architecture II 3
MLA 61400: Drawing/Visual/Media Studies I 3
MLA 61450: Fundamentals of CADD 3
BIO 64700: Botany for Landscape Architecture 3

**Semester 2**

MLA 62100: Landscape Architecture Studio II 6
MLA 62200: History/Theory of Landscape Architecture II 3
MLA 62300: Site Planning (Landscape Technology I) 3
MLA 62400: Drawing/Visual/Media Studies II 3
BIO 06270: Ecology 3

**Semester 3**

MLA 63100: Landscape Architecture Studio III 6
MLA 63300: Landscape Technology II 3
MLA 63500: Environmental Planning I 3
MLA 63600: Planting Design I 3
Professional Elective 3

**Semester 4**

MLA 64100: Landscape Architecture Studio IV 6
MLA 64200: Landscape Architecture Practice 3
MLA 64300: Landscape Technology III 3
MLA 64500: Environmental Planning II 3
MLA 64600: Planting Design II 3

**Semester 5**

MLA 65100: Landscape Architecture Studio V 6
MLA 65150: Thesis Preparation 3
MLA 65200: Urbanism 3
Professional Electives 6

**Semester 6**

MLA 66100: Thesis Studio 9
Professional Electives 3
Electives 6

**Total Credits**

108

**Master of Landscape Architecture II**

**Second Professional Degree**

**Semester 1**

MLA 65100: Landscape Architecture Studio V 6
MLA 65150: Thesis Preparation 3
Elective in History/Theory of Landscape Architecture 3
Elective in Natural Systems 3
Elective in Planning 3

**Semester 2**

MLA 66100: Landscape Architecture Thesis Studio 9
MLA 65200: Urbanism 3
Professional Electives 6

**Total Credits**

36

**Additional Requirements**

Students must complete the prescribed 36 credits with a cumulative academic average of 3.0 or better.

**REQUIREMENTS FOR THE M.U.P. DEGREE**

**Semester 1 (Fall)**

61001: Urban Design Studio I 7
61002: History of Urban Space I 3
61003: Reading the City I 3
61004: Urban Ecologies I 3

**Semester 2 (Spring)**

62001: Urban Design Studio II 7
62002: History of Urban Space II 3
62003: Reading the City II 3
62004: Urban Ecologies II 3

**Total Credits**

32

**Additional Requirements**

Students must complete the prescribed 32 credits with a cumulative academic average of 3.0 or better.

**COURSE DESCRIPTIONS**

**Architecture**

61000: Drawing/Visual Studies I
Students are led to see architectural space and to understand and draw the elements that define it. 4 HR./WK.; 3 CR.

61100: Architectural Design Studio
The objective of this studio is to introduce student with an undergraduate degree in another discipline to basic architectural design principals, drawing conventions and model making techniques. Through a series of short interrelated exercises students will be initiated into the language of architecture. Two and three-dimensional exercises will focus on the principles of fundamental space making elements (line, plane, and volume), hierarchical spatial sequence, scale, proportion, morphology and spatial perception. All exercises are designed to develop the student’s abilities to translate an idea into a physical design concept. Students are required to keep a sketchbook and are required to submit a portfolio of work done during the term. 8 HR./WK.; 6 CR.

61200: Seminar in Theory and Methods of Architectural History
A seminar in the theoretical readings that have shaped architecture and its study from the classical period to the present. The emphasis will lie in the application of theory and the relationship between philosophies and theories of architecture and their historical, political and cultural contexts. Readings will include a review of post-Colonial discourse and problems surrounding world architecture today. 3 HR./WK; 3 CR.

61300: Materials/Construction Technology I
An investigation into the systems, techniques, and materials employed in the making of architecture. Focus on case studies in wood, masonry, and other construction materials. 3 HR./WK.; 3 CR.

61301: Site Technology
This is a required course to develop the basic principles of site planning, environmental and ecological factors of siting, building, grading, drainage, and materials in the development of physical form to land forms. 3 HR./WK.; 3 CR.

62000: Visual Studies II
Further development of Visual Studies I that will incorporate the effect of light on space and form through the understanding and development of shades and shadows and the integration of color. 4 HR./WK; 3 CR.
62100: Architectural Design Studio II
The second core studio builds upon the experience of the previous studio through a series of increasingly complex design problems. Emphasis will be placed on developing a further understanding and expansion of architectural principles including spatial definition, formal composition, program analysis and organization and basic building structures and detailing as they relate to specific site contexts and activities. Projects will encompass small-scale public buildings on both urban and open sites. The general objective of this studio is to develop a student’s abilities to interrelate multiple considerations and to expand their conceptual capabilities. Further consideration of skills and techniques in drawing and building craft will be addressed. 8 HR./WK.; 6 CR.

62300: Materials/Construction Technology II
An investigation into the systems, techniques, and materials employed in the making of architecture. Focus on case studies in concrete, steel and other construction materials. 3 HR./WK.; 3 CR.

62400: Statics and Strength of Materials
This is a required course for students in the master’s program of architecture as introduction to the design and engineering of building structures. It gives an overview of structural forms and their history. Analyzing simple examples of built structures it makes students familiar with the basic principles of statics and strength of materials. 3 HR./WK. 3 CR.

62500: Mechanical Equipment I (Lighting & Acoustics)
The artificial and natural lighting of buildings will be studied along with the analysis and treatment of the built sonic environment. Spaces for performance and public assembly will be addressed along with housing, education and others. 3 HR./WK.; 3 CR.

71200: Architectural Management
The principles of management as applied to the architectural profession. Included in this course are: the general organization of the profession and its relation to client, community, and the construction industry; new management techniques; organization and retrieval; project delivery, construction, and professional documents, cost control, legal surety, contract and financial management. Prereqs: B.S. in Arch. Degree, 4th Year UL Majors. 3 HR./WK.; 3 CR.

73100: Advanced Architectural Design Studio I
The third studio will focus on the ideas of habitation and community. Through a series of discrete phases students will develop analytic methods as related to site, context and human activity patterns along with notions of how precedent and typology, through transformation, inform the design concept. The term’s work will be organized around a defined process of design leading from analysis, and conceptualization, through to design development. The student will be made aware of how social and cultural values relate to the development of a formal construct at the hierarchy of scales from community to private living spaces. 12 HR./WK.; 9 CR.

73200: The Origins of Contemporary Architecture
This course addresses the architectural and philosophical currents that inform contemporary world architecture today. Topics discussed include New Materiality, the Industrial City, Technology and Meaning, Origins of Revivalism, Colonialism, critiques and revivals of Modernism, Post-Modernism, Deconstructivism, Critical Regionalism, Architecture in Developing Countries, and regional developments in the United States. 4 HR./WK.; 3 CR.

73400: Design of Wood and Steel Structures
This is a required course introducing students of architecture to the design of wood and steel structures. It covers the properties of these materials and their respective structural forms and introduces students to the structural analysis of simple building components made from them. Students will develop an understanding of the behavior of structural systems made from wood or steel which will help them design building structures as part of a safe, functional, economical, and aesthetically sound building design. Prereq: Arch 61400. 3 HR./WK. 3 CR.

73300: Mechanical Equipment (HVAC)
Heating, ventilating, air-conditioning, plumbing, and electrical systems in buildings will be studied from a rudimentary design view to a level from which students will understand criteria involved in making choices between construction systems. Such things as space requirements and coordination with other building systems will be studied. 3 HR./WK.; 3 CR.

84100: Advanced Architectural Design Studio II
Students may select from a series of studio electives which will focus on particular buildings, typologies, site contexts and thematic concerns. These studios will be taught by noted architectural faculty. Students may select from a series of studio electives which will focus on specific building types and their contextual concerns. Among those topics for possible studio focuses are place of work, cultural, educational and recreational facilities. Design problems will be of moderate to large scale (50-100,000 square feet) with complex programs incorporating a broad range of activates and scales of spaces. Students are recommended to elect one studio, which focus on urban sites and has an urban design component. 12 HR./WK.; 9 CR.

85101: Advanced Architectural Design Studio III (or) Thesis Studio
The last semester design studio offers the student the opportunity to investigate a topic of his or her own choosing which addresses a significant area of cultural concern. The objective of this studio is to enable the student to develop an original and significant body of work which expands upon the present state of understanding of a particular architectural or urban issue.

Preparation for the thesis term will occur in an elective course during the previous term in which the student will define their thesis and prepare research on their thesis topic. The Thesis Studio is offered as an option and may be taken in lieu of ARCH 85100 with permission of the faculty. 12 HR./WK.; 9 CR.
85400: Advanced Architectural Structures
This is an elective course for students of architecture who have completed all regular structures courses with good grades and have shown a special interest in structures and their impact on the design of buildings. It emphasizes those types of structures whose characteristics are architectural in the sense that their shape may serve functions other than the structure and they often form an important part of the building's aesthetics. The course covers shells, domes and grid domes, tensile and tensile-structure fabrics, structures and glass enclosures. Prereq: Arch 73400. 3 HR./WK.; 3 CR.

86100: Thesis Studio
The last semester design studio offers the students the opportunity to investigate a topic of their own choosing which-addresses a significant area of cultural concern. The objective of this studio is to enable the student to develop an original and significant body of work which expands upon the present state of understanding of a particular architectural or urban issue. Preparation for the thesis term will occur in an elective course during the previous term in which the students will define their theses and prepare research on their thesis topic. 12 HR./WK.; 9 CR.

Landscape Architecture

61100: Landscape Architecture Studio I
Studio I is the first of a six-course studio design sequence. The course is an introduction to the range of spatial and cognitive skills involved in shaping urban open space. Students are expected to bring both critical and creative dimensions to the analytical and inventive phases of their work. This studio addresses the culture and characteristics of urban recreation. In the first studio design problem, a single-purpose facility is spatially expanded and transformed from the mundane to the sacred. Students identify aesthetic and cultural issues, research recreational case studies and conduct photographic essays. Using data as a precedent for design exploration, they synthesize their analysis into a design expression that accommodates the requirements of the facility. The design problems increase in scale and complexity when the recreation environment or its environs are shared by other interest or age groups, adding the issue of conflict and conflict resolution to the problem. 10 HR./WK.; 6 CR.

61200: History and Theory of Landscape Architecture I
This course investigates the theoretical and historical foundations of Landscape Architecture and reviews influences on the form of gardens, urban open space and city planning from prehistory to the beginnings of contemporary precedents. Coverage includes a detailed review of early garden styles and public open space expressions in ancient Mesopotamia, Egypt, Greece and Rome, followed by examples of Medieval and Moorish gardens and their influences on later Italian and French Renaissance garden styles, and still later, the reactionary English Landscape garden style. Paralleling garden design, the course will also examine how social and environmental forces affected the planning and design of towns and cities during these same periods. The course ends with an examination of the theories and meaning informing 19th and 20th Century precedents of contemporary garden and open space expression, as well as describing the roots of urban planning during that period. 3 HR./WK.; 3 CR.

61400: Drawing and Visual Media Studies I
This course will provide introductory drawing, modeling, image capturing and presentation skills required in the documentation, exploration, resolution and explanation of a landscape design problem. Areas covered include basic drawing involving various media, experience with model-making materials, site photo-montage techniques and image sensitive presentation tools. It also introduces orthographic projection drawing involving plan, section, elevation and axonometric approaches, and involves a familiarity with certain drafting principles and techniques. Finally, the course introduces various reprographic methods and their exploration. 3 HR./WK.; 3 CR.

61450: Fundamentals of Computers in Design
This course involves the use of digital and computer software for image acquisition, image processing, graphics and drafting. Tools used in design methods are explored, with models and drawings using computer technology as the medium and with the aim of understanding a variety of possible digital technology applications. An emphasis is given to the LandCADD drafting application and its use as a tool in the problem-solving process in preparing students with the skills necessary to use the software application tools for setting up project base components, to accomplish landscape design, site planning and analysis, survey adjustment, surface modeling, irrigation design, and construction detailing. 3 HR./WK.; 3 CR.

62200: History and Theory of Landscape Architecture Studio II
The second design studio focuses primarily on community and the residential environment. Using much of the knowledge and skill acquired in the previous studio, the student is confronted with more complex design problems. The student deals with the siting of residential buildings, the creation of domestic space, the design of a variety of open space facilities (e.g., walks, sitting areas, recreational areas, service areas, parking, circulation, etc.). Along with a critical understanding of the domestic landscape— involving issues of territoriality, the social contract, and other behavioral characteristics related to design— and the acquisition of skills for shaping that landscape, a major objective of this design studio is to provide an understanding of the complexity of a multi-component facility that is connected and integrated into a larger set of related components. In addition, students are expected to integrate into studio activity, advanced graphic skills involving drawing, model making and digital imaging, acquired in the first year graphic sequence. 10 HR./WK.; 6 CR.

62300: Site Planning - Technology I
This course involves an understanding of the relationship of physical development to land forms. The course deals with small area and sites. It deals with the basic principles of site planning, environmental and ecological factors of siting, building, grading, drainage, site structures and material. Underlying issues of environmentally responsible design, zoning requirements and affordability are addressed. It reviews methods for site inventory, site analysis and site selection, and investigates their application through class exercises in the development of conceptual site designs for small sites. Grading, an environmental
necessity, functional requisite and aesthetic expression is an important aspect of the course and is used as a focus to integrate other aspects, e.g., drainage and road alignment. 3 HR./WK.; 3 CR.

62400: Drawing and Visual Media Studies II
The course continues instruction in drawing, modeling, image capturing and presentation skills, with the introduction of advanced techniques in their preparation and use, as well as methods using computer technology to prepare and present effective landscape site analysis and design presentation results. 3 HR./WK.; 3 CR.

63100: Landscape Architecture Studio III
The third design studio focuses on complex and dynamic public landscapes ranging from streets to waterfronts, plazas and neighborhoods. The physical structure of the landscape (its drainage, climate, morphology and archeology) is considered in relationship to the cultural structure of the site (its history and the ongoing experiences and memories of the people who live, work and play in the landscape). Students investigate the uniqueness and complexity of each urban site in terms of dynamic environmental processes, competing interests and uses, cultural diversity and communal memories. Site analysis and understanding involves active observation - hunting for clues, listening to stories, engaging in activities - as well as more traditional methods utilizing drawing and photography. For each of the study projects, the student must articulate the design concepts and find ways to physically communicate and create meaning in place. In conjunction with each design project, the work of accomplished landscape architects is presented to expand the student's approach to conceptual development, design and presentation. 10 HR./WK.; 6 CR.

63300: Landscape Architecture Studio IV
This course is a continuation of MLA 62300 with problems increasing in scale, complexity and application. The course also involves an understanding of the relationship of physical development to land forms. Emphasis in the course is with large areas and sites. It continues to deal with the basic principles of site planning, environmental and ecological factors of siting, building, grading, drainage, site structures and material. Underlying issues of environmentally responsible design, zoning requirements and affordability for larger sites are addressed. It reviews methods for site inventory, site analysis and site selection, and investigates their application through class exercises in the development of conceptual site designs for large sites.

Grading, continues to be used as a focus to integrate other aspects, e.g., drainage and road alignment. 3 HR./WK.; 3 CR.

63500: Environmental Planning I
This course provides an overview of the physical environment of the New York City metropolitan region including geology, soils, surface water, dominant weather systems, the changing climate, plant communities, wildlife habitat and regional design style trends. The students collectively undertake a layered site analysis applying all the topics to a real site. A transparent overlay technique is used to identify areas of the site with special concerns. Each student also prepares a colloquium presentation (short paper and slides) on a particular aspect of Hudson River Valley ecology, design, local materials or an historical feature, which are compiled into a notebook kept at the Architecture Library reserve desk as a reference document. The accompanying slides become part of the Program's permanent slide library collection. 3 HR./WK.; 3 CR.

63600: Planting Design I
This course addresses the use of plant materials in the development of landscape design. It reviews the design principles (form, line, color, texture, etc) as they relate to the use of plant material and explores both the aesthetic and functional uses of plant material, particularly within the urban environment. Students learn the tolerances of materials under adverse conditions, anticipate their growth and mature form and become familiar with their special characteristics throughout the seasons. In addition to concentrating on the fundamentals of designing with plants, students work on perfecting graphic representation skills. 3 HR./WK.; 3 CR.

64100: Landscape Architecture Practice
The fourth design studio provides a semester-long problem in which the student is assigned, or chooses a large area within an existing urban complex that is in need of examination due to deterioration, change of use, or the need for a comprehensive approach to urban landscape intervention. Within a larger urban context, each student selects her/his own study area, with the instructor reviewing the proposed project for appropriateness in complexity and scope. In addition to physical and aesthetic spatial recommendations, designs must respond to significant systemic influences, including economic and demographic conditions, pedestrian and vehicular circulation, service infrastructure, as well as cultural, educational and recreational needs. The end product of this studio is a publication in which, in both narrative and graphic form, the student explains the problem, the method of solution, the objectives, and the plan. This format offers an effective method for teaching students how to organize themselves graphically and verbally in the identification of a design problem and the presentation of its solution. It is also an effective job interview tool for demonstrating the range of a student's organizational and graphic skills. 10 HR./WK.; 6 CR.

64200: Theory of Landscape Architecture
This course covers the theory and principles of management as applied to the profession of Landscape Architecture. Course coverage includes a review of the general organizational structure of the profession and its relationship to client, community and the construction industry. New management, organizational, and retrieval techniques are presented using case studies. A major review of professional responsibilities includes: project delivery, construction, and professional documents, cost controls, legal surety, bidding, contracts and financial management. 3 HR./WK.; 3 CR.

64300: Landscape Technology III
The course continues to address the fundamental technologies addressed in MLA 63300, those dealing with the basic principles of site planning, environmental and ecological factors of siting, building, grading, drainage, site structures and material. It also continues to deal with large areas and sites, but with special emphasis on their environmental sensitivity and methods for mitigating the intrusion of development. A special emphasis is given to the development of skills required to understand, organize and produce a set of contract documents. The knowledge and technique are reviewed for various landscape architecture implementation documents used to complete a site-specific project. Students complete a semester-long problem, divided into discrete units that are designed to illustrate the overall design process and the documents that accompany each segment of the process. 3 HR./WK.; 3 CR.

64500: Environmental Planning II
The course is a continuation of the learning processes involved with understanding and applying analytical techniques in environmental planning, with emphasis on case studies and their applications in environmental problem solving. 3 HR./WK.; 3 CR.

64600: Planting Design II
The second of the planting design courses advances the students to complete a proposal suitable for bid documents. Through a series of one-and-two week sketch prob-
lems covering a range of landscape types and scales, they explore different graphic techniques for presenting schematic planting design and construction drawing planting plans. Students apply the design principles, historical precedents and plant species previously learned to complex planting solutions. These involve a variety of planting conditions such as fragrance garden, interior courtyard, wetland restoration, bioengineering a steep slope, streetscape, highway verge and roof planting. Plant and soil specifications and cost estimating for planting design are integrated with one of the planting plans.

3 HR./WK.; 3 CR.

65100: Landscape Architecture Studio V

The fifth design studio provides a semester-long problem in which students are assigned a large existing urbanized area located within an ecologically sensitive context that is in need of examination due to deterioration, change of use, or the need for a comprehensive approach to urban landscape intervention. While the introduction of ecologically sensitive issues is a significantly new area of knowledge to integrate into the design process, issues involving the economic and demographic conditions, pedestrian and vehicular circulation, service infrastructure, as well as cultural, educational and recreational needs are similar to those identified in MLA 64100-Landscape Architecture Studio IV. In addition, this studio will introduce the use of Geographic Information Systems (GIS) technology with special emphasis on a city’s constantly evolving data base for accessing quantitative cultural and environmental data via internet conductivity. Within the larger urban context, each student selects her/his own study area, with the instructor reviewing the proposed project for appropriateness in complexity and scope. Each student conducts a thorough analysis of the individual study area, defines a set of social/environmental/ecological issues, and explores the resolution of these issues as a set of alternative open space design solutions. 10 HR./WK.; 6 CR.

65150 Landscape Architecture Thesis Preparation

This course is the first of a two-course sequence that tests the ability of the student to recognize a significant urbanized area in need of design intervention, identify a user/client constituency, sort out significant development/ecological issues, conduct a comprehensive site/context analysis and propose alternative design solutions. The activities of this course are focused on the development of a thoughtful and defensible proposal including the identification of a significant problem, a comprehensive analysis and preliminary solutions resolving identified cultural/ecological issues and needs. The major assignment will be a comprehensive proposal developed in MLA 65150-Landscape Architecture Thesis Preparation. The final presentation of the year-long investigation will include a defensible rationale for the design approach, a series of diagrams, drawings and spatial models informed by the knowledge and skill gained through previous coursework in the program and will be reviewed by the same group of critics intervening at the end of the thesis preparation course. In addition, a public presentation is required using both a narrative and graphic format, and presenting a defensible proposal that includes the identification of a significant problem, a comprehensive analysis and design solutions resolving the identified cultural/ecological issues and needs. 12 HR./WK.; 9 CR.

65200: Urbanism

(Also, UD 61004: Urban Ecologies I) The course involves the investigation of the place of the city in a variety of planetary and natural systems that seek to define the limits of urban sustainability. Using the concept of the urban “ecological footprint”, the course will examine the practical boundaries of urban growth, the interaction cities and the environment, the cycles of urban respiration and development, and the fundamentals of a sustainable urban economy. 3 HR./WK.; 3 CR.

Urban Design

61001: Urban Design Studio I

Working both collaboratively and individually, students will pursue the design of an autonomous city in an abstracted setting. The studio—utopian in mood—investigates principles and practices of city design at regional, urban, neighborhood, and architectural scales and engages a wide variety of analytical, representational, and expressive media. 10 HR./WK.; 7 CR.

61002: History of Urban Space I

An overview of the general process of modernization implicit in histories of city planning. The class traces the transformation of pre-modern “cities of faith” from a variety of cultures into the proto-modern cities of the Renaissance and the more controlled expressions of Baroque and Enlightenment urbanism. It examines the rise of the “city of machines” of the nineteenth century and concludes with the rise of the modernist urbanisms of Ebenezer Howard, Le Corbusier, and others. 3 HR./WK.; 3 CR.

61003: Reading the City I

A reading course devoted to close analysis of a series of major texts in urban theory. These readings are broadly drawn from the fields of urbanism, geography, cultural studies, cinema studies and other disciplines. The course aims to show both the range and nuance of styles of reading the city as well as the presence of the city as a shifting trope in larger formats by which we understand and reproduce contemporary culture. 3 HR./WK.; 3 CR.

61004: Urban Ecologies I

An investigation of the place of the city in a variety of planetary and natural systems that seeks to define the limits of urban sustainability. Using the concept of the urban “ecological footprint”, the course examines the practical boundaries of urban growth, the interaction cities and the environment, the cycles of urban respiration and development, and the fundamentals of a sustainable urban economy. 3 HR./WK.; 3 CR.

62001: Urban Design Studio II

The second urban design studio will incorporate strategies and methods developed in the first semester in the investigation of a large urban site in New York City. Drawing on a variety of “real world” influences and sources, students will produce viable designs that investigate the interplay of scale, site, program, and vision. 10 HR./WK.; 7 CR.

62002: History of Urban Space II

A survey of urban design since 1945 in the context of post-war American suburbanization and the reconstruction of Europe. The course examines the impact of the growth of the globalized economy on urban form and development. It also considers theoretical styles—collagist, deconstructivist, phenomenological, etc.—and their impact on attempts to understand the contemporary city of fragments and layers. 3 HR./WK.; 3 CR.

62003: Reading the City II

Drawing on insights and methods of the first semester, the course examines specific strategies for reading and analysis of urban sites. These will be used to reveal both the limits of different techniques of observation and the ways in which the contemporary metropolis overlays many social and imaginative spaces in the same physical place to produce the multiple and fragmentary territories that characterize the contemporary, plural metropolis. 3 HR./WK.; 3 CR.
62004: Urban Ecologies II
The second semester of the ecology sequence is focused both on ways in which the city provides a setting and a medium for a variety of human interactions and organizations and on the ways in which the city collaborates in the invention of “people” and in teaching them how to be, how to exist, in the modern world. It explores some of the basic forms of metropolitan life—the crowd, the street, the park, the mass transit system, the store, the office, etc.—as well of forms of loneliness, mass-association, art, entertainment, and politics—via a variety of imaginative and critical texts. 3 HR./WK.; 3 CR.

64301-64305: Advanced Research in Urban Design
Students in Urban Design, advanced undergraduates, and others may complete independent research projects under the supervision of the Director. Credits awarded will vary depending on the scope of the project. VARIABLE CREDIT.

FACULTY

Peter A. Gisolfi, Professor and Chair
B.A., Yale Univ.; M.Arch., M.L.A., Univ. of Pennsylvania; R.A.; R.L.A.
Hanque Macari, Professor
M.S. (Envr. Design), Univ. of Wisconsin (Madison); B. Arch., Univ. of Florida; R.A.
Garrison McNeil, Professor
B.S., B.Arch., The City College; M.S. (Urban Design), Columbia Univ.; R.A.
George Ranalli, Professor and Dean of Architecture
B.Arch., Pratt Institute; M.Arch., Harvard Univ., R.A.
Michael Sorkin, Professor
B.A., Univ. Of Chicago; M.A., Columbia Univ.; M.Arch., M.I.T.
Achva Benzinberg Stein, Professor
B.A., Univ. of Calif. (Berkeley); M.L.A., Harvard Univ.
Lee Weintraub, Associate Professor
B.S.Arch., The City College; R.L.A.
Andrew Zago, Professor
B.F.A., Univ. of Michigan; M.Arch., Harvard Univ.
The School of Education
The School of Education, an outgrowth of the Extension Courses organized in the Fall of 1908 for teachers, librarians, and social workers, was established as a separate school of The City College in the spring of 1921. It is organized under its own faculty to prepare men and women for various educational services, teaching and non-teaching, in day care/preschool settings, as well as in the elementary and secondary schools. It is also open to in-service personnel who wish to take courses for professional improvement.

In collaboration with the other Schools and Divisions of The City College, the School of Education offers programs of study in a number of professional fields. Professional preparation for educational service under the jurisdiction of the Board of the Trustees of The City University of New York and is coordinated by its Committee on Coordination of Teacher Education.

The graduate programs lead to the degrees of Master of Arts or Master of Science in Education. Initial, professional and advanced certificate programs are available in many professional fields. For elementary and middle school teachers, a variety of programs are offered including bilingual and special education. For secondary schoolteachers, highly specialized professional courses are offered in the context of the discipline taught and supported heavily by course work in these content areas. For current and prospective school supervisors and administrators, programs that are designed to address school and district needs and priorities are offered. The college participates in offering the doctorate (Ph.D.) in both Educational Psychology and Urban Education at The Graduate Center of the City University of New York.

MISSION AND SHARED VISION OF THE SCHOOL OF EDUCATION

The City College School of Education provides access to the field of education for all who show promise of contributing to New York City schools and the education of the City’s children. In keeping with the historical mission of the College, the School opens its doors to those who, because of national origin, native language, or economic condition might otherwise find a career in education out of reach.

The preparation of teachers in the United States is intended to meet the needs of a democratic society. In New York City, this is extended to preparing educators to work with students who are diverse in all respects. To that end, the School seeks to draw on the varied strengths of candidates while ensuring that they acquire the academic, pedagogical, technological, professional, and personal skills required of an educator in an urban setting. The School commits itself to ensuring that its graduates can demonstrate solid grounding in the liberal arts and sciences, a deep understanding of public purposes of education in a democracy, thorough training in effective teaching skills, and the professional and affective dispositions to work successfully with students, families, and colleagues in the field.

The School focuses on five themes to insure coherence across its curriculum, instruction, field experience, and assessment:

- Content knowledge
- Pedagogical knowledge
- Diversity
- Leadership
- Building of caring communities.

A. Developing In-depth Knowledge About the World

Candidates preparing to work in schools in teaching or supervisory roles demonstrate the content knowledge and skills necessary to help all students learn. All the College’s programs attempt to meet national and professional standards of content, rigor, and coherence. This knowledge is found in the liberal arts and sciences and is presented with the most up-to-date technology. Indeed, there is a consensus of educators, from progressives to traditionalists, that literature, history, philosophy, mathematics, natural science, foreign languages, and art and music must be part of a university curriculum.

To that end, the institution requires a core curriculum emanating from its College of Liberal Arts and Science. The School adopts and enhances this curriculum by requiring of its candidates additional math and science courses. Undergraduate candidates, in addition to their pedagogical courses, must complete an academic major or concentration. (In addition to these requirements, pedagogical courses echo the content of the liberal arts core and concentrations, philosophy, history, mathematics and English are part of these courses.)

Content knowledge is demonstrated in teaching methods courses: e.g. language arts, social studies, math and science. In these courses, candidates are introduced to State learning standards at the level appropriate to the certification they seek. Through use of content knowledge, candidates must be able to determine the widest and deepest potential knowledge base of each of their students with the accompanying strategies that range from direct instruction to inquiry so the student can, from textual and electronic
sources, obtain, rehearse, recall, and transfer new knowledge to routine and new learning contexts. Knowledge of students and pedagogy goes hand-in-hand with content knowledge.

The seven knowledge areas of a university curriculum, listed above, have value in themselves, a value that education and liberal arts faculty communicate, deliberately and in passing, even in pedagogical courses. These faculties work together on curriculum and search committees. Only if they share and transmit the value of these knowledge areas will candidates develop a disposition to continue experiencing these and participate in lifelong learning. If they are not disposed to recognize this value they will not be able to pass it on to their students.

The target for teacher and other professional candidates with regard to content includes in-depth knowledge of the subject matter to be taught or supervised including the methods of the discipline that determine what becomes knowledge. Candidates demonstrate this knowledge through inquiry, critical analysis, and synthesis of the subjects they plan to teach. Some are able to meet target levels of performance by graduation from the programs of the School. Others, at that point in their development as educators, meet, at least, acceptable levels. But all graduates have the basic tools, technology and necessary dispositions to continue their development as educational professionals as well as learners. In order to ultimately meet target levels of performance, our graduates will have to continue to develop their content as well as their professional knowledge.

B. Becoming Skilled, Reflective Practitioners

Teacher competence is obviously a primary influence on student learning. Critical dimensions of competence are pedagogical knowledge and skills. The School of Education adds to this the knowledge and skills to be a successful educator in urban schools that serve a diverse population of children and families and the disposition to use these to promote the learning of all children. In order to articulate the School’s purposes and goals, pedagogical competence is divided into six subcategories:

1) Knowledge of human learning and development. In coursework, candidates build their pedagogical knowledge on a foundation of learning and developmental theory in tandem with practice in fieldwork. Candidates observe students in an educational and cultural context.

2) Knowledge of constructivism and inquiry learning. In coursework and fieldwork, candidates learn how to provide students with opportunities to explore, inquire, discover, and problem-solve. Candidates apply knowledge by gradually implementing a wider range of instructional practices in the field with diverse groups of students.

3) Knowledge of pedagogical (including behavioral) approaches to working with students with special needs. Candidates, whether in special education or not, recognize that they may be called upon to work in inclusion classrooms and engage in culturally responsive teaching. As well as experiencing constructivist and inquiry models, candidates investigate complementary models for students with special needs.

4) Knowledge of the use of instructional technology for teaching, learning, and assessment. The School promotes the skillful use of instructional and communications technology with a predominantly "across the curriculum" approach based on the recognition that technology must be used to support student learning.

5) The knowledge and ability to put into practice both multiple teaching strategies and approaches to assessment that build on the knowledge and strengths that students bring to school and allow for differentiated instruction for diverse learners. Based on their knowledge and experiences with cultural differences, candidates integrate multiple strategies in the preparation of lessons and fieldwork. They are introduced to formal and informal assessment devices in foundation courses and, in succeeding course and fieldwork experiences, become comfortable with a wide range of assessment strategies.

6) Application of knowledge and skills through sequenced experiences in the field. Through sequenced fieldwork, candidates grow in their ability to apply the skills and knowledge learned. Fieldwork culminates in a carefully monitored semester of student teaching or, in the case, of graduate students, a practicum in which they engage in a formal inquiry into their teaching practice.

C. Educating For and About Diversity

The great strength of City College is the diversity of its students and faculty. As a public institution, the College has in place a policy of nondiscrimination on the basis of age, color, disability, national or ethnic origin, race, religion, sex, sexual orientation, veteran or marital status. As a campus situated at the center of one of the world’s most diverse metropolises, the College enjoys the opportunity of making that policy a living reality.

The School of Education subscribes wholeheartedly to the goal of full inclusion and so works continuously to ensure that the diversity of the New York City population, and particularly of the surrounding local community of upper Manhattan, is reflected in the make-up of the faculty and in the perspectives, concerns, and materials taken up throughout the curriculum. Access to education and to careers in teaching for the widest possible representation across the City’s population is central to the School’s mission but, at the same time, a wider variety of educational options is often available to the economically more advantaged. In this light, the School and the College seek especially to provide access to those who are economically disadvantaged. Mechanisms to provide such access include low tuition, financial aid, academic support services, and scheduling of classes to accommodate students who work.

The School views the diversity of students and faculty, defined in its widest sense, not just as an obligation but as an educational resource. While an emphasis on multiculturalism does prepare learners for the diversity of the world outside the classroom, a diverse classroom actually brings that reality
into the educational process itself. In a true community of learners, where each member contributes to the learning process, it must be the case that greater diversity of lived experience among the learners results in a richer learning experience for the community. For the School of Education candidate, diversity is more than a fact of the world, something about which the candidate must learn; it is a fact of the candidate’s own classroom, something through which the candidate can learn. It is the responsibility of faculty to draw upon the diversity of the school to enrich the learning processes of all candidates, a practice that serves as a model for candidates in their own teaching.

The School is continuously working towards finding ways to promote understanding across experiential divides. Particularly where native cultures, languages, and dialects differ from candidate to candidate, candidate to instructor, and faculty member to faculty member, it is a challenge to appreciate and accurately assess the value of another’s contribution. It is also a challenge to prepare candidates to meet the demands of state and professional assessment instruments, which may not always be sufficiently sensitive to cultural and linguistic differences. The School strives to meet these demands without sacrificing either academic rigor or cultural and linguistic pluralism.

D. Nurturing Leadership for Learning

1) General preparation. Our goal is to develop the capabilities of candidates to assume leadership roles in their classrooms, schools, and communities. Whether or not candidates eventually assume formal leadership positions, the acquisition of the knowledge, skills, technology, and dispositions required for providing leadership serves to enhance their performance at the classroom, school, and community levels. Accordingly, developing the capacity to apply leadership skills that foster the development of community in multicultural, multilingual schools is a theme that is embedded and reinforced in the course content, fieldwork, research requirements, and internship experiences offered by all the programs in the School.

Candidates acquire the ability to lead and participate in decision-making bodies that address the academic content and management structure of the diverse programs in their schools. They are prepared to engage in collaborative processes that encourage the mutual efforts of teachers, administrators, and staff to work and learn together. They become skilled at collegial planning and evaluation, managing conflict, and reflecting and dialoging on their own professional practices. They seek to become stewards of best practice, which, by so doing, feel a responsibility for the whole School and not just the classroom.

2) Preparing candidates for formal leadership positions. Candidates learn to lead through the co-creation of a shared vision, values and goals. To accomplish this, they learn to build consensus, manage conflict, and clearly communicate the importance of the shared vision and values on an ongoing basis. They learn to create and maintain a culture of cooperation and collaboration which has teaching and learning as its central focus. They develop the value of empowering teachers and staff to act on their own ideas by involving them in decision-making processes and encouraging them to think of themselves as leaders. They demonstrate commitment to and sensitivity and respect for diverse cultures served by school communities.

Faculty in the leadership preparation programs utilize case study methodology, problem-based learning, and cooperative learning strategies to prepare candidates to understand the process of developing and articulating a vision and its related goals, to acquire the skills and dispositions needed to relinquish authority to teachers and staff, to appropriately involve others in decision-making processes, to delegate authority, and to share credit with others for the successes enjoyed by a school or other institutional unit.

E. Building Caring Communities

Community-building must be at the heart of any school improvement effort. Caring communities are places where teachers and children support and celebrate each other’s learning and general well-being. The School, in order to help candidates begin this career-long endeavor, focuses on the creation of democratic classrooms and schools and teachers’ roles as models of caring, values, and moral behavior.

1) Democratic classrooms and schools. Candidates come to understand what democratic classrooms and schools look like and what values they have. Faculty strives to be examples, not as transmitters where their voices dominate, but as co-intentional learners, coaches, and facilitators. Beyond modeling, faculty explore with candidates the dynamics of democratic classrooms and emphasize why they are important. They emphasize the connection between public education and caring citizens equipped to make judgments as they participate in the decision-making processes of society.

2) Teachers as models of caring, values, and moral behavior. All teachers need to know their students well and, to the extent possible, personalize instruction and provide advice, nurturing, and counseling when needed. Faculty of the School, therefore, need to know candidates well and help them identify ways to know their students and to express interest in and caring for them. Candidates need to remember details about students’ lives, keep notes, call and visit their homes, respond authentically, and ask students what they think and care about. Most of all, candidates need to learn that being a caring teacher is not playing a role. They must be authentic persons before they are caring persons. To be authentic in front of students leaves one vulnerable and candidates need to be able to deal with that vulnerability.

Candidates, therefore, learn how classrooms and schools become caring communities and how they become more democratic. They understand behaviors and forces that militate against caring, democratic classrooms.
They exhibit caring and democratic behaviors in their education classes. Finally, they will define the values they have been met.

The School continually reviews and evaluates all undergraduate and graduate programs, including the objectives, content, and learning activities of individual courses. Experimentation is sought in all aspects of the program. Through required courses, counseling, experience in community agencies, and in affiliated and other schools, students are prepared to fill their role as urban teachers.

**ACCREDITATION AND CERTIFICATION**

The City College is accredited by the Middle States Association of Colleges and Secondary Schools. The teacher education program of the College prepares elementary teachers, secondary teachers, and school service personnel with the master’s degree as the highest approved degree. Certificate programs beyond the master’s degree are also offered in several fields. The School of Education is accredited by the National Council for Accreditation of Teacher Education (NCATE) and all of its programs are state approved. The School of Education is affiliated with the American Association of Colleges for Teacher Education.

Programs of study are designed primarily to meet State certification requirements. Students who at the time of receipt of an advanced certificate or master’s degree and as a result of their studies at the College meet all the requirements of one of the College’s teacher education programs approved by the New York State Department of Education are recommended to that Department by the dean of the School of Education for state certification. However, State requirements change from time to time. Consequently, students interested in State certification should inform themselves of current requirements. Students having questions regarding State requirements should consult the Certification Officer (NAC 3/213).

All School of Education students should apply, upon conferred degree, for certification through the Certification Officer (NAC 3/213) or on their own without college endorsement.

Students who have completed a teacher education program at City College meet the educational requirements for certification in 39 states through the Interstate Agreement on Qualification of Educational Personnel. Included among these are Connecticut, Delaware, Florida, Georgia, Maine, Massachusetts, New Hampshire, New Jersey, North Carolina, Rhode Island, South Carolina, Vermont and Virginia. More information on teaching in other states is available through the Certification Officer, NAC 3/213.

Students who plan to take examinations to teach in the elementary and secondary schools of New York City are advised to obtain a copy of the certification requirements from the Center for Recruitment and Professional Development, 65 Court Street, 3rd Floor, Brooklyn, New York 11201, www.nycenet.edu, and from the Office of Teacher Education and Certification, State Education Department, Cultural Education Center, Empire State Plaza, Albany, New York 11201 for information and updates.

**NEW YORK STATE CERTIFICATION REQUIREMENTS**

The Graduate School of Education has programs leading to initial and professional certification in New York State. When students complete a certification program, they may request the College, through the Certification Officer (NAC 3/213), to recommend their certification to the New York State Education Department. The Dean’s Office, in conjunction with the program head, determines that all program requirements have been met.

In addition to the academic requirements of the program, candidates must also pass the New York State Certification Examinations (NYSTCE) appropriate to the certificate they seek. The NYSTCE to be passed are the Liberal Arts and Sciences Test (LAST), the Assessment of Teaching Skills-Written (ATS-W), the Content Specialty Test (CST) and the Assessment of Teaching Skills-Performance (ATS-P). For professional certification, candidates must also have a master’s degree in an area that is functionally related to the area of certification and three years of satisfactory teaching experience in the certification area.

**GRADUATE PROGRAMS**

**Master of Science in Education**
- Bilingual Childhood Education
- Early Childhood Education
- Educational Leadership
- Childhood Education
- Literacy, Birth-6 or 5-12
- Mathematics Education (Grades 5-9)
- Science Education (Grades 5-9): Biology, Chemistry, Earth Sciences, Physics
- Teaching Students with Disabilities in Childhood Education
- Teaching Students with Disabilities in Middle Childhood Education
- Bilingual Special Education

**Master of Science**
- Teaching English to Speakers of Other Languages

**Master of Arts**
- Art Education (Grades K-12)
- English Education
- Mathematics Education (Grades 7-12)
- Secondary Science Education (Grades 7-12): Biology, Chemistry, Earth Science, Physics
- Social Studies Education

**Extensions to Certificate Programs**
- Bilingual Education

**Advanced Certificate Programs for Baccalaureate Degree Holders**
- English Education
- Mathematics Education
- Science Education: Biology, Chemistry, Earth and Atmospheric Science, Physics
- Social Studies Education

**Post Master’s Advanced Certificate Program**
- Administration and Supervision
OFFICERS OF ADMINISTRATION
Dean
Alfred S. Posamentier
NAC 3/203, 212-650-5471
Associate Dean
Doris Cintrón
NAC 3/213, 212-650-5302
Department of Childhood Education Chair
Professor Gretchen Johnson
NAC 6/207B; 212-650-7262
Department of Leadership and Special Education Chair
Professor Sylvia Roberts
NAC 6/207B; 212-650-7262
Department of Secondary Education Chair
Professor Susan Semel
NAC 6/207B; 212-650-7262
School of Education Offices
Department of Education
NAC 6/207; 212-650-7262
Office of Student Services
NAC 6/204B; 212-650-5316
Field Experiences and Student Teaching
NAC 6/207A; 212-650-6915
Graduate Admissions
NAC 3/223A; 212-650-6296
Certification Office
NAC 3/213; 212-650-5590

The Office of Graduate Admissions provides general information about the programs of study. All courses must be approved by the student’s major field advisor before they may be credited toward the degree of Master of Arts, Master of Science in Education, or Advanced Certificates.

ADVISORS FOR ADMISSIONS, COURSES, PROGRAMS, AND REGISTRATION

Leadership
Professor Coppin, 212-650-6276

Art Education
Professor James, 212-650-7433

Bilingual Education
Professor Cintron, 212-650-5146
Professor Davis, 212-650-6240

Childhood Education
Professor Neujahr, 212-650-6269

Early Childhood Education
Professor Falk, 212-650-5182

English Education
Professor Rorschach, 212-650-6291

Mathematics Education
Professor Smith, 212-650-5975

Science Education
Professor Steinberg, 212-650-5698

Social Studies Education
Professor Semel, 212-650-5038

Special Education
Professor Ware, 212-650-5884

Bilingual Special Education
Professor Stern/Ware, 212-650-5185

TESOL
Professor Cintrón, 212-650-5146
Professor Davis, 212-650-6240

ADMISSION

Matriculation Status

Initial Certification Programs
Full matriculation is open to graduates of colleges of recognized standing who are qualified to undertake graduate study by reason of previous preparation in both subject matter and professional fields as listed under the several program specialization’s. To be admitted to an initial certificate program in elementary or secondary education, the candidate’s preparation in the Liberal Arts and Sciences must include a Liberal Arts major and course work in English composition, literature, mathematics, the sciences, history, and a foreign language.

For the teaching specializations, professional preparation may also be required in areas such as history of education, child development or adolescent development. These requirements differ by program. Students lacking such preparation may be admitted on condition (see Matriculation with Conditions below).

Candidates are expected to meet acceptable standards in respect to academic record, character and health. A candidate may be rejected if there is any doubt concerning certification or Licensure by the New York State Department of Education or by the New York City Department of Education.

The number of candidates admitted to programs is necessarily determined by the needs of the schools. If the number of eligible applicants is patently in excess of the anticipated capacity of the schools to absorb them within a reasonable period subsequent to their graduation, matriculation is limited to those who offer surest promise of effectiveness in educational service.

Professional Certification Programs
Full matriculation is open to graduates of colleges of recognized standing who are qualified to undertake graduate study by reason of previous preparation in both subject matter and professional fields as listed under the several program specializations.

Candidates are expected to meet acceptable standards in respect to academic record, character and health. Candidates must hold initial New York State Certification to be admitted to a program leading to professional certification.

Matriculation with Conditions
A student who is otherwise qualified but who has not completed the courses requisite to matriculation, may be admitted to matriculation with conditional status, provided that the deficiencies are not in excess of twelve credits of work in professional and subject matter courses combined. Students admitted to matriculation with conditions will be expected to remove all conditions within three semesters after their initial acceptance.
No credit toward the degree is allowed for courses taken to fulfill the requirements or conditions for matriculation.

**Admissions Procedure for Matriculated Status**

Students applying for admission to the master’s degree or advanced certificate programs in the School of Education follow the following procedure:

1. Complete an application for admission to the particular program. Applications may be obtained from the Office of Graduate Admissions, NAC 3/223A.
2. Submit the application for admission and letters of recommendation to the Office of Graduate Admissions by October 15th for the Spring, and March 15th for the Fall.
3. Complete an in person written essay and interview.
4. Provide evidence of New York State initial certification if applying to a program that leads to professional certification.
5. Provide evidence of having taken the LAST if applying to a program that leads to initial certification.

Decisions on admissions will be made by each graduate program after consideration of all admissions materials. Decisions will be announced in January for Spring admissions and June for Fall admissions.

The Advanced Certificate programs are designed to accommodate students who already have a baccalaureate degree with a major in English, History, Mathematics, or one of the sciences, but no teacher preparation courses. The programs in the four major discipline areas of study consist of fifteen credits of study in education which, together with any Liberal Arts prerequisites, will lead to New York State initial certification as a secondary schoolteacher of English, mathematics, science, or social science.

Students seeking admission to one of these programs must:

1. Possess a bachelor’s degree from an accredited college or university.
2. Demonstrate an ability to pursue graduate study successfully.
3. Possess a grade point average of B or above.
4. Submit two letters of recommendation.
5. Have taken the LAST New York State Teacher Certification Examination.
6. Complete an in person written essay and interview.

Students who have not completed all Liberal Arts requirements for initial certification will be conditioned to those courses they lack. Conditioned courses must be completed, in addition to the core education curriculum, in order for a student to be recommended for initial certification.

**Maintenance of Matriculation**

As a professional school with the responsibility of recommending students for New York State certification, the School of Education must conduct ongoing professional evaluation of students. In cases where faculty determine that an individual is inappropriate for the teaching profession, they may recommend dismissal to the Committee on Course and Standing. The findings of the Committee can be appealed to the dean, whose judgment is then final.

**Admission with Advanced Standing**

Up to six credits in advanced standing may be allowed for graduate work satisfactorily completed at institutions other than The City College, provided that the program head deems the work appropriate to the student’s program of study and an official transcript is on file in the Office of the Registrar. The course or courses for which such credit is sought must have been completed within the three-year period prior to the date of matriculation in the graduate program.

**Seniors**

A senior, with the approval of the department chair or designee, may be admitted to selected graduate courses. These may be credited toward the master’s degree if the student does not use the credits toward the undergraduate degree and full graduate tuition is paid for each credit.

**Foreign Student Credentials**

An applicant who files credentials from foreign institutions of higher learning in support of an application for admission to a graduate program in the School of Education must present:

1. The original of all academic records and certifications for all institutions attended.
2. Available bulletins and catalogs of the institutions attended and the curricula followed.
3. Original and photostatic copies of statements by the United States Office of Education or other agencies relative to standing, level, or validity of foreign records filed with such agencies for purposes of evaluation and certification or licensing.

Conditional matriculation can be achieved with photostatic copy and notarized translation of academic records and certifications from all foreign institutions attended until the originals are received.

Credentials filed in support of an application become part of the permanent file and the property of the college. When a student has presented both the original and a photostatic copy of a document, the Registrar will return the original to the student after verification.

**Non-Matriculant Admissions**

The School of Education will allow degree and/or certification seeking students to take up to nine credits as non-matriculated students. If such students are accepted as matriculated students, the program head will decide whether any of the credits taken as a non-matriculated student may be applied toward the program requirements.

Those who wish to attend as non-matriculated students may be admitted to courses for which they are qualified. Such students must file for admissions as a non-matriculated student at the Office of Graduate Admissions in NAC 3/223A and present student copies of transcripts or other credentials proving graduation from an accredited institution at that time.

Non-matriculated students who hope to pursue a graduate program in education are strongly advised to take the LAST Certification Examination during the first semester, if they have not already passed these examinations or otherwise hold New York State certification.
Non-Degree Admissions
The School of Education Graduate Division will accept non-degree students who seek professional growth. One or a series of courses taken to improve teaching skills and to keep up with new developments in the student's area of teaching is encouraged by the College.

Advisors in each of the several teaching and service fields are available for consultation at registration and during the regular semesters. Courses taken as a non-degree student are applicable neither to a certificate program nor to a Master's Degree program.

Those who wish to attend as non-degree students may be admitted to courses for which they are qualified. Such students may file for admission at non-degree registration, which is described in the Graduate Education Schedule of Classes. Before registration, these applicants must present student copies of transcripts or other credentials proving graduation from accredited institutions. A student may file for admission as a non-degree student in the Office of Graduate Admissions, NAC 3/223A.

Non-degree students must follow the regular rules for registration and course requirements, including prerequisites. Schedules of Classes are available at the School of Education or the Office of the Registrar, Y Building, two weeks before the registration period.

Grading and Course Information
Grades awarded in the School of Education are:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent (includes + and – grades)</td>
</tr>
<tr>
<td>B</td>
<td>Good (includes + and – grades)</td>
</tr>
<tr>
<td>C</td>
<td>Fair (includes + and – grades) (lowest passing grade for graduate credit)</td>
</tr>
<tr>
<td>F</td>
<td>No credit granted. If this grade is received in a required course, the course must be repeated.</td>
</tr>
<tr>
<td>W</td>
<td>Withdrew without penalty</td>
</tr>
<tr>
<td>INC</td>
<td>Incomplete. This is a temporary grade, authorized only where unavoidable circumstances have prevented the completion of course assignments. Instructors may give this grade at their discretion, but it is expected that students will complete the requirements by the published date in the following semester. If extraordinary situations require a further extension, it must be obtained through the Committee on Course and Standing. Graduating students must complete courses before the semester’s graduation date (September 1, February 1, and the official June Commencement date) in order to graduate at the expected date.</td>
</tr>
</tbody>
</table>

ABS Absent From Final Examination. This is a temporary grade given when a student completes all course requirements but misses the final examination because of unavoidable circumstances. In this event the student must apply for a special final examination. Requests should be made to the instructor no later than three weeks after the start of the next semester.

An average grade of B (3.0) is required for graduation. Students whose academic status falls below this standard will be placed on probation.

Normally, students are not permitted to repeat a course that they have already passed. If permitted to do so, the second grade is not counted in computing the scholastic average, unless the Committee on Course and Standing so authorizes.

Important Note on Restricted Courses
There are several kinds of courses which are limited in their enrollment to certain categories of students. These restrictions are noted in the course descriptions. Students who register contrary to these rules will be dropped from the course and may lose part or all of their tuition. Restrictions are as follows:

Special permission required. Permission is to be obtained in writing from the major advisor in the student’s field or program only. This may be done at the time of registration. Open to matriculants only. This indicates that only those persons in an approved program leading to the master’s degree, post-master’s, or an advanced certificate may take the course. In some instances, the course may be open only to matriculants in a particular program; if so, this restriction is stated in the course listing.

Open only to... Certain courses are restricted to special groups of students (e.g., science majors or those with 10 credits of graduate work). In each case, the limitation is specified in the course listing.

Advanced approval required. Students must receive written permission from the appropriate advisor during the preceding semester, prior to the date listed in the Collegiate Calendar for obtaining such permissions. This date is normally about the middle of April or November.

Prerequisite or corequisite courses. In each instance where particular courses are listed as pre- or corequisite, equivalent courses may be presented for the advisor’s approval. Students registering without the necessary prerequisite or corequisites will be barred from such classes.

Basic Prerequisite Education Courses
There may be basic courses in the Foundations of Education which should be taken before other Education courses, unless special permission has been obtained from the program advisor to follow some other sequence. These courses differ by program.

Independent Study
Students are encouraged to include Independent Study courses in their programs, as appropriate. Such work may only be embarked upon under the advisement of a program advisor. Students who wish to take an independent study course must do so with the agreement of the faculty member who will act as mentor for such work. This must be done in advance of registration. Approvals are not available at registration.

Admission to Student Teaching/Practicum
Only students who are matriculated in graduate programs in the School of Education will be admitted to student teaching/practicum courses. Those matriculated students who wish to take
student teaching courses must apply during the first ten weeks of the preceding semester to the Office of Field Experiences and Student Teaching, NAC 6/207A, 650-6915. For policies and procedures regarding student teaching, please see the School of Education section of the 2005-2007 Undergraduate Bulletin.

Courses in the Graduate Division
College of Liberal Arts and Science
Matriculants for advanced certificates or a master’s degree in the School of Education are afforded the opportunity of enrolling in the courses offered in the Graduate Division of the College of Liberal Arts and Science under the following conditions.

1. Not more than twelve credits taken in that division may be credited toward the graduate degree in the School of Education.

2. Each course included in a student’s program of study must be approved in writing by the student’s major field advisor and by the appropriate departmental advisor in the College of Liberal Arts and Science.

Except for the limitations cited above, students in a master’s program will receive the same privileges accorded students in a master’s program will receive the same privileges accorded students in a master’s program. Further details about courses are contained in this Bulletin.

Courses in Other Divisions of The City College
Non Degree Students. The School of Education cannot give permits to non-degree students to take courses in other Divisions of the College. Such students must arrange their own registration in other Divisions of the College and fulfill requirements of these divisions.

Matriculants. Matriculated graduate students who wish to take undergraduate courses must obtain the approval of their major field advisor and must complete enrollment in courses at the time and place of School of Education registration. (See Schedule of Courses of the Graduate School of Education for time of registration and further particulars.)

Permission to register in courses of other Divisions of the College is issued provisionally and subject to cancellation if the courses have reached their maximum enrollment.

Courses at Institutions Other Than The City College
Advance Approval. A matriculated student who desires to take courses in an institution other than The City College must secure advance written approval for such courses from the major field advisor. If these courses are to be taken at one of the other City University colleges, the student must present such approval to the Registrar of the School of Education, and obtain the necessary permission prior to the registration period. No more than 6 credits of transfer courses may be applied to degree requirements.

Proof of Outside Work. The student is responsible for having an official transcript sent from the other institution as soon as final grades are available. A student who expects to be graduated at the end of the current term should not register in courses at another institution.

Human Relations Courses Likely to be Accepted by the New York City Department of Education
It is expected that the following courses will be offered in such a manner as to comply with the regulations of the New York City Board of Education for teacher credit in meeting the “Human Relations” requirements.

EDUC 0200A: Sociology of Education
EDUC 2200A: Human Relations in a Pluralistic Society
EDUC 3600A: Anthropology and Urban Education
EDUC 1800K: Parent, Child, and the School
EDUC 5700C: Education that is Multicultural

ATTENDANCE
Attendance is credited from the first session of the course. Students who register late incur absences for all sessions held prior to their registration.

Students are expected to be punctual, and to attend every session of the classes for which they are registered. It is not permissible to register for courses which cannot under normal conditions be reached at the time scheduled for the opening of the class.

Provision is made for unavoidable absence due to illness or authorized conferences by permitting two absences in a fifteen session course, or four absences in a thirty session course.

No credit will be granted for a course in which a student has incurred excess absences except that, where circumstances warrant, instructors may accept special assignments in lieu of one or two unavoidable absences. In no case will credit be granted if five absences have been incurred in a fifteen-session course.

If five absences occur prior to or by the midterm period, the instructor will forward to the Registrar a W grade. If the fifth absence occurs after the midterm period, the student must appeal to the School of Education Committee on Course and Standing in order to avoid the F grade.

DEGREE REQUIREMENTS
Matriculated Status. Degree candidates are required to be matriculants and to complete the minimum number of graduate credits specified in an approved program of study (not less than 30), to pass a written Qualifying Examination (unless a B average is achieved at graduation), and to complete Introduction to Educational Research (EDUC 0000I) and Individual Study in Educational Research (EDUC 0100I) or designated equivalent courses.

Approvals. All courses to be credited toward Advanced Certificates, the post-master’s Coordinated Course Sequence, the degree of Master of Arts, and the degree of Master of Science in Education must be included in the program of study, approved by the major field advisor before students register for courses.

Enrollment Residence and Time Limitations. To be continued as a matriculant in a master’s degree program, a student is required to take at least one approved course in each semester beginning in September and to maintain academic standards estab-
lished by the Committee on Course and Standing. All requirements for the degree must be completed within a five-year period from the date of matriculation. When advanced standing has been granted, one year will be deducted from this five-year period for each six credits of such advanced standing.

**Extension of Time Limitation.** Requests for extension of the time for the completion of graduate work should be made in writing in advance of the termination of the four-year period and addressed to the Committee on Course and Standing, School of Education. Extensions of time are given for compelling reasons.

**Exceptions to Enrollment**

**Residence.** Exceptions to the above enrollment rules may be made in the case of students who apply in advance and are granted a maternity, military or medical leave, etc. Requests for such leaves should be made in writing and addressed to the Director, Office of Student Services.

**Withdrawal from Courses.** Students wishing to withdraw from courses must report to the Office of the Registrar, to make formal application.

**Credit Limitations.** Graduates who are teaching or otherwise fully employed may not take more than six credits in any one semester, unless prior approval has been given by the program head. Full-time student status is established at twelve credits. However, persons who are carrying a full schedule may not take more than sixteen credits in the semester, including all courses taken in the several Divisions of the College, unless written permission has been secured from the School of Education Committee on Course and Standing.

**Academic Requirements.** The right is reserved to ask the withdrawal of any student who fails to maintain a satisfactory record in graduate courses.

**Professional Requirements.** The right is reserved to ask the withdrawal of any student who fails to display satisfactory professional attitudes and behavior in class or in a professional responsibility.

**Applying for Graduation.** Candidates for degrees and advanced certificates must apply before November 1st or April 1st of their expected final semester (July 1st, if final semester is to be the summer session). Applications may be obtained at the Registrar’s Office or online at www.ccny.cuny.edu.

**Graduation Honors.** Students graduating with a GPA of 3.7 and with no grade below B in courses applicable to the degree and who have exhibited high personal and professional qualities will be recommended to the dean to be awarded honors.

**ACADEMIC AND PROFESSIONAL STANDARDS**

Each graduate program establishes the academic and professional standards expected of its students. Traditional professional standards conform to but are not limited to the codes of ethics of professional educational associations.

The right is reserved to ask for the withdrawal of any student who fails to meet professional standards and/or fails to maintain a satisfactory academic record in courses. Offenses include, but are not limited to, cheating, plagiarism, inappropriate behavior and unsatisfactory grade point average.

**Jurisdiction Over Academic and Professional Standards**

Department chairs have jurisdiction over offenses regarding academic and professional standards for any student whose field of interest is in their department.

**Procedure for Handling Violations**

Violations of academic and professional standards shall be reported in writing to the department Chair, and a copy sent to the offender as soon as possible, but no later than one week after the offense is alleged to have taken place. In any appeal, the student must first arrange an appeal conference with the instructor who shall arrange a conference with the student as expeditiously as possible in order to settle the issue informally. The decision agreed upon shall be reported in writing to all persons involved, including the Director of Student Services, the department chair, and the dean.

When an informal settlement cannot be arranged with the instructor or program head, the student may request a hearing through the Committee on Course and Standing of the School of Education. This request must be filed with the Director of Student Services no later than fifteen days after the offense is alleged to have taken place.

**Appeals Procedures for Academic Judgments**

The School of Education Committee on Course and Standing will review only appeals that pertain to the School of Education. Students who wish to appeal academic judgments, including grades, begin by discussing the grades with the instructor as soon as possible after the grade is issued. Grades in courses may not be changed after the first month of the following semester without the approval of the department Chair and dean. A grade may be changed after a student has graduated.

If, after discussing the grade or other academic judgment with the instructor, a student wishes to pursue an appeal, he or she must discuss it with the program head. The program head will make an independent recommendation and then forward it to the department Chair and to the Committee on Course and Standing.

The student may pursue the appeal further to the Committee on Course and Standing, which has final jurisdiction. Such appeals are transmitted to the Committee through the Director of the Office of Student Services (OSS) and, in general, students should discuss the appeal with the Director before submitting a formal appeal.

The Committee on Course and Standing considers appeals in writing and neither the student nor the instructor appears in person. The student appeal should be in the form of a detailed letter accompanied by any supporting evidence the student wishes to submit, including copies of papers or letters from other students or instructors.

The Committee normally asks the instructor and the department Chair to comment, in writing, on the student’s appeal. On request, the OSS Director will discuss these responses with the student before the Committee meets.
The Committee’s decision is sent to the student, in writing, by the OSS Director. Other academic appeals, such as appeals from probation, academic dismissal, and failures, for poor attendance may be appealed directly to the Committee on Course and Standing. In addition, requests for waivers of degree requirements, extensions for incompletes, limitations on registration, and similar matters should be made to the Committee. The Committee has delegated its authority to the OSS Director for requests for extensions for incompletes, limitations on registration, and similar matters, but reserves appellate authority to itself.

STUDENT LIFE AND SERVICES

Educational Placement
Educational Placement services are available to assist graduate students and alumni in locating and securing positions in local and out of town school systems. Further information may be obtained from the Office of Student Services, NAC 6/204, or the Career Services Office, NAC 1/116.

Student Organizations

Education Club
Offers students interested in teaching careers an opportunity to explore issues of common interest; to promote professional growth; to act as a service group to the School of Education, The City College, and the community; and to maintain dialogue with the faculty in matters relevant to teaching.

Honor Society
Kappa Delta Pi, is an Honor Society in Education. City College constitutes the Gamma Iota Chapter. Graduate students and undergraduates in the junior or senior year who are preparing for the teaching profession, and who exhibit commendable personal qualities, sound educational ideals, and superior scholarship may be elected to membership if recommended by faculty.
The Department of Childhood Education

is located within the School of Education. The School of Education maintains policies and regulations that apply to all students in education programs.

The City College Department of Childhood Education offers the following Master’s degrees and advanced certificates in education:

**Master of Science in Education (M.S.E.D)**
- Bilingual Childhood Education
- Bilingual Childhood Special Education
- Early Childhood Education (Birth through age 8)
- Childhood Education (Grades 1-6)
- Literacy: (Birth-Grade 6; Grades 6-12)

**Master of Sciences (M.S.)**
- Teaching English to Speakers of Other Languages

**Extension Program**
- Bilingual Extension

**Non-degree Certificate Programs**
- Childhood Education
- Early Childhood Education

**ADVISEMENT**

The Office of Student Services (212-650-5316) or the Office of the Chair (212-650-7262) will be pleased to assist you in contacting the faculty member in charge of any of the programs above.

**PROGRAMS AND OBJECTIVES**

All courses are EDCE unless otherwise noted.

### BILINGUAL CHILDHOOD EDUCATION

The aims of this program are: to develop an academically, linguistically, and culturally enriching environment where the fields of bilingual and childhood education come together to develop skilled childhood education teachers, quality bilingual programs, and related exceptional teaching and learning practices; and to validate and build upon the linguistic and cultural strengths of diverse student populations.

**Stream A**— For students holding initial New York State certification and a Bilingual Extension. This stream will lead to professional New York State Certification and a Master’s Degree in Bilingual Education.

**Required Courses:**
- 2300C: Social Studies Inquiry for Pre-K to 6 Teachers 3
- 3200C: Science Inquiry for Pre-K to 6 Teachers 3
- 5201C: Teaching Language Arts and Reading in Bilingual Education (English) 3
- 6200C: Mathematics for Pre-K to Teachers 3
- 2203I: Content Research Seminar in Bilingual Education 2
- 2400C: Development and Evaluation of Materials in Bilingual Education 3
- 2900I: Seminar in Educational Research 2
- 5300C: Theories and Practices of Bilingual Education 3
- 5700C: Education that is Multicultural 3

**Electives**
(with permission of advisor): 6
- 0100E: Cultural Pluralism in Curriculum Development (3 cr.)

**Total credits:** 31

**Stream B**— For students who hold initial New York State Certification seeking a professional certificate and a Bilingual Extension. This stream will provide the requirements for a master’s degree in bilingual education, a bilingual extension and a professional certificate.

**Required Courses:**
- 2400C: Development and Evaluation of Materials in Bilingual Education 3
- 2600C: Linguistics in a Multicultural Society 3
- 5201C: Teaching Language Arts & Reading in Bilingual Education (English) 3
- 5202C: Teaching Language Arts & Reading to Bilingual-Bicultural Children (Spanish) 3
- 5203C: Teaching Language Arts & Reading to Bilingual-Bicultural Children (Haitian) 3
- 5204C: Teaching Language Arts & Reading to Bilingual-Bicultural Children (Chinese) 3
- 5500C: Children of the Caribbean Cultures and Curriculum 3
- 6700C: Phonology of English for Teachers 3
- 6800C: Grammar and its Pedagogy: English and Other Languages 3

**Total credits:** 31
5700C: Education that is Multicultural 3
6400C: Teaching Content (Math, Science, and Social Studies) using both English and a Native Language 3
2203I: Content Research Seminar in Bilingual Education 2
2900I: Seminar in Educational Research 2

Total Credits: 31

Stream C– For Students who hold a Bachelor’s Degree outside of Education while seeking an initial New York State Certificate (Childhood) and a Bilingual Extension.

Prerequisite/Corequisite: 
0200A: Psychology of Teaching and Learning 3
0300A: Child Development 3
0400A: The School in American Society: Bilingual Education in the Urban School 3

Required Courses:
2100C: Social Studies in Childhood Education 3
3100C: Science in Program of Childhood Education 3
5201C: Teaching Language Arts and Reading in Bilingual Education (English) 3
5202C: Teaching Language Arts and Reading to Bilingual-Bicultural Children (Spanish) 3
5300C: Theories and Practices of Bilingual Education 3
5400C: Teaching English as a Second Language 3
5600C: Psycho-sociolinguistic Aspects of Bilingual Education 3
5700C: Education that is Multicultural 3
6100C: How Children Learn Mathematics: Implications for Teaching II 3
6400C: Teaching Content (Math, Science, and Social Studies) Using both English and a Native Language 3

One of the following two: 3
4100C: Teaching Elementary Arts and Crafts in Childhood Education (3 cr.) 3
7100C: Creative Movement and Music in Childhood Education (3 cr.) 3
2203I: Content Research Seminar in Bilingual Education 2
2900I: Seminar in Educational Research 2
0502G: Student Teaching in Bilingual Education 6
1900G: Child Abuse and Health Education Seminar 0

Total Credits: 52

BILINGUAL CHILDHOOD SPECIAL EDUCATION

This program prepares Bilingual Special Education teachers to address the educational, emotional and behavioral needs of linguistically diverse minority students with a wide range of disabilities. Students completing the program become certified in Special Education 1-6 with Bilingual Extension.

Stream A–For students with initial certification

Required Courses:
3300K: Building Community in Inclusive Contexts 3
3600K: Adapting Reading Instructions for Children with Diverse Abilities 3
3800K: Differentiated Instruction and Assessment in Collaborative Contexts in Childhood Education 3
5202C: Teaching Language Arts & Reading to Bilingual Students: Spanish 3
5300C: Theories & Practices of Bilingual Education 3
5300K: Positive Approaches for Difficult Behavior 3
5401C: Methods of Teaching Second Languages 3
5600C: Socio- and Psycholinguistic Issues in Bilingual Education 3
5700C: Education That Is Multicultural 3

Total credits: 43

Stream B–For students without initial certification

Required Courses:
0200A: Psychology of Learning and Teaching 3
0300A: Child and Adolescent Development 3
0400A: The School in American Society: Bilingual Education in the Urban School 3
3300K: Building Community in Inclusive Contexts 3
5202C: Teaching Language Arts & Reading to Bilingual Students: Spanish 3
5300C: Theories & Practices of Bilingual Education 3
5300K: Positive Approaches for Difficult Behavior 3
5401C: Methods of Teaching Second Languages 3
5600C: Socio- and Psycholinguistic Issues in Bilingual Education 3
5700C: Education That Is Multicultural 3
5901G: Curriculum and Instructional Approaches in Bilingual Special Education 3
6000K: Introduction to the Education of Language Minority Students with Disabilities 3
6100K: Assessing the Educational Needs of Language Minority Students with Disabilities 3
6200K: Language Minority Families and the Special Education System 3
0703G: Internship in Bilingual Special Education 4
2600I: Content Research Seminar in Special Education 2
2900I: Seminar in Educational Research 2

Total credits: 56
BILINGUAL EXTENSION CERTIFICATE

Extension in Bilingual Education only—for students who hold initial or professional certification in early childhood/middle or adolescent education while seeking a Bilingual Extension.

Required Courses:
5201C: Teaching Language Arts & Reading in Bilingual Education (English) 3
5202C: Teaching Language Arts & Reading to Bilingual-Bicultural Children (Spanish) 3
5300C: Theories & Practices of Bilingual Education 3
5600C: Psycho-sociolinguistic Aspects of Bilingual Education 3
5700C: Education That Is Multicultural 3
6400C: Teaching Content (Math, Science, and Social Studies) using both English and a Native Language 3

Total credits: 18

CHILDHOOD EDUCATION

There are two graduate programs in Childhood (grades 1-6) Education. The initial certification program prepares candidates to enter the teaching profession. The professional certification program is for teachers who currently possess provisional certification (N-6) or initial certification (1-6).

Stream A–Initial Certificate Program
Up to nine credits can be waived due to equivalent coursework on the graduate or undergraduate level.

Required Courses:
0100A: Urban Schools in a Diverse Society 3
0200A: Psychology of Teaching and Learning 3
0300A: Child Development 3
0500C: Emergent to Fluent Literacy 3
0600C: Fluent to Experienced Literacy 3

One of the following two: 3
1800K: Family, Child & School (3 cr.)
5700C: Education That Is Multicultural (3 cr.)

2900F: Curriculum Development in Childhood Education I 3
3000F: Curriculum Development in Childhood Education II 3
2100C: Teaching Social Studies in Childhood Education 3
3100C: Science in a Program of Childhood Education 3
6000C: How Children Learn Math: Implications for Teaching I 3
6100C: How Children Learn Math: Implications for Teaching II 3

One of the following two: 3
4100C: Teaching Arts and Crafts in Childhood Education (3 cr.)
7100C: Creative Music & Movement in Childhood Education (3 cr.)

One of the following options: 6
0401G: Teaching Practice in Childhood Education I and Seminar (grades 1-3) 7 weeks (3 cr.)
0402G: Teaching Practice in Childhood Education II and Seminar (grades 4-6) 7 weeks (3 cr.)
or
0403G: Supervised Teaching in Childhood Education I and Seminar (grades 1-3) 7 weeks (3 cr.)
or
0404G: Supervised Teaching in Childhood Education II and Seminar (grades 4-6) 7 weeks (3 cr.)

Total credits: 40-49

Electives: 12

Total credits: 52

Non-degree Certification Options

Non-degree Certificate Program in Early Childhood Education for Holders of Certification in Childhood Education
This program is for individuals who hold Initial Certification in Childhood Education (grades 1-6) who want to extend their certification to include Early Childhood Education (birth through grade 2).

Required Courses:
0200C: Curriculum Development in Early Childhood Education 3
1900C: Language and Literacy Development in Young Children 3
3500C: Education in the Early Years: Infants, Toddlers & Preschoolers 3
4200C: Including Young Children with Special Needs in the General Education Classroom 3

One of the following options: 3
0301G: Teaching Practice in Early Childhood Education I and Seminar (7 weeks)
0303G: Supervised Teaching in Early Childhood Education and Seminar (7 weeks)

Total credits: 15

Non-degree Certificate Program in Childhood Education for Holders of Certification in Early Childhood Education
This program is for individuals who hold Initial Certification in Early Childhood Education (birth through grade 2) who want to extend their certification to include Childhood Education (grades 1-6).
The Graduate Program in Early Childhood Education prepares teachers to meet national standards of excellence in teaching by supporting children’s understandings of the world through inquiry and active learning. The program emphasizes deep knowledge of human development, learning processes, instructional strategies, and subject matter. All courses use technology and focus on how teaching, learning, and assessment connect. Special attention is given to how issues of diversity—of culture, language, family, and learning styles—can best be used to positively impact schools and schooling in urban settings. The program leads to New York State certification as a teacher of 0–8 year olds.

Stream A–Initial Certificate Program
Up to six credits can be waived at discretion of the advisor.

The initial certification program is for individuals who hold a Bachelor’s degree outside of Education and want to enter the profession. Rich fieldwork and student teaching experiences with educators in the public schools of New York City combine educational theory with practice.

Required Courses:
0100A: Urban Schools in a Diverse Society 3

Total credits: 31

Suggested Electives: *
1900C: Literature and Storytelling (3 cr.)
2100C: Social Studies Education in Elementary and Intermediate Schools (3 cr.)
2101C: Social Studies in the Early Childhood Curriculum (3 cr.)
3300C: How Young Children Learn Science (3 cr.)
5000K: Introduction to the Psychology of the Exceptional Child (3 cr.)
5300K: Applied Behavior Analysis (3 cr.)
5700C: Education That Is Multicultural (3 cr.)
6000C: How Young Children Learn Mathematics: Implications for Teaching I (3 cr.)
9602G: Administration and Supervision of Early Childhood Education (3 cr.)
7300C: Music and Movement for Young Children (2 cr.)
4300C: Art and Expressive Activities in Early Childhood Education (2 cr.)

Total credits: 39-45

* This is not an inclusive list. Please review the College’s Schedule of Classes for each semester’s list of offerings.

Stream B–Professional Certificate Program
The professional certification program is for teachers who already possess initial certification in some area of education. It emphasizes ongoing inquiry and learning and the evolving nature of the professional teacher.

Required Courses:
0100C: Observing and Recording Young Children’s Development in Classroom Contexts 3
0200C: Curriculum Development in Early Childhood Education 3
3500C: Education in the Early Years: Infants, Toddlers & Preschoolers 2

One of the following options:
1800K: Family/Child/School (3 cr.)
5700C: Multicultural Education (3 cr.)
0500C: Emergent to Fluent Literacy 3
1900C: Language and Literacy Development in Young Children 3
2101C: Social Studies in the Early Childhood Education 3
3300C: How Young Children Learn Science 3
6000C: How Young Children Learn Mathematics: Implications for Teaching I 3

Total credits: 39-45
* This is not an inclusive list. Please review the College’s Schedule of Classes for each semester’s list of offerings. Also note that students pursuing a New York City Board of Education license must obtain six (6) credits of Special Education courses, although these are not required for the Masters degree.

**Stream C**
This program stream is for individuals who hold Initial Certification in some area of education and who are seeking a master’s degree leading to Initial Certification in Early Childhood Education.

**Required Courses:**

**Core Courses:**
- 0100C: Observing and Recording Young Children’s Development in Classroom Contexts (3 cr.)
- 0200C: Curriculum Development in Early Childhood Education (3 cr.)
- 0300F: Contemporary Problems and Issues in ECE (3 cr.)
- 2100K: Developmental Issues in ECE (3 cr.)
- 3500C: Education in the Early Years: Infants, Toddlers & Preschoolers (3 cr.)

**Electives (on advisement):**

- **One of the following three Literacy courses:** 3 cr.
  - 0500C: Emergent to Fluent Literacy (3 cr.)
  - 0800C: Critical Examination of Current Literacy Research (3 cr.)
  - 1900C: Language and Literacy Development in Young Children (3 cr.)

**Research:**
- 2202I: Content Research Seminar in Early Childhood Education (7 weeks) (3 cr.)
- 2900I: Seminar in Educational Research (7 weeks) (3 cr.)

**Total credits:** 37

**Non-Degree Certification Options**

**Non-degree Certificate Program in Early Childhood Education for Holders of Certification in Early Childhood Education**
This program is for individuals who hold Initial Certification in Early Childhood Education (grades 1-6) who want to extend their certification to include Childhood Education (birth through grade 2).

**Required Courses:**
- 0200C: Curriculum Development in Early Childhood Education (3 cr.)
- 1900C: Language and Literacy Development in Young Children (3 cr.)
- 3500C: Education in the Early Years: Infants, Toddlers & Preschoolers (7 weeks) (3 cr.)
- 4200C: Including Young Children with Special Needs in the General Education Classroom (3 cr.)

**Total credits:** 15

**LITERACY ACQUISITION AND DEVELOPMENT**
This 32-credit Master’s Degree is designed to develop excellent literacy professionals based on the standards of the International Reading Association and the National Council for Accreditation of Teacher Education. Participants will learn how to teach literacy to students from culturally, linguistically, socio-economically, and developmentally diverse backgrounds. Graduate students will integrate in-depth knowledge of current research with active inquiry into literacy methodologies. Admission requires candidates to be Initially Certified by New York State in Early Childhood, Elementary, or Secondary Education, ESL, Bilingual Education or Special Education. Students should select preparation for either the Birth to 6th
Grade Literacy License or the 5th-12th grade Literacy License.

**Stream A—Birth—6th Grade**

**Required Courses:**

*Prerequisites:*
- 600C: Emergent to Fluent Literacy (3 cr.) or equivalent
- 600C: Fluent to Experienced Literacy or equivalent (3 cr.)

*Initial State Certification*
- 500C: Assessment, Analysis and Teaching* 3
- 600C: Analysis and Instruction—Individual Student Practicum* 3
- 600E: Organizing Inquiry Contexts—Small Group Practicum* 3
- 700E: Negotiating Curriculum* 3
- 800E: Writing for Teachers and Teacher Researchers 2
- 900E: Critical Examination of Current Literacy Research 3
- 901C: Beginning Literacy Research Seminar 1
- 902C: Literacy Research Seminar II 1
- 903C: Literacy Research Seminar III 1
- 904C: Literacy Research Seminar IV 1
- 910G: Home-School Partnerships for Literacy 3
- 910G: First and Second Language and Literacy Acquisition 3
- 910K: Literacy Instruction for Struggling Readers and Writers 3
* Particular to the 5th to 12th Grade Literacy License

**Total credits:** 38

**TESOL**

The School of Education offers a Master of Science in the Teaching of English to Speakers of Other Languages (TESOL). The mission of the TESOL program is to successfully combine academic rigor with innovative pedagogical training that develops knowledge of and respect for the linguistic, social, and cognitive needs of all learners, and the complexity of the TESOL teaching and learning environment. The program aims to develop teachers who are committed to promoting equity and excellence in urban public education, particularly for English Language Learners. Students may enroll in one of three Streams.

**Stream A — For students who hold initial or provisional teaching certification**

**Required Courses:**

*Prerequisites:*
- 600C: Emergent to Fluent Literacy (3 cr.) or equivalent
- 600C: Fluent to Experienced Literacy or equivalent (3 cr.)

*Initial State Certification*
- 500C: Assessment, Analysis and Teaching* 3
- 600C: Analysis and Instruction—Individual Student Practicum* 3
- 600E: Organizing Inquiry Contexts—Small Group Practicum* 3
- 700E: Negotiating Curriculum* 3
- 800E: Writing for Teachers and Teacher Researchers 2
- 901C: Critical Examination of Current Literacy Research 3
- 901C: Beginning Literacy Research Seminar 1
- 902C: Literacy Research Seminar II 1
- 903C: Literacy Research Seminar III 1
- 904C: Literacy Research Seminar IV 1
- 900G: Home-School Partnerships for Literacy 3
- 900G: First and Second Language and Literacy Acquisition 3
- 900K: Literacy Instruction for Struggling Readers and Writers 3
* Particular to the Birth to 6th Grade Literacy License

**Total credits:** 38

**Field Experiences and Student Teaching** — For students who do not seek New York State Certification in TESOL (those seeking employment outside the United States, in adult education or in English Language Institutes) 30 hours of field experiences to be apportioned within the pedagogical core curriculum, and 20 hours in the research seminars. Each 2-credit practicum will require 10 days of work with students learning English as a second language.

**Required Courses:**

- 2600C: Linguistics in a Multicultural Society 3
- 5400C: Methods of Teaching Second Languages: English 3
- 5700C: Education that is Multicultural 3
- 5800C: Theories of Second Language Acquisition 3
- 6500C: Developmental Reading and Writing in a Second Language (English) 3
- 6800C: Grammar and its Pedagogy: English and Other Languages 3

Two of the following:

- 5300C: Theories and Practices of Bilingual Education (3 cr.) 2
- 5600C: Psycho-Sociolinguistic Aspects of Bilingual Education (3 cr.)
- 5900C: Development and Evaluation of Materials for teaching Second Languages (English) (3 cr.)
- 6900C: Teaching English Through the Content Areas (3 cr.)

In addition to field experiences that are apportioned within the pedagogical core curriculum, students complete one of the following practicum courses, which will require 10 days of work with students learning English as a second language.

One of the following four practica:

- 6601C: Practicum (A) in Teaching a Second Language: Elementary (2 cr.)
Field experiences are apportioned within the pedagogical core curriculum, and in an additional course, Field-based Inquiry: TESOL (3 cr.), which requires 40 hours of fieldwork prior to student teaching. Candidates also complete 6 credits of supervised teaching, including one experience at the elementary level and one at the secondary level, each of at least 20 school days (6 cr.).

**COURSE DESCRIPTIONS**

Each of the following courses carries a designation of EDCE unless otherwise noted. The courses are arranged according to the last-place letter.

**0100A: Urban Schools in a Diverse Society**
Selected significant social, political and economic forces which influence the school as an institution and which in turn are influenced by the school, especially in urban settings that educate students from diverse ethnic and cultural backgrounds. Includes history, philosophy, sociology and politics of education. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCES AT EITHER THE 1-3 OR 4-6 LEVEL; 3 CR.

**0200A: Psychology of Learning and Teaching**
The course includes theories and principles of learning and instruction pertinent to achievement, development, self-regulation, and behavior in children from culturally and ethnically diverse backgrounds. Includes classroom applications, testing and evaluation. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCE AT THE 1-3 AND 4-6 LEVELS; 3 CR.

**0300A: Child Development**
Theories and principles of development pertinent to culturally and ethnically diverse and inclusive classrooms with an emphasis on classroom applications and fieldwork. 3 HR./WK., PLUS 10 TO 15 HRS. OF FIELD EXPERIENCE AT THE 1-3 AND 4-6 LEVELS; 3 CR.

**0400A: The School in American Society: Bilingual Education in the Urban School**
Analysis of selected social, political and economic forces that influence the school as an institution, and in turn are influenced by the school, especially in urban settings. Special attention to immigrant, bilingual and language minority groups. Not open to students who have taken EDUC 22100, 22200, or equivalent. 3 HR./WK.; 3 CR.

**0100C: Observing and Recording Children in Classroom Contexts**
How to examine children’s behaviors, work, and approaches to learning to inform the development of environments responsive to students’ diverse needs. Major developmental and learning theories are referenced. Case study of an individual child will be completed. Required for initial certification. Ancillary requirement for professional certificate (on advisement). 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCES; 3 CR.

**0200C: Curriculum Development in ECE**
Critical examination of principles underlying curriculum development and program planning for young children. How to prepare the environment, integrate the day, differentiate instruction for students with varying needs, discipline effectively, and use technology. To be taken with or after student teaching. Required for initial certification. Ancillary requirement for professional certificate (on advisement). 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCES; 3 CR.

**0500C: Emergent to Fluent Literacy**
(Prereq. for Graduate Program in Literacy Acquisition and Development.) Emergent to fluent literacy acquisition for students with diverse cultural and linguistic backgrounds and students with special needs; assessment of semantic, syntactic, phonic and phonemic awareness; strategies for children having difficulties in acquisition of speaking, listening, reading, and writing competencies; organizing shared, guided, and independent reading and writing instruction; use of technology. 3 HR./WK., PLUS 15 HOURS FIELDWORK IN EXEMPLARY SETTING; 3 CR.

**0600C: Fluent to Experienced Literacy**
(Prereq. for Graduate Program in Literacy Acquisition and Development.) Balanced literacy instruction for fluent readers and writers from a diversity of cultural and linguistic backgrounds and needs; becoming experienced in a variety of genres; literacy assessment, instructional implications, and curriculum design for inferential/deep structure comprehension; content area literacies; word work; selection of appropriate materials; use of technology. 3 HR./WK., PLUS 15 HRS. FIELDWORK IN EXEMPLARY SETTING; 3 CR.

**0800C: Critical Examination of Current Original Research in Literacy**
Examine current research in language and literacy acquisition; the integration of reading and writing and three cueing systems; phonemic awareness; emergent literacy; content area literacy; dialects and language acquisition of second language learners; discourses as social languages and class-
rooms as speech communities; balanced literacy for diverse learners; contexts for developing instructional strategies for students with difficulties; meta cognition and self-assessment. Co-requisite for Literacy majors: Beginning Literacy Research Seminar. 3 HR./WK., PLUS 8 HRS. FIELDWORK IN LICENSE AREA; 3 CR.

**0801C: Beginning Literacy Research Seminar**
In respective license area, teacher-researchers choose one area of research, focus on classroom issues and questions arising in own instructional practices and interactions with a variety of reading and writing genres. Begin literature review, integrate theory and practice; initiate development of research design for collecting data. Co-requisite: Critical Examination of Current Literacy Research. 1 HR./WK.; 1 CR.

**0802C: Literacy Research Seminar II**
Complete literature review, focus on consolidation of research design, data collection and beginning analysis of data. Prerequisite: Beginning Literacy Research Seminar. 1 HR./WK.; 1 CR.

**0803C: Literacy Research Seminar III**
Focus on continued analysis of data and writing of final document: Evolution of the question; review of literature; design description for data collection; analysis; implications. Prerequisite: Beginning Literacy Research Seminar and Literacy Research Seminar II. 1 HR./WK.; 1 CR.

**0804C: Literacy Research Seminar IV**
This course is the final of four research seminars. Work will focus on the completion, publication, and public presentation of research findings. Students will view their work in the context of the professional literacy organizations and journals and prepare to present their question, research design for collecting data, conclusions, and new emerging questions in a public forum for all students in the Graduate Literacy Acquisition and Development Program. Prereq.: Literacy Research Seminar I, II, and III. 1 HR./WK.; 1 CR.

**1500C: Assessment, Analysis and Teaching of Literacy Learners—Birth to 6th Grade**
Theoretical underpinnings for literacy practice. Become familiar and fluent with variety of methodologies for reading and writing assessment for Birth to 6th grade, as well as learning to determine instructional implications (next steps) implied by results. Share and analyze children’s work, critique own instructional techniques and curricula. 3 HR./WK.; 3 CR.

**1501C: Assessment, Analysis and Teaching of Literacy Learners—5th to 12th Grade**
Theoretical underpinnings for literacy practice. Become familiar and fluent with variety of methodologies for reading and writing assessment, grades 5-12, as well as learning to determine instructional implications (next steps) implied by results. Share and analyze children’s work, critique own instructional techniques and curricula. 3 HR./WK.; 3 CR.

**1600C: Analysis and Instruction for Individual Literacy Learners—Pre-Kindergarten to 6th grade**
Support individual child’s literacy development (Pre-K-6th Grade). Develop curriculum based on initial conversation with child and family, and on-going observations. Record child’s literacy strategies, collect and analyze reading and writing samples to adapt curriculum to child’s strengths and needs. 18 HOURS practicum. 3 HR./WK. 3 CR.

**1601C: Analysis and Instruction for Individual Literacy Learners—5th to 12th Grade**
Support individual child’s literacy development (5th to 12th Grade). Develop curriculum based on initial conversation with child and family, and on-going observations. Record child’s literacy strategies, collect and analyze reading and writing samples to adapt curriculum to child’s strengths and needs. 18 HOURS practicum. 3 HR./WK. 3 CR., PLUS 18 HRS., PRACTICUM; 3 CR.

**1900C: Language and Literacy Development in Young Children**
This course focuses on language and literacy development from birth to age 6 and on how to develop a well-balanced literacy program for young children. Special emphasis is placed on an exploration of research in the field, a study and critical analysis of children’s language, the art of storytelling, and effective strategies for learning to read. 3 HR./WK.; 3 CR.

**2000C: First and Second Language and Literacy Acquisition**
Current research and practical applications of first and second language and literacy learning, developmental stages, connections between oral and print literacies, strengths of first language literacy. Integration of two active languages to communicate. Strategies to assess and support first and second language and literacy acquisition. 3 HR./WK., PLUS 8 HRS. FIELDWORK; 3 CR.

**2100C: Teaching Social Studies in Childhood Education**
Integrated unit planning centered on a study of the community, cultural diversity and historical sequence; focuses on inquiry learning strategies and multicultural approaches to instruction. Includes introduction to Internet resources and software for classroom instruction in geography. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCE AT THE 1-3 AND 4-6 LEVELS; 3 CR.

**2101C: Social Studies in the Early Childhood Curriculum**
How to develop and carry out experiences that help children inquire about the world, their history, and their backgrounds and integrate their understandings; how to utilize students’ diverse ethnolinguistic backgrounds and information technology as resources. Emphasis placed on the classroom as a democratic learning community. Required for initial certification. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCES; 3 CR.

**2200C: Social Studies Inquiry for Pre-K to 6 Teachers**
Focuses on two national and state social studies learning standards: geography and the history of New York State and the U.S. Students experience an inquiry approach to social studies that will increase their content knowledge and model inquiry methods. Students plan learning experiences for children. Includes an instructional technology component. Required for professional certification. Prereq. EDUC 2100C or equivalent. 3 HR./WK.; 3 CR.

**2400C: Development & Evaluation of Materials in Bilingual Education**
Production and evaluation of bilingual instructional materials using various media. Integration of instructional materials in a bilingual curriculum. Prereq: 5300C. 3 HR./WK.; 3 CR.

**2600C: Linguistics in a Multicultural Society**
An introduction to basic concepts in linguistics, including phonology, lexicon, and grammar; language contact, variation, and prescriptivism; linguistic experience of bilingual and second-language communities and individuals. 3 HR./WK.; 3 CR.

**2700C: Literacy Instruction for Struggling Readers and Writers**
This course will model literacy instruction for readers and writers who are struggling to develop competence and independence. Candidates will learn to provide differentiated instruction through intensive modeling, shared reading and writing, leveled guided reading lessons, and directed word work and vocabulary development in meaningful contexts across the curriculum. The course will support teachers to incorporate highly motivating children’s literature that scaffolds meaningful language in a variety
of genres in their curriculum planning. It is designed to enable teachers to become successful literacy instructors for all children in their classes. Candidate will focus on developing children’s oral language expression as foundation for planning and writing their own stories, which they will learn to use, in turn, as texts for reading. This course for Literacy Professionals will support participants to become adept at assessing individual's needs and strengths in order to provide appropriate instructional experiences. 3 HR./WK.; 3 CR.

3000C: Development of Laboratory Materials for Elementary Science
Construction and use of laboratory equipment and materials which implement the critical thinking and problem solving approach to the teaching of the new curricula in science in the elementary school. Pre- or coreq.: EDUC 3100C. 3 HR./WK.; 3 CR.

3100C: Science in a Program of Childhood Education
Development of first-hand knowledge of standards-based science content, materials and methods appropriate to the several growth levels of children in the primary and intermediate programs of the elementary school. Written reviews of scholarly literature, maintenance of written journals, and fieldwork on the study of teaching in a childhood education classroom. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCE AT THE 1-3 AND 4-6 LEVELS.; 3 CR.

3200C: Science Inquiry for Pre-K to 6 Teachers
Develops teachers’ knowledge of the teaching and learning of science in childhood education. Focuses on three New York State science standards: scientific inquiry, application of scientific concepts and theories and the historical development of ideas in science and common themes that connect mathematics, science and technology. First-hand experiences developing and analyzing knowledge gained through inquiry. Required for professional certification. Prereq.: EDU C 3100C or equivalent. 3 HR./WK.; 3 CR.

3300C: How Young Children Learn Science: Implications for Teaching
Workshop designed to deepen understanding of the active, investigative nature of science learning. Participants’ own explorations and experiences parallel the child’s inquiring approach. Materials and resources (including information technology) appropriate for the diverse learning needs of young children are examined, required for initial certification. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCES; 3 CR.

3400C: Focus on Inquiry in Education
Study of background literature and developmental theory; observing and recording children’s growth; teacher’s role. Special permission required. 3 HR./WK.; 3 CR.

3500C: Education in the Early Years: Infants, Toddlers, and “Preschoolers”
How knowledge develops from infancy through the preschool years; with a focus on how to support learners’ growth and development and how to structure appropriate learning environments for infants, toddlers, and preschoolers with diverse needs. Theoretical perspectives on learning are explored. Required for initial certification. Ancillary requirement for professional certificate (on advisement). Prereq.: Child Development. 3 HR./WK.; PLUS 10-15 HRS. OF FIELD EXPERIENCES; 3 CR.

3800C: Materials for a Flexible and Individualized Curriculum
The development, use and evaluation of materials for individuals and small group instruction. 3 HR./WK.; 3 CR.

4100C: Teaching Arts and Crafts in Childhood Education
Art principles, practices and materials appropriate to the teaching of arts and crafts in childhood education; integrating arts and crafts into the content areas of the elementary curriculum. 3 HR./WK., PLUS 10 HRS. OF FIELD EXPERIENCE AT THE 1-3 OR 4-6 LEVELS; 3 CR.

4200C: Including Young Children with Special Needs in the General Education Classroom
This course will provide early childhood educators with a theoretical framework and practical applications for successfully including students with special needs within the general education setting. Information, guidance and resources will be presented to assist teachers in differentiating curriculum, using adaptive technology, assessing students holistically, working with their classroom/administrative school team as well as with children’s home/family/community in situations where a child may require an evaluation and/or additional support services. Special attention will be paid to diversity issues, helping teachers to frame differences in a respectful, non-biased way. 3 HR./WK. PLUS 10 HOURS OF FIELDWORK; 3 CR.

4300C: Art and Expressive Activities in Early Childhood Education
Interpretation and use of creative activities for the diverse learning needs of young children as they explore and develop personal skills and interests in various art media. Required for initial certification. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCES; 3 CR.

5100C: Teaching Foreign Languages in Elementary Education
Objectives, principles and methods of teaching modern languages in the elementary school. Problems of organizing foreign language teaching. Study and evaluation of curricula, syllabi, textbooks, language tests, audio-visual aids, and the language laboratory and area-study materials. 3 HR./WK.; 3 CR.

5201C: Teaching Language Arts & Reading in Bilingual Education (English)
Introduction to reading and learning to read at the elementary school level with special emphasis on ESL reading in bilingual education. 3 HR./WK., PLUS 10 HRS. FIELDWORK; 3 CR.

5202C: Teaching Language Arts & Reading to Bilingual-Bicultural Students (Spanish)
Methods and materials for the teaching of reading and language in Spanish to Spanish-dominant and English-dominant children. Prereq: 5300C. 3 HR./WK., PLUS 10 HRS. OF FIELDWORK; 3 CR.

5203C: Teaching Language Arts & Reading to Bilingual-Bicultural Students (Haitian)
Methods and materials for the teaching of reading and language in Haitian/Creole to Haitian/Creole-dominant and English-dominant children. Prereq: 5300C. 3 HR./WK., PLUS 10 HRS. OF FIELDWORK; 3 CR.

5204C: Teaching Language Arts & Reading to Bilingual-Bicultural Students (Chinese)
Methods and materials for the teaching of reading and language in Chinese to Chinese-dominant and English-dominant children. Prereq: 5300C. 3 HR./WK., PLUS 10 HRS. OF FIELDWORK; 3 CR.

5300C: Theories and Practices of Bilingual Education
Historical background, philosophy, and approaches to bilingual education. Study of bilingual proposals, legislation, teaching procedures and materials. 3 HR./WK.; 3 CR.

5400C: Methods of Teaching Second Languages
Methods and materials useful in teaching English to non-native speakers, especially Spanish-speaking children in elementary and secondary schools; applicability of modern structural studies of the language to such teaching; appropriateness of various techniques and aids for different age levels. 3 HR./WK., PLUS 10 HRS. OF FIELDWORK; 3 CR.
5500C: Children of the Caribbean Cultures & Curriculum
The cultural background of these children and their parents, and the problems of
adjustment to a complex urban society. Attention to learning behavior affected by
the difficulty of communication and new school environments. 3 HR./WK.; 3 CR.

5600C: Psycholinguistic and Sociolinguistic Aspects of Bilingual Education
Relevant findings in psycholinguistics and socio-linguistics. Acquisition and social set-
tings of first and second languages by children. 3 HR./WK., PLUS 10 HRS. OF FIELD-
WORK; 3 CR.

5700C: Education that is Multicultural
Analyzes the various components of a desir-
able education in a pluralistic society; pro-
vides opportunities for developing curricu-
lum and strategies which reflect respect and
dignity for all people; examines stu-
dents’ needs within a humanistic frame-
work; critically examines instructional materials for bias. 3 HR./WK., PLUS 10 HRS.
OF FIELDWORK; 3 CR.

5800C: Theories of Second Language Acquisition
Designed to develop the students’ under-
standing of the different theories that have
been developed to explain the process of
acquisition of second languages and of the
interaction between such theories and
strategies for maintaining and developing bilingualism. 3 HR./WK.; 3 CR.

5900C: Development and Evaluation of Materials for Teaching Second Languages: English
Designed to familiarize students with com-
mercial materials used in teaching second
languages, and to increase their capacity
to develop materials of their own. 3 HR./WK.;
3 CR.

6000C: How Children Learn Mathematics: Implications for Teaching I
Emphasis on growth and development of
the mathematical thinking of children in
grades 3-6 through their action and explo-
rative in a supportive classroom environ-
ment. Includes discussion of teaching
strategies, planning learning experiences,
and a strong component on the use of
technology for modeling effective instruc-
tion and studying children’s learning.
Includes 10 – 15 hours of field experience. Prerequisites: Math 18000 and 18500 or
equivalent. 3 HR./WK., PLUS 10-15 HRS. OF FIELDWORK; 3 CR.

6100C: How Children Learn Mathematics: Implications for Teaching II
Emphasis on growth and development of
the mathematical thinking of children in
grades 3-6 through their action and explo-
rative in a supportive classroom environ-
ment. Includes discussion of teaching
strategies, planning learning experiences,
and a strong component on the use of
technology for modeling effective instruc-
tion and studying children’s learning.
Prereq.: Educ 6000C. 3 HR./WK., PLUS 10-15 HRS. OF FIELDWORK; 3 CR.

6200C: Mathematics for Pre-K to 6 Teachers
Includes mathematics content and peda-
gogy; focuses on selected topics in number,
geometry, algebra and probability for grades
3-5 and 6-8; attention to the NCTM content and process standards, analysis of students’
work; and analysis, design and assessment of mathematics curriculum. Required for
professional certification. Prereq.: Educ 6100C or the equivalent. 3 HR./WK.; 3 CR.

6400C: Teaching Content (Math, Science, Social Studies) using both
English and a Native Language.
Designed to develop an interdisciplinary
approach to teaching Math, Science, and
Social Studies using both English and a
native language (e.g., Chinese, Haitian, and
Spanish). Prospective bilingual teachers will
be provided with knowledge, interdiscipli-
ary content skills, and specific language-
related skills on how to use available mate-
rials and resources (i.e., standard glossaries and curriculum guides) when planning and
integrating content-area learning experi-
ences and/or interdisciplinary thematic
units, using both English and a native
language (Chinese, Haitian, or Spanish).
Prereq.: 5300C. 3 HR./WK., PLUS 10 HRS. OF FIELDWORK; 3 CR.

6500C: Developmental Reading & Writing in a Second Language (English)
Designed to develop instructional experi-
ences and to plan supportive environments
that promote the acquisition of literacy in
a second language. 3 HR./WK.; 3 CR.

6601C: Practicum (A) in Teaching a Second Language (Elementary)
Designed to provide students with super-
vised field experiences teaching the lan-
guage of their specialized study to students
for whom it is not their primary language.
2 HR./WK.; 2 CR.

6602C: Practicum (B) in Teaching a Second Language (Secondary)
Designed to provide students with super-
vised field experiences teaching the lan-
guage of their specialized study to students
for whom it is not their primary language.
2 HR./WK.; 2 CR.

6603C: Practicum (C) in Teaching a Second Language (Mixed Levels)
Designed to provide students with super-
vised field experiences teaching the lan-
guage of their specialized study to students
for whom it is not their primary language.
2 HR./WK.; 2 CR.

6604C: Practicum (D) in Teaching a Second Language (Adults)
Designed to provide students with super-
vised field experiences teaching the lan-
guage of their specialized study to students
for whom it is not their primary language.
2 HR./WK.; 2 CR.

6700C: Contrastive Phonology of English and
Other Languages for Teachers
Advanced study of the phonology of English
and its contrasts with other languages.
Areas of difficulty for second-language
learners. Pedagogical strategies. Prereq:
2600C. 3 HR./WK.; 3 CR.

6800C: Grammar and its Pedagogy:
English and Other Languages
Advanced study of the grammar of English,
with strategies for application in bilingual
and second-language classrooms. Students
will be given the opportunity to contrast
aspects of grammar of English with that of
other languages. Prereq: 2600C. 3 HR./WK.;
3 CR.

6900C: Teaching English Through the
Content Areas
Introduces students to theories and prac-
tices involved in the teaching of English to
speakers of other languages by means of
instruction in the content areas of mathe-
matics, science and technology, and social
studies. Particular emphasis is given to the
development of strategies and skills for
using content lessons to teach second lan-
guage learners of different ages, back-
grounds, and proficiency levels, including
gifted and talented students and those with
special developmental needs. 3 HR./WK.;
3 CR.

7100C: Creative Movement and Music in
Childhood Education
Integrating the expressive arts into all
areas of the curriculum. Focus on creative
expression as an effective modality for
learning. Strategies that allow teachers to
model creativity for their students in a sup-
portive learning environment. Students
should come prepared for moderate physical activity. 3 HR./WK., PLUS 10 HRS. OF FIELD
EXPERIENCE AT THE 1-3 OR 4-6 LEVELS;
2 CR.
7300C: Music and Movement for Young Children
Participants in this course learn how to create a program of activities that guide and incorporate the diverse needs and interests of young children through their responses to music, rhythms, dramatic play, and spontaneous imaginative experiences. Required for initial certification. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCES; 3 CR.

1600E: Organizing Contexts for the Acquisition of Literacy: Pre-K to 6th Grade
Support literacy with groups (pre-K to 6th grade). Develop curriculum based on initial assessments. Observe and record literacy strategies; collect reading and writing samples; reflect with instructor and peers to assess evidence and develop instructional implications for individuals and groups. 3 HR./WK., PLUS 18 HRS. PRACTICUM; 3 CR.

1400E: Writing for Teachers and Teacher Researchers
Candidates develop experience as confident and effective writers, acquiring a range of strategies for composing, collectively reflecting upon, revising, and editing their own writings. 2 HR./WK.; 2 CR.

1500E: Teaching Writing in Secondary Schools
Students taking this course will write as a way to engage in the best practices of writing instruction while reflecting on this practice by examining the theoretical lens that inform its use. 3 HR./WK.; 3 CR.

1400E: Writing for Teachers and Teacher Researchers
Candidates develop experience as confident and effective writers, acquiring a range of strategies for composing, collectively reflecting upon, revising, and editing their own writings. 2 HR./WK.; 2 CR.

1600E: Organizing Contexts for the Acquisition of Literacy: Pre-K to 6th Grade
Support literacy with groups (pre-K to 6th grade). Develop curriculum based on initial assessments. Observe and record literacy strategies; collect reading and writing samples; reflect with instructor and peers to assess evidence and develop instructional implications for individuals and groups. 3 HR./WK., PLUS 18 HRS. PRACTICUM; 3 CR.

1700E: Critical Use of Technology for Literacy Instructors of Students Pre-K to 6th Grade
Examine relevant technological resources for Pre-K to 6th grade literacy; apply research; examine impact of technology on language and culture; learn to support students to critically use technology for composing and communicating. 2 HR./WK., PLUS 8 HRS. FIELDWORK; 2 CR.

1701E: Critical Use of Technology for Literacy Instructors of Students 5th to 12th Grade
Examine relevant technological resources for 5th to 12th grade literacy; apply research; examine impact of technology on language and culture; learn to support students to critically use technology for composing and communicating. 2 HR./WK., PLUS 8 HRS. FIELDWORK; 2 CR.

1700E: Critical Use of Technology for Literacy Instructors of Students Pre-K to 6th Grade
Examine relevant technological resources for Pre-K to 6th grade literacy; apply research; examine impact of technology on language and culture; learn to support students to critically use technology for composing and communicating. 2 HR./WK., PLUS 8 HRS. FIELDWORK; 2 CR.

1701E: Critical Use of Technology for Literacy Instructors of Students 5th to 12th Grade
Examine relevant technological resources for 5th to 12th grade literacy; apply research; examine impact of technology on language and culture; learn to support students to critically use technology for composing and communicating. 2 HR./WK., PLUS 8 HRS. FIELDWORK; 2 CR.

0200F: Contemporary Problems in Bilingual Education
Workshop to assist teachers in bilingual education in solving, through action research, problems they encounter in their teaching and in the development and use of materials. Prereq.: EDUC 0500G or present full-time service as a teacher. This course must be taken before EDUC 2200I. 3 HR./WK.; 3 CR.

0300F: Contemporary Problems and Issues in Early Childhood Education
The identification and study of classroom and school problems educators encounter in their teaching, including effective instruction for children with a range of special needs. Serves as an introduction to action research and as preparation for the research sequence of courses the student will complete at the final stage of the program. Required for professional certification in Early Childhood. Prerequisite: a minimum of 18 credits or special permission of advisor. 3 HR./WK.; 3 CR.

0400F: Contemporary Problems and Issues in Childhood Education
The identification and study of classroom and school problems educators encounter in their teaching, including effective instruction for children with a range of special needs. Serves as an introduction to action research and as preparation for the research sequence of courses the student will complete at the final stage of the program. Required for professional certification in Childhood Education. Prerequisite: a minimum of 18 credits or special permission of advisor. 3 HR./WK.; 3 CR.

2900F: Curriculum Development in Childhood Education I
Students develop a framework for analyzing learners, curriculum design, and teaching strategies based on readings by outstanding contributors to educational thought and practice, and observation of children in a classroom setting. Includes case study of a child in the classroom context. Open only to matriculants. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCE AT EITHER THE 1-3 OR 4-6 LEVEL; 3 CR.

3000F: Curriculum Development in Childhood Education II
An examination of principles that underlie curriculum development; planning appropriate goals, sequencing content, and implementing teaching/learning strategies. An important goal of the course is to help students develop skills in developing and offering differentiated instruction and integrating technology into learning experiences. Prereq.: EDUC 2900F. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCE AT EITHER THE 1-3 OR 4-6 LEVEL; 3 CR.

4300F: Workshop in Art Education
Designed to assist art teachers in meeting selected problems growing out of elementary and secondary teaching of art, or in consulting or supervisory efforts to enhance the subject. Specific needs of students are considered in planning the course work. 3 HR./WK.; 3 CR.

0301G: Student Teaching and Seminar in Early Childhood Education I
Full time supervised student teaching for 7 weeks in one developmental level of early childhood. Accompanying weekly seminar integrates the teaching experience with course work. Required for those in the initial certification program. Advance approval
n necessary. To be completed at the end of the program sequence. Co-req: 1900G. 3 HR./WK.; 3 CR.

0302G: Student Teaching and Seminar in Early Childhood Education II
Full time supervised student teaching for 7 weeks in a second developmental level of early childhood. Accompanying weekly seminar integrates the teaching experience with course work. Required for those in the initial certification program. Advance approval necessary. To be completed at the end of the program sequence. 3 HR./WK.; 3 CR.

0303G: Supervised Teaching and Seminar in Early Childhood Education
Full time supervised student teaching for a semester in their own classroom for those who teach full-time. Accompanying weekly seminar integrates the teaching experience with course work. Option for those in the initial certification program. Advance approval necessary. To be completed at the end of the program sequence. 3 HR./WK.; 3 CR.

0304G: Student Teaching in Early Childhood Education and Seminar
Supervised student teaching for 100 hours in pre-K, or grades 1-2 and a weekly seminar. Includes special seminars on school violence prevention and intervention, safety education and fire and arson prevention. Required of students in the Teaching Fellows program that provides supervision of student teaching. Advance approval required. 0 CR.

0305G: Supervised Teaching in Early Childhood Education and Seminar
Supervised teaching for one semester in the student’s own classroom in pre-K, K, or grades 1-2 (the level being different from that in EDUC 0304G) and a weekly seminar. Required of students in the Teaching Fellows program that provides supervision of teaching. Advance approval required. 0 CR.

0401G: Student Teaching in Childhood Education I and Seminar
Supervised teaching full time for seven weeks in grades 1-3 and weekly seminar. Includes special seminars on school violence prevention and intervention, safety education and fire and arson prevention. Required of all students in the initial certification program in childhood education who are not currently holding a full-time teaching position. Advance approval required. Completion of EDUC 6000C, EDUC 0500C, EDUC 0600C and one other methods course required. Coreq: 1900G. 3 CR.

0402G: Student Teaching in Childhood Education II and Seminar
Supervised teaching full time for seven weeks in grades 4-6 and weekly seminar. Includes special seminars on preventing child abduction and on preventing alcohol, tobacco and other drug abuse. Required of all students in the graduate initial certification program in childhood education who are not currently holding a full-time teaching position. Advance approval required. Completion of EDUC 6100C, EDUC 0500C, EDUC 0600C and one other methods course required. 3 CR.

0403G: Supervised Teaching in Childhood Education I and Seminar
Supervised teaching for one semester in the students’ own classroom in grades 1-3 or 4-6 and weekly seminar. Includes special seminars on school violence prevention and intervention, safety education and fire and arson prevention. Required of all students in the initial certification program who are presently teaching full time. Advance approval required. Completion of EDUC 6000C or EDUC 6100C, EDUC 0500C, and one other methods course required. Coreq: 1900G. 3 CR.

0404G: Supervised Teaching in Childhood Education II and Seminar
Supervised teaching for 120 hours at the grade level (1-3 or 4-6) that the student did not complete in Supervised Teaching I, and weekly seminar. Includes special seminars on preventing child abduction and on preventing alcohol, tobacco and other drug abuse. Advance approval required. Completion of EDUC 0403G, EDUC 6100C, or EDUC 6000C, EDUC 0500C, EDUC 0600C and one other methods course required. 3 CR.

0405G: Student Teaching in Childhood Education and Seminar
Supervised student teaching for 100 hours in grades 1 to 3 or 4 to 6 and weekly seminar. Includes special seminars on school violence prevention and intervention, safety education and fire and arson prevention. Required of students in the Teaching Fellows program and similar programs that provide supervision of student teaching. Advance approval required. 0 CR.

0406G: Supervised Student Teaching in Childhood Education Seminar
Supervised student teaching for one semester in the student’s own classroom in grades 1 to 3 or 4 to 6 (the level being different from that in EDUC 0405G) and weekly seminar. Required of students in the Teaching Fellows program and similar programs that provide supervision of student teaching. Advance approval required. 0 CR.

0502G: Student Teaching in Bilingual Education
A continuation of EDUC 0501G. Five mornings and one afternoon per week. Open only to matriculants. Advance approval required. Prereq.: EDUC 0501G. For certification purposes, this is equivalent to six semester hours of undergraduate student teaching for 300 clock hours of supervised observation and teaching. 6 CR.

0703G: Internship in Bilingual Special Education
Students will be assigned to a school and will spend half a semester teaching in a regular class and half a semester student teaching in a special class for exceptional bilingual children. 4 HR./WK.; 4 CR.

1700G: Home-School Partnerships for Literacy Development
Theoretical and practical approaches to build equitable home-school partnerships to support children’s literacy development. Creating bridges between children’s learning at home and at school. Identify families’ funds of knowledge and utilize that knowledge to build literacy curriculum. 2 HR./WK.; PLUS 8 HRS. FIELDWORK; 2 CR.

1900G: Child Abuse and Health Education Seminar
Definitions, indicators, and the impact of abuse and neglect on the child; reporting abuse. Health, safety, fire prevention and drug education. Coreq.: Student Teaching. 2 HR./WK.; 0 CR.

5701G: Practicum Teaching Bilingual Special Education
Assessing and developing skills for teaching language minority students with disabilities. Field supervision, integrative seminar, individual conferences. Approval required one semester in advance; open only to matriculants. Prereq.: completion of 15 credits. 3 HR./WK.; 3 CR.

5901G: Curriculum and Instructional Approaches in Bilingual Special Education
Examination and development of curriculum and material for teaching language minority students with disabilities in English and non-English. Special emphasis will be given to NYS learning standards for science and social studies. 3 HR./WK., PLUS 10 HRS. OF FIELDWORK; 3 CR.

9602G: Administration and Supervision of Early Childhood Education
The supervisor’s responsibilities in such areas as program making, staff development, pupil/personnel, and program/department management. Cases and problems examined in laboratory set-
tings, taught by joint administration and specialized area faculty. Special permission required. 3 HR./WK.; 3 CR.

9602G: Guidance Services
9604G: Literacy Programs

9800G: Educational Leadership in Day Care
Role of the director in setting priorities for the center and its early childhood program. Supervision and development of staff. Relations with governmental agencies, sponsoring agency, board and community. Open only to matriculants in the Day Care Leadership Program or by special permission. 3 HR./WK.; 3 CR.

0200I: Master's Project
The objective of this course is to have students do a critical analysis of their evolving understanding of learning and teaching and how these views influence what occurs in their own classrooms. This critical analysis will be the basis for their extended written piece, which will serve as the culminating experience of the program. 3 HR./WK.; 3 CR.

2202I: Content Research Seminar in Early Childhood Education
Culminating experience of the graduate education program. Students identify a problem or issue about which to inquire, review the research literature related to that problem (including on-line sources), and design a study to carry out in the following semester. Required of all graduate students in Early Childhood Education. By permission only. Prereq.: 2100K or equivalent. 2 HR./WK.; 2 CR.

2203I: Content Research Seminar in Bilingual Education
A critical review of the research literature in the candidate's major field, as well as research methodology and instrumentation appropriate to the field. This first semester covers the basic concepts and procedures needed to evaluate research critically. Each student will identify a problem in his or her major area, review the literature related to that problem, and design a project to study the problem. This project will be carried out during the second semester. Matriculants only. This course is followed by EDUC 2900I. This course should be taken no later than the semester prior to the one in which the student expects to complete the requirements for the degree. Students who expect to write a thesis should take this course no later than two semesters prior to the one in which they expect to complete the requirements for their degree. Prereq.: see individual programs. 2 HR./WK.; 2 CR.

2204I: Content Research Seminar in Childhood Education
Culminating experience in the graduate program in childhood education. Students identify a problem or issue about which to inquire, review the research literature related to that problem, and design a study to carry out the following semester. By permission only. Prereq.: Matriculation, 15 cr. and EDUC 2900F. 2 HR./WK.; 2 CR.

2205I: Content Research Seminar in TESOL
A critical review of the research literature in the candidate's major field, as well as research methodology and instrumentation appropriate to the field. This first semester covers the basic concepts and procedures needed to evaluate research critically. Each student will identify a problem in his or her major area, review the literature related to that problem, and design a project to study the problem. This project will be carried out during the second semester. Matriculants only. This course is followed by EDUC 2900I. This course should be taken no later than the semester prior to the one in which the student expects to complete the requirements for the degree. Students who expect to write a thesis should take this course no later than two semesters prior to the one in which they expect to complete the requirements for their degree. Prereq.: see individual programs. 2 HR./WK.; 2 CR.

61010: Working with Parents of Students with Disabilities
Problems, principles, and procedures in working with parents of students with disabilities. Impact of disabling factors on parents, and study of different problem solutions including study of school and community resources. 3 HR./WK.; 3 CR.

7000I: Language and Learning
The course examines learning theories and their application to language learning with an emphasis on the student as both teacher and learner. Special emphasis is given to talking to learn and writing to learn. 3 HR./WK.; 3 CR.

1800K: Family, Child and School
A study of the contexts for learning that affect teachers, children, and their families. Topics explored include: multicultural communities and differing family structures, conferencing with parents, children with special needs, indications of child abuse, educators' legal and ethical responsibilities. Required for initial certification. Includes 10-15 hours of field experiences. 3 HR./WK.; 3 CR.

2100K: Developmental Issues in Early Childhood Education
In-depth study of the developmental progression and the active nature of young children's learning. Major developmental theories are critically examined and illuminated through candidates' experiences with children of diverse needs from varying backgrounds. Implications for program planning, classroom organization, and differentiating curriculum to meet special needs are continually drawn. Required for professional certification. 3 HR./WK.; 3 CR.

6000K: Language Minority Students with Disabilities
An overview of the needs of children with disabilities who are in the process of acquiring skills in English. Special Education and Bilingual Education principles will be emphasized and a rationale for the integration of theories and practices from these two fields will be established. 3 HR./WK.; 3 CR.

6100K: Assessing the Educational Needs of Language Minority Students with Disabilities
This course examines the impact of second language, cultural variables, and bilingualism on academic test performance. Participants will learn to assess educational environments, previous educational experiences, administer norm-referenced tests and criterion-referenced tests in English and in the non-English language. Both formal and informal assessment techniques will be studied. Prereq.: EDUC 6000K. 3 HR./WK., PLUS 20 HRS. PRACTICUM; 3 CR.
6200K: Language Minority Families and the Special Education System
This course examines current and historical perspectives on parent involvement in the special education of children and youth with disabilities. Emphasis on understanding the views of exceptionalities and family involvement held by language minority families. Focuses on strategies, activities, and materials that will facilitate school and family collaboration. Prereq.: EDUC 6000K. 3 HR./WK.; 3 CR.

Latin American and Latino Studies

LALS 1100C: Puerto Rican Community: Field Research Work
Study of migration of the Puerto Rican to New York City, sociological impact, and resultant problems in education, housing, health services, family and community development. Practical experience and research through placement in agencies serving Puerto Ricans. 3 HR./WK.; 3 CR.

LALS 1200C: Vernacular Language of Puerto Rico
Provides basic knowledge of Spanish as spoken in Puerto Rico. Includes linguistic concepts needed to help students develop communicative skills in reading, writing, and speaking the vernacular language to allow research and facilitate communication with the Puerto Rican. Prereq.: fluency in conversational Spanish. 3 HR./WK.; 3 CR.

LALS 3200F: Independent Study and Research in Latin American and Latino Studies
Open to qualified graduate students in the School of Education interested in the study on special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. VARIABLE 1-3 CR./SEM. AND MAY BE REPEATED FOR A MAXIMUM OF SIX CREDITS.

FACULTY

Megan Blumenreich, Assistant Professor  

Doris Cintrón, Associate Professor and Associate Dean  

Joseph Davis, Assistant Professor  
M.A., Columbia Univ.; M.S.P.H., Univ. of North Carolina; Ph.D., Columbia Univ.

Hubert M. Dyasi, Professor  
B.Sc., Rhodes Univ. (South Africa), B.Ed., M.Ed.; Ph.D., Univ. of Illinois

Beverly Falk, Professor  
B.A., Sarah Lawrence College; M.S.Ed, The City College; Ed.D., Teachers College, Columbia Univ.

Catherine Twomey Fosnot, Professor  
B.S., Univ. of Connecticut; M.S., SUNY (Albany); Ed.D., Univ. of Massachusetts

Catherine Franklin, Assistant Professor  
B.A., University of Rhode Island; M.A., Leslie College Graduate School; Ed. D., Teachers College, Columbia Univ.

Vicki Garavuso, Assistant Professor  
B.A., Lehman College; M.S., M.Ed., Bank Street College of Education; Ed. D., Teachers College, Columbia Univ.

Amita Gupta, Assistant Professor  

Gretchen Johnson, Associate Professor and Chair  
B.A., Queens College.; M.A., Yeshiva Univ.; Ph.D., New York Univ.

Adele MacGowan-Gilhooly, Associate Professor  
B.A., Georgian Court College; M.A., Hunter College; Ed.D., Boston Univ.

Alexandra Miletta, Assistant Professor  
B.A., Empire State College; M.S., The City College; PhD., Union Institute

James L. Neu Jahr, Professor  

Nadjwa Norton, Assistant Professor  
B.A., Yale Univ.; M.Ed., Teachers College, Columbia Univ., Ed.D.

Lisa Simon, Assistant Professor  
B.A., Bryn Mawr College; M.A., New York Univ., Ph.D.

Nancy Stern, Assistant Professor  
B.A., The College of William and Mary; M.Phil. (Linguistics), CUNY Graduate Center, Ph.D.

Edward Wall, Assistant Professor  
B.A. Univ. of Minnesota; M.A. Univ. of Maryland; Ph.D., Univ. of Michigan

Ann Wilgus, Assistant Professor  
B.L.A., Sarah Lawrence Univ.; M.F.A., Univ. of North Carolina-Greensboro; M.S.Ed., Bank Street College; Ph.D., CUNY Graduate Center

PROFESSORS EMERITI

Ruth R. Adams
Miriam Dorn
Shirley Feldmann
Ruth Grossman
Elisabeth S. Hirsch
Kristina Leeb-Lundberg
Oliver Patterson
Madelon Delany Stent

FACULTY

Megan Blumenreich, Assistant Professor  

Doris Cintrón, Associate Professor and Associate Dean  

Joseph Davis, Assistant Professor  
M.A., Columbia Univ.; M.S.P.H., Univ. of North Carolina; Ph.D., Columbia Univ.

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The City College offers the following Master's degrees and advanced certificates in Education:

**Master of Science in Education (M.S.Ed.)**
- Bilingual Childhood Special Education
- Teaching Students with Disabilities in Childhood Education
- Teaching Students with Disabilities in Middle Childhood Education
- Administration and Supervision

**Post Master's Advanced Certificate Program**
- Administration and Supervision

**ADVICEMENT**

The Office of Student Services (212-650-5316) of the Office of the Chair (212-650-7262) will be pleased to assist you in contacting the faculty member in charge of any of the programs above.

**PROGRAMS AND OBJECTIVES**

All courses are EDUC unless otherwise noted.

**BILINGUAL CHILDHOOD SPECIAL EDUCATION**

This program prepares Bilingual Special Education teachers to address the educational, emotional, and behavioral needs of linguistically diverse minority students with a wide range of disabilities. Students completing the program become certified in Special Education 1-6 with Bilingual Extension.

**Stream A—For students with initial certification**

**Required Courses:**
- 3300K: Building Community in Inclusive Contexts 3
- 3800K: Differentiated Instruction and Assessment in Collaborative Contexts I in Childhood Education 3
- 5202C: Teaching Language Arts & Reading to Bilingual Students (Spanish) 3
- 5300C: Theories and Practices of Bilingual Education 3
- 5300K: Positive Approaches for Difficult Behavior 3
- 5400C: Methods of Teaching Second Languages 3
- 5600C: Socio- and Psycholinguistic Issues in Bilingual Education 3
- 5700C: Education That Is Multicultural 3
- 5901G: Curriculum and Instructional Approaches in Bilingual Special Education 3
- 6000K: Introduction to the Education of Language Minority Students with Disabilities 3
- 6100K: Assessing the Educational Needs of Language Minority Students with Disabilities 3
- 6200K: Language Minority Families and the Special Education System 3
- 5701G: Practicum Teaching Bilingual Special Education 3
- 2600I: Content Research Special Education 2
- 2900I: Seminar in Educational Research 2

**Total credits:** 43

**Stream B—For students without initial certification**

**Required Courses:**
- 0200A: Psychology of Learning and Teaching 3
- 0300A: Child and Adolescent Development 3
- 0400A: The School in American Society: Bilingual Education in the Urban School 3
- 3300K: Building Community in Inclusive Contexts 3
- 3600K: Approaches to Literacy I in Childhood Education 3
- 3800K: Differentiated Instruction and Assessment in Collaborative Contexts I in Childhood Education 3
- 5202C: Teaching Language Arts & Reading to Bilingual Students: Spanish 3
- 5300C: Theories & Practices of Bilingual Education 3
- 5300K: Positive Approaches for Difficult Behavior 3
- 5400C: Methods of Teaching Second Languages 3
- 5600C: Socio- and Psycholinguistic Issues in Bilingual Education 3
- 5700C: Education That Is Multicultural 3
- 5901G: Curriculum and Instructional Approaches in Bilingual Special Education 3
- 6000K: Introduction to the Education of Language Minority Students with Disabilities 3
- 6100K: Assessing the Educational Needs of Language Minority Students with Disabilities 3
- 6200K: Language Minority Families and the Special Education System 3
- 0703G: Internship in Bilingual Special Education 4
- 2600I: Content Research Special Education 2
- 2900I: Seminar in Educational Research 2

**Total credits:** 56
SPECIAL EDUCATION

The School of Education offers two graduate programs in Special Education: Teachers of Students with Disabilities in Childhood Education (Grades 1-6) and Teachers of Students with Disabilities in Middle Childhood Education (Grades 5-9). The programs require 31-43 credit hours (depending on previous coursework) and lead to a Master of Science (Education). Completion of either of the programs satisfies the educational requirements for Provisional (initial) Certification in New York State and students may apply for such through the School. In addition, the master’s degree fulfills the education requirements for the State Professional (permanent) Certificate in either Special Education or Elementary Education if the candidate already holds Provisional certification. The inclusion model of delivering special education services in an urban environment is emphasized but candidates will be prepared to work in self-contained environments as well.

Stream A—Teaching Students with Disabilities in Childhood Education (Grades 1-6)

1. Prerequisites for all candidates: bachelor’s degree with a major or concentration in one of the liberal arts or sciences with study in a foreign language (two semesters of ASL accepted). Candidates with deficiencies in any of these areas that can be made up within two semesters may be conditionally accepted.

2. Prerequisites for candidates seeking Provisional New York State Certification (credit may be given for these courses or their equivalents if taken elsewhere on the graduate or undergraduate Level but is not counted toward the master’s degree):
   - 0100A: The School in American Society (3 cr.)
   - 0200A: Psychology of Learning and Teaching (2 cr.)
   - 0300A: Child Development (3 cr.)
   - 5000K: Introduction to Inclusive Education (2 cr.)

The 31-credit program listed below fulfills the education requirements for Provisional or Professional New York State Certification in Special Education (for those who hold provisional). It will also fulfill the education requirements for Professional Certification in Elementary Education (for those who hold provisional certification in that area). Note: those taking courses requiring fieldwork or practica may do it in their own workplaces if they are employed as special education teachers or have major responsibility in inclusion classrooms. All others will be placed in fieldwork situations taking place within the normal school day.

Required Courses:

- 5300K: Positive Approaches for Challenging Behaviors (3 cr.)
- One of the following two: (3 cr.)
  - 3300K: Building Community in Inclusive Contexts
  - 3500K: Identity and Disability
- One of the following two: (3 cr.)
  - 3600K: Approaches to Literacy I in Childhood Education
  - 3700K: Approaches to Literacy II in Childhood Education
- 3800K: Differentiated Instruction and Assessment in Collaborative Contexts I in Childhood Education
- One of the following two: (3 cr.)
  - 3900K: Differentiated Instruction and Assessment in Collaborative Contexts II in Childhood Education
  - 4000K: Disability Studies in Childhood Education (3 cr.)
- 5400C: Methods of Teaching Second Languages (3 cr.)
- 6100I: Parents, Families and Disabilities (3 cr.)
- One of the following two: (3 cr.)
  - 5700G: Practicum in Teaching Special Education (for those who hold teaching positions)
  - 0701G: Internship in Special Education I: Childhood Education (for those not teaching)
- One of the following options: (4 cr.)
  - 2600I: Content Research Seminar in Special Education
  - 2900I: Seminar in Educational Research
  - 0000I: Introduction to Educational Research

Stream B—Teaching Students with Disabilities in Middle Childhood Education (Grades 5-9)

1. Prerequisites for all candidates: bachelor’s degree with a major or concentration in one of the liberal arts or sciences with study in a foreign language (two semesters of ASL accepted). Candidates with deficiencies in any of these areas that can be made up within two semesters may be conditionally accepted.

2. Prerequisites for candidates seeking Provisional New York State Certification (credit may be given for these courses or their equivalents if taken elsewhere on the graduate or undergraduate Level but is not counted toward the master’s degree):
   - 0100A: The School in American Society (3 cr.)
   - 0200A: Psychology of Learning and Teaching (3 cr.)
   - 0300A: Child and Adolescent Development (3 cr.)
   - 5000K: Introduction to Inclusive Education (3 cr.)

The 31-credit program listed below fulfills the education requirements for Provisional or Professional New York State Certification in Special Education (for those who hold provisional). Note: those taking courses requiring fieldwork or practica may do it in their own workplaces if they are employed as special education teachers or have major responsibility in inclusion classrooms. All others will be placed in fieldwork situations taking place within the normal school day.

Required Courses:

- 5300K: Positive Approaches for Challenging Behavior (2 cr.)

Total credits: 31
Department of Leadership and Special Education

3601K: Approaches to Literacy I in Middle Childhood Education 3
3701K: Approaches to Literacy II in Middle Childhood Education 3
3801K: Differentiated Instruction and Assessment in Collaborative Contexts I in Middle Childhood Education 3

One of the following two:
3901K: Differentiated Instruction and Assessment in Collaborative Contexts II in Middle Childhood Education (3 cr.)

4001K: Disability Studies in Middle Childhood Education (3 cr.)
5400C: Methods of Teaching Second Languages 3
6100I: Parents, Families, and Disability 3

One of the following two:
5700G: Practicum in Teaching Special Education (3 cr.)
0701G: Internship in Special Education I: Middle Childhood Education (3 cr.)

One of the following options:
2600I: Content Research Seminar in Special Education (2 cr.)
2900I: Seminar in Educational Research (2 cr.)
or
0000I: Introduction to Educational Research (2 cr.)
0100I: Seminar in Educational Research (2 cr.)

Total credits: 31

EDUCATIONAL LEADERSHIP

School District Leader
The School District Leader Program (SDL) is an Advanced Certificate Program targeting district or central office leader positions. Candidates are prepared for New York State certification as a School District Leader (SDL). The Program prepares candidates for a number of roles including but not limited to:

Superintendent
Deputy Superintendent
Assistant Superintendent
Executive Assistant to the Superintendent

Director of Instruction
Director of Personnel
Coordinator of Educational Planning
Director of Finance and Business Management
Director of Special Programs and Projects
Administrative Assistant

Matriculation Requirements
Candidates seeking matriculation must (1) possess a Bachelor’s Degree from an accredited institution, (2) possess a Master’s Degree with a minimum 3.0 grade point average, (3) hold state certification as a teacher, guidance counselor, school psychologist, school social worker, or other appropriate certification, (4) have three years teaching or relevant educational work experience, including demonstrated success in fulfilling leadership roles in school or district, (5) submit three letters of recommendation and official transcripts, and (6) satisfactorily complete an interview and an on-site essay. In addition, candidates will be judged on the basis of superior references and evidence of strong potential for professional work in administration.

Total credits: 31

DEGREE REQUIREMENTS

School District Leader
Core A: Human, Foundational, & Structural Elements of Education
7101G: Dynamics of Educational Organizations 3
7201G: Moral Dimensions of Leadership 3
7401G: Instructional Leadership 3
6701G: School Management 3
8801G: School Community Building 3
8601G: Education Law 3

Core C: District Level Application
8103G: Management Operations at the District Level 3
8604I: Social Responsibility, Politics, and Education 3
5607G: Leadership at the District Level 3
7904G: Internship and Seminar 3

Total credits: 30

School Building Leader Degree Requirements
Core A: Human, Foundational, & Structural Elements of Education
7101G: Dynamics of Educational Organizations 3
7201G: Moral Dimensions of Leadership 3
7401G: Instructional Leadership 3
6701G: School Management 3
8801G: School Community-Building 3
8601G: Education Law 3

Core B: Building Level Application
7001G: Foundations of Educational Policy-Making 3
2501I: Research and Assessment Seminar in Educational Leadership 2
8501I: Field Problem Seminar in Educational Leadership 2
7301G: Curriculum Development 3
7904G: Internship and Seminar: Building Level 3

Total credits: 31
Entry Level Leader Certification Program (ELLC)
The Entry Level Leadership Certification Program (ELLC) is a fast-track twenty-one (21) credit hour initial School Building Leadership certification program targeted for entry-level leader positions in education. Addressing the need for “front-line” leaders (i.e. assistant principals, content coaches, department heads) who deal daily with “on the ground” issues of educational policy, practice, and people, the ELLC Program concentrates on preparing a cohort of candidates to assume the moral stewardship of equity and excellence in diverse, high-need urban schools. The ELLC Program is a certification only program that involves Core A courses plus three semester internship. Beginning in the first semester of the program, the courses will have a field experience component. All courses in the programs; integrate the use of technology as a tool, are problem-based, utilize case studies and data based decision-making instructional strategies.

Academy For Promising Leaders in Urban Schools (A+ PLUS)
The Academy for Promising Leaders in Urban Schools is an off-campus School Building Leader certification program. The program components are the same as those listed for the Entry Level Leader Certification program.

Matriculation Requirements
Candidates must be nominated by their principal or other school leader. In addition, candidates must have a bachelor’s degree from an accredited institution, a master’s degree with a minimum 3.0 G.P.A., state certification as a teacher, guidance counselor, school psychologist, school social worker, or other appropriate certification, three years teaching or relevant educational work experience, including demonstrated success in fulfilling leadership roles in school or district, three letters of recommendation, satisfactory completion of an interview and on-site essay and submit official transcripts. In addition, candidates will be judged on the basis of references, interviews, and potential for professional work in administration.

Entry Level Leader Certification (ELLC) and Academy for Promising Leaders in Urban Schools (A+PLUS) Requirements

Core A: Human, Foundational, & Structural Elements of Education
7101G: Dynamics of Educational Organizations 3
7201G: Moral Dimensions of Leadership 3
7401G: Instructional Leadership 3
6701G: School Management 3
8801G: School Community Building 3
8601G: Education Law 3
7904G: Internship and Seminar 3

Total credits: 21

COURSE DESCRIPTIONS

Each of the following courses carries a designation of EDLS unless otherwise noted. The courses are arranged according to the last-place letter.

0100A: Urban Schools in a Diverse Society
Selected significant social, political and economic forces which influence the school as an institution and which in turn are influenced by the school, especially in urban settings that educate students from diverse ethnic and cultural backgrounds. Includes history, philosophy, sociology and politics of education. 3 HR./WK., PLUS 10 HRS. OF FIELD EXPERIENCE AT EITHER THE 1-3 OR 4-6 LEVEL; 3 CR.

0200A: Psychology of Learning and Teaching
Theories and principles of learning and instruction pertinent to achievement, development, self-regulation, and behavior in children from culturally and ethnically diverse backgrounds. Includes classroom applications, testing and evaluation. 3 HR./WK., PLUS 10-15 HRS. OF FIELD EXPERIENCE AT THE 1-3 OR 4-6 LEVEL; 3 CR.

0300A: Child Development
Theories and principles of development pertinent to culturally and ethnically diverse and inclusive classrooms with an emphasis on classroom applications and fieldwork. 3 HR./WK., PLUS 10 TO 15 HRS. OF FIELD EXPERIENCE AT THE 1-3 AND 4-6 LEVELS; 3 CR.

0400A: The School in American Society: Bilingual Education in the Urban School
Analysis of selected social, political and economic forces that influence the school as an institution, and in turn are influenced by the school, especially in urban settings. Special attention to immigrant, bilingual and language minority groups. Not open to students who have taken EDUC 22100, 22200, or equivalent. 3 HR./WK.; 3 CR.

0500A: Adolescent Learning and Development
The evolution of how theories and research on learning and development manifest themselves in urban settings for teachers of adolescents. Teacher-centered and student-centered, human and technology-based approaches, emphasizing those promoting independent, self-regulated adolescent learners. Theories, their cultural implications and their classroom applications: learning, intelligence, motivation, affect, parenting styles, classroom communication, and classroom management strategies. 3 HR./WK.; 3 CR.

0501A: Fieldwork in Adolescent Learning and Development
Structured fieldwork activities for students to implement in exemplary junior high and high school classrooms. The fieldwork component, in part, will be structured to meet State standards and to help prepare students to pass the ATS-W. Prereq. or coreq.: EDUC 0500A. 1 HR./WK.; 1 CR.

The nature of students with disabilities and health-care needs. Effects of disabilities on learning and behavior. Identifying strengths, individualizing instruction, and collaborating to prepare special-needs students to their highest levels of achievement, literacy, and independence. Language acquisition and literacy development by native English speakers and English language learners. Developing listening, speaking, reading and writing. Prereq.: EDUC 0601A. 3 HR./WK.; 3 CR.

0601A: Fieldwork in Issues for Secondary School Teachers
Forty-five hours of fieldwork related to the study of students with disabilities, students learning English as a second language, and literacy issues. Pre-or coreq.: EDUC 0600A. 3 HR./WK.; 3 CR.

0701G: Internship in Special Education I: Childhood Education
Students will be assigned to a school and spend half a semester in a special education or inclusion classroom, grades 1-3, and
half a semester in a special education or inclusion classroom, grades 4-6. Minimum of 15 hours per week, 3 credits equivalent to 12 semester hours for 240 hour (40 day) minimum. There is a scheduled weekly seminar. 3 CR.

0703G: Internship in Bilingual Special Education
Students will be assigned to a school and will spend half a semester teaching in a regular class and half a semester student teaching in a special class for exceptional bilingual children. 4 HR./WK.; 4 CR.

5607G: Leadership at the District Level: Roles and Responsibilities
Roles and Responsibilities of the superintendent, deputy superintendent, and central headquarters personnel for curriculum and instruction, business, pupil support programs, school safety, and school-community and parent involvement to increase student achievement and attain the goals specified in the No Child Left Behind legislation. Develop knowledge and skills necessary to build the capacities of central staff and school leaders through support, mentoring, coaching, assignments, and succession planning. Strategies for effective communication and interaction with school board members, community leaders, and school leaders are developed. Restructuring and school reform and effective implementation of policies and state and federal statues are to be studied and analyzed. 3 HR./WK.; 3 CR.

5700G: Practicum in Teaching Bilingual Special Education
An advanced course to assess and develop teaching skills in various special education settings under supervision in the field and in an integrative seminar. Individual conferences to review teaching strategies, materials, and techniques. 3 HR./WK.; 3 CR.

5701G: Practicum Teaching Bilingual Special Education
Assessing and developing skills for teaching language minority students with disabilities. Field supervision, integrative seminar, individual conferences. Approval required one semester in advance; open only to matriculants. Prereq.: completion of 15 credits. 3 HR./WK.; 3 CR.

5901G: Curriculum and Instructional Approaches in Bilingual Special Education
Examination and development of curriculum and material for teaching language minority students with disabilities in English and non-English. Special emphasis will be given to NYS learning standards for science and social studies. 3 HR./WK., PLUS 10 HRS. OF FIELDWORK; 3 CR.

6700G: The Management of Schools - Operational Problems and Practices
Aspects of management such as scheduling, assignment, financial management and reporting. Basic operational needs, procedures and administration for prospective building level principals. 3 HR./WK.; 3 CR.

6701G: School Management
An examination of the leader's role in managing the organization's operations required to deliver an effective school program. Emphasis is placed data gathering and analysis in the management of human, fiscal, facility, and technology resources. Candidates will learn strategies that will prepare them to plan and utilize resources comprehensively from federal, state, and city sources to enhance, supplement, and achieve goals and objectives. 3 HR./WK.; 3 CR.

7000G: Educational Policy and School Administration
Policy formulations and basic issues examined with a view to identifying underlying assumptions. Attempts to analyze and assess consequences of alternative courses of action, including consequences in terms of major issues, with emphasis on the controversies of our time. 3 HR./WK.; 3 CR.

7001G: Foundations of Educational Policy-Making
Introduction to the process by which policy is formulated, analyzed, implemented, and evaluated. The roles of the educational leader, educational interest groups, school boards, professional educators, parents and other citizens in the formulation and execution of educational policy are explored. Contemporary policy issues are examined and critiqued. Critical examination of ethical issues confronting education leaders and policymakers in a liberal-democratic society. 3 HR./WK.; 3 CR.

7100G: Leadership in Education I
Introduction to organizational development. Tested concepts and theoretical formulations concerning organizational behavior, participative management and systematic school improvement. Application of organizational development concepts to leadership behavior, with particular focus on group dynamics and human relations. 3 HR./WK.; 3 CR.

7101G: Dynamics of Educational Organizations
Candidates explore the foundations and philosophies of education, systems theory, the principles of organizational development, and the change process for systems, organizations, schools, and individuals. Candidates learn to develop and sustain an educational vision for all students informed by multiple data sources, to lead comprehensive long-range strategic planning projects and to utilize effective communication, consensus-building, and negotiation skills. 3 HR./WK.; 3 CR.

7200G: Leadership in Education II
Organizational behavior. Situational analysis of administrative problems through the application of behavioral science theories in role communication, decision-making, leadership, and organizational change, using a series of elementary, secondary and central office case studies. Prereq.: 7100G. 3 HR./WK.; 3 CR.

7201G: Moral Dimensions of Leadership
Candidates explore leadership theories, develop a leadership philosophy, a professional code of ethics, and a personal growth plan. An examination of issues related to personal and professional accountability is conducted. Preparation is provided in the leadership skills (i.e., motivation, conflict management, decision-making, etc.) needed to influence individual and group behavior and to shape school culture and values in the context of highly diverse schools and student and staff needs. 3 HR./WK.; 3 CR.

7300G: Curriculum Development and Supervision I
Current and developing curriculum patterns, technological innovations, and strategies for effecting curriculum change. Role of the principal supervisor considered within the context of formulations for innovations in organization. 3 HR./WK.; 3 CR.

7301G: Curriculum Development
An examination of the principles of curriculum development, implementation, evaluation, and instructional programming. Emphasis is placed on understanding learners, the learning environment and developing instructional support services for diverse and special school populations. Best practices in curriculum and instruction and standards based teaching and learning are addressed. Strategies for developing and implementing curriculum improvement plans for improved student achievement are stressed. Candidates are expected to develop an eclectic approach to the curriculum improvement process. 3 HR./WK.; 3 CR.

7400G: Curriculum Development and Supervision II
Theory of supervisory functions. Wide range of techniques that provide for in-service education and staff development, emphasizing clinical supervision and interactional analyses. Guidelines and procedures for the effective evaluation of both learning and teaching. Prereq.: 7300G. 3 HR./WK.; 3 CR.
7401G: Instructional Leadership
Purpose, theory, and nature of instructional leadership are examined. This course focuses on the supervisor’s human relations skills as a group leader; classroom visitations and conferences; supervisory techniques, teacher assessment, student learning and development, and curriculum review. Candidates explore the role of entry level leaders in the improvement and evolution of teaching and learning; assessing supervision and teaching, and exploring strategies that promote the transformation of districts and schools into effective learning communities. 3 HR./WK.; 3 CR.

7800G: Advanced Seminar in Educational Organizational Development
In-depth analysis of O.D. models and processes for improving schools, ranging from individual to system-wide interventions. Providing and refining organizational development skills for those seeking organizational leadership roles within schools, human service, and other related institutions. Prereqs: 7100G, 7200G. 3 HR./WK.; 3 CR.

7903G: Internship in School Administration and Supervision
Carefully planned and supervised on-the-job training under general control of the faculty in Administration. Where possible, the work will be in a school system, but, as appropriate, may be carried on in another community agency. Regular reports and conferences required. 3 HR./WK.; 3 CR.

7904G: Internship and Seminar
The internship is a supervised learning experience in a school setting that provides an opportunity to apply the theories and concepts learned and skills acquired during the candidates’ graduate program. Candidates for the internship identify areas they need to strengthen and develop a plan to enhance their skills in the identified areas. During the internship, candidates work under the guidelines of a college facilitator and the supervision of a school-site administrator. Problem-solving seminars that focus on internship activities are conducted on a regular basis. 3 HR./WK.; 3 CR.

8000G: Survey of Problems in Educational Administration and Supervision
A foundations course designed to set forth systematically the problems of educational administration and supervision. May be credited toward a master’s degree only with permission of student’s major field advisor. Open to non-degree students. 3 HR./WK.; 3 CR.

8101G: School Finances and the Economics of Public Education
An overview of school finance and educational economics. Topics include: property taxation, assessed valuation, school finance court decisions, federal aid to education, and school finance alternatives. Although New York State aid formulas are emphasized, data from California, New Jersey, Hawaii and Washington, D.C. are also utilized. 3 HR./WK.; 3 CR.

8102G: School Business Management and Budgeting
Budgetary processes and tools, critique of PPBS zero-based budgeting, and other control techniques. Use of cost-effectiveness measures. Federal, state and local support patterns. Categorical aid, special funding, and their budgetary implications. Open to non-degree students, with permission. 3 HR./WK.; 3 CR.

8103G: Management and Organizational Leadership at the District Level
This course provides models, strategies, and applications in use of information sources, data collection and analysis in designing and executing strategic plans for district-wide systems. Management and operational functions of a school district leader including human resources administration, budgeting and financial operations at the school and district levels, obtaining and using resources comprehensively from a variety of public and private sources, training schools in prioritizing the use of resources, and planning for and utilizing school plants and facilities to support the instructional program. Exploration of safety and security issues and concerns; model plans are developed. Operational plans to implement the district’s mission and vision and maximize student achievement. 3 HR./WK.; 3 CR.

8200G: Education Planning and Systems Problem-Solving
The role of educational administrators and supervisors in short and long-range program planning, resource allocation, and physical planning. The relationship between educational planning and human resources, utilizing organizational development strategies, application of general systems theory, systems analysis, and the techniques of PERT, MBO, PPBS and CPM, etc. to educational and human service institutions. Open to non-matriculants. 3 HR./WK.; 3 CR.

8301G: School Personnel I
Personnel administration and staff development. Practices and processes in educational leadership. Developing programs, organizing staff and facilities, defining roles of professional and non-professional personnel; personnel administration and guidance; application of techniques for evaluating the effectiveness of the organization. Open to non-degree students. 3 HR./WK.; 3 CR.

8302G: School Personnel II
Collective bargaining, contract administration, and grievance arbitration. The meaning and impact of collective negotiations on public education. Topics include: the background of collective bargaining in public education; the legal and political framework, organizational approaches to, and organizational issues in negotiations; administering the agreement; and grievance machinery. Strategy, tactics, and special issues in relation to educational administration will be studied. Open to non-degree students. 3 HR./WK.; 3 CR.

8600G: School Law and the Administrator
Legal responsibilities of administrators. Requirements of local boards, including contracts, state and federal laws affecting local operation of schools. May be credited toward a master’s degree only with permission of the student’s major field advisor. Open to non-degree students, with permission. 3 HR./WK.; 3 CR.

8601G: Education Law
Candidates will examine the constitutional and statutory provisions and principles of representative government that undergird the American public school system. A comprehensive overview of the origin and legal status of the local school unit, legal responsibilities of administrators, requirements of school boards, rights of students and teachers, evolution of legal provisions for school support; and the importance of diversity and equity in a democratic political system provides the basis for candidate discussion, analysis and application. Contemporary legal and ethical issues confronting education leaders and policymakers in a liberal-democratic society are critically examined, as are the dynamics of policy development and advocacy under our democratic political system. Issues are examined for common legal pitfalls affecting all school personnel contracts and labor relations. 3 HR./WK.; 3 CR.

8800G: School-Public Relations
A study of concepts, organizational and administrative processes. Functions of school personnel, media designed to promote school-community understanding and cooperation. May be credited toward master’s degree only with permission of student’s major field advisor. 3 HR./WK.; 3 CR.

8801G: School Community-Building
Utilizing the values, emerging issues and trends, conditions, and dynamics impacting the school community and educational programs, this course provides best practices
in communication, marketing strategies, media use, and partnerships with HE, social agencies, businesses, and other stakeholders to build support and garner community resources for improving student achievement. 3 HR./WK.; 3 CR.

9600G: Administration and Supervision of Specialized Programs/Departments
The chair’s or special area supervisor’s responsibilities in such areas as program making, staff development, pupil/personnel, and program/department management. Cases and problems examined in laboratory settings, taught by joint administration and specialized area faculty. Special permission of particular program advisor required. 3 HR./WK.; 3 CR.

9601G: Adult Education
Problems involving administrative routine, discipline, classification of pupils, experimental programs, standards of promotion, and human relationships in administration. May be credited toward a master’s degree only with permission of student’s major field advisor. 3 HR./WK.; 3 CR.

9602G: Administration and Supervision of Early Childhood Education
The supervisor’s responsibilities in such areas as program making, staff development, pupil/personnel, and program/department management. Cases and problems examined in laboratory settings, taught by joint administration and specialized area faculty. Special permission required. 3 HR./WK.; 3 CR.

9605G: Administration of Special Education
Problems involving administrative routine, discipline, classification of pupils, experimental programs, standards of promotion, and human relationships in administration. May be credited toward a master’s degree only with permission of student’s major field advisor. 3 HR./WK.; 3 CR.

9800G: Educational Leadership in Day Care
Role of the director in setting priorities for the center and its early childhood program. Supervision and development of staff. Relations with governmental agencies, sponsoring agency, board and community. Open only to matriculants in the Day Care Leadership Program or by special permission. 3 HR./WK.; 3 CR.

0000I: Introduction to Educational Research
The first semester of the research sequence covers the basic concepts needed to evaluate research critically and plan it effectively. Each student will identify a problem in his or her major area, review the literature related to that problem, and design a project to study the problem. The study will be carried out during the second semester. This course should be taken no later than the semester prior to the one in which the student expects to complete the requirements for the degree. 2 HR./WK.; 2 CR.

0100I: Individual Study in Educational Research
Second semester of research sequence. Consideration of research design, sampling, instrumentation, data collection, statistical or qualitative data presentation. Students will execute the study developed during the first semester and prepare a written report, in research form, of the complete study. Prereq.: EDUC 0000I. 2 HR./WK.; 2 CR.

2500I: Content Research Seminar in Educational Administration
A critical review of the research literature in the candidate’s major field, as well as research methodology and instrumentation appropriate to the field. This first semester covers the basic concepts and procedures needed to evaluate research critically. Each student will identify a problem in his or her major area, review the literature related to that problem, and design a project to study the problem. This project will be carried out during the second semester. Matriculants only. This course is followed by EDUC 8100I. This course should be taken no later than the semester prior to the one in which the student expects to complete the requirements for the degree. Students who expect to write a thesis should take this course no later than two semesters prior to the one in which they expect to complete the requirements for their degree. Prereq.: see individual programs. 2 HR./WK.; 2 CR.

2501I: Research and Assessment Seminar in Educational Leadership
Examination of the basic concepts and procedures necessary for identifying and using strategies, analyzing performance data, and understanding and using research within classroom and school contexts for the improvement of instruction. Each candidate will identify a school-based research problem and design a project to study the problem. 2 HR./WK.; 2 CR.

2600I: Content Research Seminar in Special Education
A critical review of the research literature in the candidate’s major interest, as well as appropriate research methodology and instrumentation. The first semester covers the basic concepts needed to evaluate research critically. Each student will identify a research problem, review literature related to that problem, and design a project to study it. The study will be carried out during the second semester. This course should be taken no later than the semester prior to the one in which the student expects to complete the requirements for the degree. 2 HR./WK.; 2 CR.

6100I: Parents, Families, and Disability
Understanding and valuing the perspective and knowledge of parents and families who raise children with disabilities forms the focus of this class. We will reflect upon our own assumptions and misconceptions about parents and families and consider positive reconceptualizations of family/school relationships. We explore how “the medical model of disability”—inherent within the institution of special education—disrupts effective communication between families and professionals. We will also explore the relational aspects of disability on extended family members. Attention will be paid to culturally responsive factors that promote effective communication and authentic collaboration with families as well as effective parent/family advocacy strategies. 3 HR./WK.; 3 CR.

8000I: Critique of Research in Educational Administration and Supervision
A review of the literature, and an analysis of the implications of this research for administrative performance. Special permission required. 2 HR./WK.; 2 CR.

8100I: Individual Research in Educational Administration and Supervision
Advanced study of special problems in education sponsorship by staff member. Special permission required. Hours to be arranged. 2 HR./WK.; 2 CR.

8200I: Computer Applications and Use for School Administrators
Discussion of a variety of current topics related to computer applications and use in school administration and with particular emphasis on recent advancement and research in hardware/software development, and adaptation at the elementary and secondary school levels. Ample opportunity to participate in hands-on computer laboratory. 3 HR./WK.; 3 CR.

8500I: Field Problem Seminar in Educational Administration and Supervision
Analysis of problems arising in the experience of the group. Relation to perennial problems in this field. Directed self-study of pertinent bibliographic sources. Arrangements may be made for observations and conferences. Designed for those currently engaged in administration or supervision. Open only to matriculants in
Administration. (This course is part of a specialized component in organizational development.) 3 HR. TO BE ARRANGED/WK.; 1-6 CR.

85011: Field Problem Seminar in Educational Leadership
Candidates carry out the school-based research projects designed in EDUC 25001 and participate in seminars to review, critique, and apply current research in Educational Leadership. Critical examinations are conducted of the candidates' school-based research projects. 2 HR./WK.; 2 CR.

86011: Advanced Problem Seminar in Urban Education and Administration
In-depth analysis of issues that have special significance for urban school administrators; the current status of decentralization, integration, minimum competency, school finance, and constituent participation. The local, state and federal roles in policy formulation; Analysis of research findings; alternate models. Open to non-matriculants; permission required. 3 HR./WK.; 3 CR.

86021: Strategies for Organizational Development in Educational Administration
Simulated laboratory applications of organizational development and open systems theory to the field of educational administration, including time management, team building, force field analysis and survey feedback. Course draws upon the works of Schmuck, Levinson, Argyris, et al. Open to non-matriculants; permission required. 3 HR./WK.; 3 CR.

86031: Strategies for Instructional Change in Educational Administration
The role of the administrator in creating and supporting a climate for the adoption of educational change and instructional innovation. Application of various techniques to design and evaluate the effectiveness of various change strategies. 3 HR./WK.; 3 CR.

86041: Social Responsibility, Politics and Education
Rooted in educational foundations, educational philosophy, and current social and economic dynamics, this course provides an in-depth analysis of issues of special significance for urban central office educational leaders impacting the quality, equity, and excellence of education for all students and includes best practices for communicating, understanding, valuing, and working effectively with district leaders, state leaders, community leaders and other community members from diverse backgrounds. Candidates develop an understanding of the implications of political strategies and involvement in education. 3 HR./WK.; 3 CR.

3300K: Building Community in Inclusive Contexts
Children come to school as unique learners who negotiate the world within complex and ever-shifting intersectionalities of race, class, gender, and ability. This course prepares teacher candidates to conceptualize human diversity as a resource (rather than a liability) and to facilitate caring classroom communities within which all learners are viewed as valuable. Participants will acquire in-depth understanding of techniques that nurture the development of an interdependent learning community based upon trust, mutual respect, and acceptance. Issues specific to classroom dynamics and access are considered in the instance of physical setting, curriculum, and teaching strategies as each relates to building community in the classroom. In addition, community building in the larger school context (including strategies for initiating and sustaining school change) will be addressed as well as transition issues that bridge to the outside community (community-based inclusion). Attention will be given to language arts, mathematics, science, social studies, and technology as appropriate and consistent with the N.Y. State Learning Standards. 3 HR./WK.; 3 CR.

3500K: Identity and Disability
What does it mean to be “disabled” in contemporary society? Is disability best viewed as a marker of identity such as race, ethnicity, class, gender, and sexual orientation? How does a person experience disability as it intersects with these other markers of identity? Is there a disability culture? What is the history of people with disabilities? How are people with disabilities represented: in literature, science, the law, religion, the media, film and television? How is disability understood in other countries and cultures? Bearing these questions in mind, we must ask: How do school structures incorporate disabled students and teachers? What is learned about disability both formally and informally throughout general education? How is disability taught within the curriculum? Given that all teachers work with a significant number of students labeled disabled, these are all important questions to explore. In this course, participants will engage with issues raised by Disability Studies in conceptualization(s) of disability and the social impact of our individual values, beliefs, and actions. 3 HR./WK.; 3 CR.

3600K: Approaches to Literacy I in Childhood Education
This course is the first in a two-part sequence designed to assist participants to make informed choices about how to structure classroom routines and rituals that maximize opportunities for teaching reading and writing in an integrated fashion. Various frameworks for lesson planning to complement the IEP will be introduced as well as exceptionality specific assessment instruments. Course content will address the essential components of reading, including: phonemic awareness, phonics, fluency and expressiveness, vocabulary, and comprehension. In conjunction with reading skills, methodologies of writing through a process approach will also be introduced (i.e., pre-writing, organization, writing a primary draft, multiple revisions, and final editing). 3 HR./WK. PLUS 15 HRS. OF FIELDWORK; 3 CR.

3601K: Approaches to Literacy I in Middle Childhood Education
This course is the first in a two-part sequence designed to assist participants to make informed choices about how to structure classroom routines and rituals that maximize opportunities for teaching reading and writing in an integrated fashion. Various frameworks for lesson planning to complement the IEP will be introduced as well as exceptionality specific assessment instruments. Course content will address the essential components of reading, including: phonemic awareness, phonics, fluency and expressiveness, vocabulary, and comprehension. In conjunction with reading skills, methodologies of writing through a process approach will also be introduced (i.e., pre-writing, organization, writing a primary draft, multiple revisions, and final editing). 3 HR./WK. PLUS 15 HRS. OF FIELDWORK; 3 CR.

3700K: Approaches to Literacy II in Childhood Education
This course (part II) is designed to extend the literacy components introduced in part I. Extended experiences will focus on maintaining a classroom structure that supports a reading-rich context in conjunction with writing-worthy opportunities for use in a variety of educational contexts. The course will feature strategies to teach habits of good readers, such as: activating schema, visualizing, questioning, determining importance, making inferences, monitoring for meaning, and synthesizing. In conjunction with explicit reading skills (part I), methodologies of writing will also be taught, focusing on the process of writing through: pre-writing, organization, writing a primary draft, multiple revisions, and final editing. The art of individual con-
ferencing with students will be featured at length. Prereq. EDUC 3600K. 3 HR./WK. PLUS 15 HRS. OF FIELDWORK; 3 CR.

**3701K: Approaches to Literacy II in Middle Childhood Education**

This course (part II) is designed to extend the literacy components introduced in part I. Extended experiences will focus on maintaining a classroom structure that supports a reading-rich context in conjunction with writing-worthy opportunities for use in a variety of educational contexts. The course will feature strategies to teach habits of good readers, such as: activating schema, visualizing, questioning, determining importance, making inferences, monitoring for meaning, and synthesizing. In conjunction with explicit reading skills (part I), methodologies of writing will also be taught, focusing on the process of writing through: pre-writing, organization, writing a primary draft, multiple revisions, and final editing. The art of individual conferencing with students will be featured at length. Prereq. EDUC 3601K. 3 HR./WK. PLUS 15 HRS. OF FIELDWORK; 3 CR.

**3800K: Differentiated Instruction and Assessment in Collaborative Contexts I in Childhood Education**

This course is the first in a two-part sequence designed to foster creative approaches to planning, implementation of instruction, ongoing curriculum-based/authentic instruction for all children in a variety of educational settings. Participants will focus on understanding differences as a basis for planning; use diagnostic assessment in an ongoing manner to make instruction more responsive to learner need; utilize multiple forms of intelligence; assist students by frequently guiding them in making interest-based choices; use varied instructional arrangements; employ student readiness, interest, and learning profile in planning; develop multiple option assignments; develop flexible use of timing; facilitate students becoming more self reliant learners; and implement multiple forms of assessment. Content specialists will inform the course activities in the areas of language arts, mathematics, science, social studies and technology (teaching modules) as per the Part 100 Regulation of the Commissioner of Education and the New York State Standards. Participants will utilize content modules and apply their acquired knowledge of assessment, differentiated instructional design and planning to the content areas studied. Regulatory requirements (Part 100 and Part 200 Rules and Regulations of the NYS Commissioner of Education) that focus on curriculum content, due process, assessment, programs and services are correlated to the topics covered during this course. Prereq. EDUC 3801K. 3 HR./WK. PLUS 15 HRS. OF FIELDWORK; 3 CR.

**3801K: Differentiated Instruction and Assessment in Collaborative Contexts I in Middle Childhood Education**

This course is the first in a two-part sequence designed to foster creative approaches to planning, implementation of instruction, ongoing curriculum-based/authentic instruction for all children in a variety of educational settings. Participants will focus on understanding differences as a basis for planning; use diagnostic assessment in an ongoing manner to make instruction more responsive to learner need; utilize multiple forms of intelligence; assist students by frequently guiding them in making interest-based choices; use varied instructional arrangements; employ student readiness, interest, and learning profile in planning; develop multiple option assignments; develop flexible use of timing; facilitate students becoming more self reliant learners; and implement multiple forms of assessment. Content specialists will inform the course activities in the areas of language arts, mathematics, science, social studies and technology (teaching modules) as per the Part 100 Regulation of the Commissioner of Education and the New York State Standards. Participants will utilize content modules and apply their acquired knowledge of assessment, differentiated instructional design and planning to the content areas studied. Regulatory requirements (Part 100 and Part 200 Rules and Regulations of the NYS Commissioner of Education) that focus on curriculum content, due process, assessment, programs and services are correlated to the topics covered during this course. Prereq. EDUC 3801K. 3 HR./WK. PLUS 15 HRS. OF FIELDWORK; 3 CR.

**3901K: Differentiated Instruction and Assessment in Collaborative Contexts II in Middle Childhood Education**

This course is the second part of a two-part sequence that extends the content addressed in Part I. Participants will focus on developing pedagogical flexibility within three broad, interconnected strands: The information to be taught (content specific to: language arts, mathematics, science, social studies, technology), how students engage with that information (process), and ways in which students demonstrate their knowledge as a result of interacting with information (product). Content areas are used to engage participants as per the Part 100 Regulation of the Commissioner of Education and the New York State Standards. Extending part I of the course, participants will elaborate on content-based modules and apply acquired knowledge of assessment, differentiated instructional design and planning to the content areas studied. In addition, regulatory requirements (Part 100 and Part 200 Rules and Regulations of the NYS Commissioner of Education) that focus on curriculum content, due process, assessment, programs and services are correlated to the topics covered during this course. Prereq. EDUC 3801K. 3 HR./WK. PLUS 15 HRS. OF FIELDWORK; 3 CR.

**4000K: Disability Studies in Childhood Education**

This course has the dual focus of promoting understanding disability and creating instruction informed by the experience of disability. Various contemporary literary and historical accounts of living with disability will be explored with attention to their use in a variety of educational contexts. Traditional as well as alternative interpretations of living with disability will be explored for consideration of their impact on learning. Moving away from the hegemony of strictly biological and/or pathological interpretations of disability, participants will design curriculum materials for classroom use that integrate disability positive portrayals. The participants will identify print materials (i.e., picture books, chapter books, young adult fiction, memoirs, biography, newspaper and magazine
articles), and other visual media (film, television programs, advertisements, web-based materials) suitable for inclusion in the general curriculum (i.e., language arts, social studies, science, mathematics). From this selection the participants will develop lessons that focus on understanding disability in the everyday context (i.e., how many people live with disability). Attention will be given to issues of transition and access. This curriculum experience seeks to promote the view of disability as an essential feature of diversity in a multicultural society. 3 HR./WK. PLUS 15–20 HRS. OF FIELDWORK; 3 CR.

4001K: Disability Studies in Middle Childhood Education

This course has the dual focus of promoting understanding disability and creating instruction informed by the experience of disability. Various contemporary literary and historical accounts of living with disability will be explored with attention to their use in a variety of educational contexts. Traditional as well as alternative interpretations of living with disability will be explored for consideration of their impact on learning. Moving away from the hegemony of strictly biological and/or pathological interpretations of disability, participants will design curriculum materials for classroom use that integrate disability positive portrayals. The participants will identify print materials (i.e., picture books, chapter books, young adult fiction, memoirs, biography, newspaper and magazine articles), and other visual media (film, television programs, advertisements, web-based materials) suitable for inclusion in the general curriculum (i.e., language arts, social studies, science, mathematics). From this selection the participants will develop lessons that focus on understanding disability in the everyday context (i.e., how many people live with disability). Attention will be given to issues of transition and access. This curriculum experience seeks to promote the view of disability as an essential feature of diversity in a multicultural society. 3 HR./WK. PLUS 15–20 HRS. OF FIELDWORK; 3 CR.

5000K: Introduction to Inclusive Education

An introduction to the multiple meanings of inclusive education as employed in both national and international contexts. Specific attention is paid to school structure, legislative mandates in support of inclusive education, collaborative problem-solving relationships among educators (general and special), students, and families in designing and modeling inclusive pedagogies and practices for diverse learners. We will examine historical contexts, shifting societal beliefs, and subsequent educational theories that have led to an increased emphasis on inclusion and the merits of collaborative education to serve students with disabilities in more integrated contexts. The course includes: an overview of inclusive education, student characteristics; diverse approaches to pedagogical practice; models of collaboration, including collaborative team teaching (CTT); classroom management; and assessment, and utilization of assistive instructional technologies. 3 HR./WK.; 3 CR.

5300K: Positive Approaches for Challenging Behaviors

This course is designed to assist participants to make informed choices about how to analyze a “behavior issue” in the classroom and school context. Participants will learn how to develop multiple positive approaches for extinguishing difficult behaviors. Traditional as well as alternative behavioral interventions will be considered including an overview of the traditional (i.e., controlling) behavioral approaches and practices typically used with students with intellectual or emotional disabilities. Readings and activities will encourage examination of the conceptual foundations and underlying principles of such approaches for use in an inclusive society. The central feature of this course, however, will be on interactive intervention alternatives that alleviate frustrations for students with disabilities, focus on their needs and wishes, and support them in taking control of their lives. The final project will require participants to apply an approach to the management of difficult behaviors they find most suitable in their classrooms. 3 HR./WK.; PLUS 15–20 HRS. OF FIELDWORK; 3 CR.

6000K: Introduction to the Education of Language Minority Students with Disabilities

An overview of the needs of children with disabilities who are in the process of acquiring skills in English. Special Education and Bilingual Education principles will be emphasized and a rationale for the integration of theories and practices from these two fields will be established. Prereq.: EDUC 5000K. 3 HR./WK.; 3 CR.

6100K: Assessing the Educational Needs of Language Minority Students with Disabilities

This course examines the impact of second language, cultural variables, and bilingualism on academic test performance. Participants will learn to assess educational environments, previous educational experiences, administer norm-referenced tests and criterion-referenced tests in English and in the non-English language. Both formal and informal assessment techniques will be studied. Prereq.: EDUC 6000K or permission of instructor. 3 HR./WK., PLUS 20 HRS. PRACTICUM; 3 CR.

6200K: Language Minority Families and the Special Education System

This course examines current and historical perspectives on parent involvement in the special education of children and youth with disabilities. Emphasis on understanding the views of exceptionalities and family involvement held by language minority families. Focuses on strategies, activities, and materials that will facilitate school and family collaboration. Prereq.: 5000K. 3 HR./WK.; 3 CR.
Shu Jen Chen, Assistant Professor  
B.A., Chinese Culture Univ.; M.A., Arizona State Univ.; Ph.D., Oklahoma State Univ.  
Joyce Coppin, Distinguished Lecturer  
B.S., The City College; M.S., Brooklyn College, Prof. Dipl. Special Ed.  
Phyllis Durden, Associate Professor  
Hope Hartman, Professor  
B.A., Ohio State Univ.; Ph.D., Rutgers Univ.  
Carol Huang, Assistant Professor  
B.A., Tamkang Univ. (Taiwan); M.A., Michigan State Univ.; M.Ed., New York Univ.; Ph.D., Univ. of Illinois, Urbana-Champaign  
Joseph Jiggetts, Assistant Professor  
B.S., Morgan State Univ.; M.S., The City College; M.Ed., Teachers College, Columbia Univ.  
Sylvia Roberts, Associate Professor and Chair  
B.A., St. Joseph’s Univ.; M.A., Montclair State College; Ph.D., New York Univ.  
Irvin Schonfeld, Professor  
B.S., Brooklyn College; M.A., New School for Social Research; Ph.D., CUNY; M.P.H., Columbia Univ.  
Jan Valle, Assistant Professor  
B.A., Furman University, M.A.; Ed.D., Teachers College, Columbia Univ.  
Linda Ware, Assistant Professor  
B.S., Univ. of Texas, M.S.; Ph.D. Univ. of Kansas  

PROFESSORS EMERITI  
Doyle Bortner  
Debora C. Brink  
Paul J. Burke  
Thomas F. Carey  
Helen J. Davidson  
Richard G. Dumin  
Edwin Farrell  
Harwood Fisher  
David J. Fox  
Anthony F. Jansic  
Florence Roswell  
Arnold Rothstein  
Marilyn Rousseau  
Cyril G. Sargent  
Norman Shapiro  
James J. Shields  
Marvin Siegelman  
Martin Silverman  
Robert Simmelkjeer  
Sigmund Tobias
The Department of Secondary Education offers graduate programs leading to New York State initial and professional certification in adolescent education (7-12) in the following areas: English, Mathematics, Sciences, and Social Studies; and K-12 in Art and Music. There are middle school programs (5-9) in Mathematics and Science.

Initial certification programs are available at the graduate level for students with a baccalaureate in their teaching subject area. At the graduate level, students ordinarily enroll in an initial certification Master’s program; students already holding a Master’s degree in their subject area or with previous graduate work may enroll in the advanced certification program (initial).

Professional certification programs leading to a Master’s Degree are available to students who possess initial certification at the undergraduate level.

The City College offers the following master’s degrees and advanced certificates in Secondary Education:

**Master of Arts (M.A.)**
- Art Education K-12
- English Education
- Mathematics Education (Grades 7-12)
- Music Education (Grades 7-12)
- Science Education (Grades 7-12) – Biology, Chemistry, Earth Science, Physics
- Social Studies Education

**Master of Science in Education (M.S.Ed.)**
- Mathematics Education(Grades 5-9)
- Science Education (Grades 5-9) – Biology, Chemistry, Earth Science, Physics

### Advanced Certificate Programs for Baccalaureate Degree Holders

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| General Education Courses: 3-4 |
|---|---|
| 0000I: Introduction to Educational Research (2 cr.) 3  |
| 0100I: Independent Study and Research in Education (2 cr.) 3  |
| 0200I: Master’s Project (3 cr.) 3  |

**Total credits:** 38-39

### ENGLISH EDUCATION

The English Education Program serves both students who want to become high school English teachers and those students who are currently practicing educators interested in meaningful professional development. This graduate program encourages students to develop a breadth of knowledge and a specialization within the field.

Graduate students in English Education, English, or a related field have the three different teacher certification programs to choose from: Initial, Professional, and Advanced.

Undergraduate English majors in good standing can begin coursework toward a teaching credential during the senior year.

**Stream A—Initial Certification**

Graduate students with an undergraduate major in English, or a related field, complete 38 credits resulting in both New York State Initial Teacher Certification in Secondary English and a Master of Arts in Secondary English Education.

### ART EDUCATION (K-12)

**Required Courses:**

**Secondary Education**
- 0500A: Adolescent Learning and Development 3
- 0501A: Fieldwork: Adolescent Learning and Development 1
- 0601A: Fieldwork: Special Education, Second Language Acquisition and Literacy 1
- 1200E: Reading and Writing in Secondary School Subjects 3
- 1900G: Child Abuse and Health Education Seminar 0
- 4100E: Teaching Art in Secondary Schools 3
- 4200E: Problems of Teaching Art 3
- 0800G: Teaching Practicum in the Arts 3
- 4300F: Workshop in Art Education 3

Art
- 5300E: Special Projects I 3
- 6300E: Special Projects II 3

One course in art history selected under advisement 3

One studio course selected under advisement 3

One course in art history selected under advisement 3

One studio course selected under advisement 3

One course in art history selected under advisement 3

One studio course selected under advisement 3

One course in art history selected under advisement 3

One studio course selected under advisement 3
Required Courses:

Education
0500A: Adolescent Learning and Development 3
0501A: Field Work in Adolescent Learning and Development 1
0601A: Field Work in Issues for Secondary School Teachers 1
1100E: Methods of Teaching of English in Secondary Schools 3
1200E: Reading and Writing Instruction Across the Curriculum 3
0300E: Curriculum Development in Secondary School English 3
0600G: Teaching Practicum in Secondary Education 3
1900G: Child Abuse and Health Education Seminar 0
0200I: Master’s Project 3

English Education
1500E: Teaching Writing in Secondary Schools 3
English Education electives 6

English
English electives with advisor approval 6

Total credits: 38

Stream B–Professional Certification
Graduate students must complete 30 credits resulting in New York State Professional Teacher Certification and a Master of Arts in Secondary English Education.

Required Courses:

Education
1100E: Methods of Teaching English in Secondary Schools 3
1200E: Reading and Writing in Secondary Schools 3
0200I: Masters Project 3

English Education
1500E: Teaching Writing in Secondary Schools 3
English Education electives 6

English
English electives with advisor approval 6

Total credits: 30

MIDDLE SCHOOL
MATHEMATICS EDUCATION

Stream A–Initial Certification Program
The initial certification program in middle school mathematics is for graduate students who have completed 18 credit hours of mathematics and are interested in teaching mathematics in grades 5–9. This program provides a background in the study of education psychology, literacy, special education, teaching methodology, and curricular issues related to mathematics. It links mathematics content and pedagogy and provides the additional coursework in mathematics needed to meet New York State certification requirements. The program culminates with a master’s degree thesis or an equivalent project.

Required Courses:

0500A: Adolescent Learning and Development 3
0501A: Fieldwork in Adolescent Learning and Development 1

Total credits: 12

Stream C–Advanced Certification
Students with a Master of Arts degree in English, who want to prepare to teach secondary school English take 23 credits resulting in New York State Advanced Teacher Certification.

Required Courses:

0500A: Adolescent Learning and Development 3
0501A: Field Work in Adolescent Learning and Development 1
0601A: Field Work in Issues for Secondary School Teachers: Special Education, Second Language Acquisition and Literacy 1
1100E: Methods of Teaching English in Secondary Schools 3
1200E: Reading and Writing Across the Curriculum 3
1500E: Teaching Writing in Secondary Schools 3
0300E: Curriculum Development in Secondary School English 3
0600G: Teaching Practicum in Secondary Education 3

Choose three courses from the following in consultation with the advisor 9

Mathematics Education Courses
MATH 2700E: Teaching Corrective Mathematics (3 cr.)
MATH 6200E: Teaching and Problem Solving Strategies in Mathematics (3 cr.)
MATH 6800E: Teaching Mathematics Using Graphing Utilities (3 cr.)

Algebra Courses
MATH 2600E: Linear Algebra (3 cr.)
MATH 2900E: Theory of Equations (3 cr.)
MATH 7700E: Modern Algebra (3 cr.)

Geometry Courses
MATH 0400E: Foundations of Geometry (3 cr.)
MATH 0800E: Transformational Geometry (3 cr.)
MATH 1100E: Advanced Euclidean Geometry (3 cr.)

Discrete Mathematics Courses
MATH 0700E: Introduction to Discrete Mathematics (3 cr.)
MATH 2200E: Mathematical Statistics (3 cr.)

Analysis Courses
MATH 0500E: Classic Applications of Calculus I (3 cr.)
MATH 0600E: Classic Applications of Calculus II (3 cr.)
MATH 2800E: Numerical Analysis (3 cr.)
MATH 7500E: Classic Applications of Advanced Calculus (3 cr.)
Topics
MATH 1000E: The History of Mathematics (3 cr.)
MATH 2700E: The Theory of Numbers (3 cr.)
MATH 3700E: Topology (3 cr.)
MATH 6500C: Mathematical Applications in Science and Industry (3 cr.)
MATH 3200F: Independent Study and Research in Mathematics (1-3 cr.)

Research: 3-4

0000I: Introduction to Educational Research (2 cr.)
0100I: Independent Study and Research in Mathematics (2 cr.)
or
0200I: Master’s Project (3 cr.)

Total Credits 42-43

Stream B—Professional Certificate Program
The professional certification program is for graduate students who have fulfilled the requirements for initial certification and who have completed 18 credit hours of mathematics. The students in this program enhance their prior study of mathematics by taking courses in areas not previously studied. In addition, they will complete courses that link the mathematical content and pedagogy of the middle school. The program culminates with a master’s degree thesis or an equivalent project.

Required Courses:
6100E: Teaching Mathematics in Middle and Secondary Schools 3
6400E: Curriculum and Instruction in Mathematics Education 3
0600G: Teaching Practicum in Secondary Education 3

Choose three of the following: 9
2700E: Teaching Corrective Mathematics 3
6200E: Teaching Problem Solving Strategies in Mathematics 3
6800E: Teaching Mathematics Using Graphic Utilities 3
MATH 4600C: Mathematics Foundations of Arithmetic 3
MATH 4700C: Introduction to Mathematical Thinking 3
MATH 4800C: Mathematics Foundations in Algebra and Arithmetic 3

Algebra Courses
MATH 2600E: Linear Algebra (3 cr.)
MATH 2900E: Theory of Equations (3 cr.)
MATH 7700E: Modern Algebra (3 cr.)

Geometry
MATH 0400E: Foundations of Geometry (3 cr.)
MATH 0800E: Transformational Geometry (3 cr.)
MATH 1100E: Advanced Euclidean Geometry (3 cr.)

Discrete Mathematics
MATH 0700E: Introduction to Discrete Mathematics (3 cr.)
MATH 2200E: Mathematical Statistics (3 cr.)

Analysis
MATH 0500E: Classic Applications of Calculus I (3 cr.)
MATH 0600E: Classic Applications of Calculus II (3 cr.)
MATH 2800E: Numerical Analysis (3 cr.)
MATH 7500E: Classic Applications of Advanced Calculus (3 cr.)

Topics
MATH 1000E: The History of Mathematics (3 cr.)
MATH 2700E: The Theory of Numbers (3 cr.)
MATH 3700E: Topology (3 cr.)
MATH 6500C: Mathematical Applications in Science and Industry (3 cr.)
MATH 3200F: Independent Study and Research in Mathematics (1-3 cr.)

Research 3-4

0000I: Introduction to Educational Research (2 cr.)
0100I: Independent Study and Research in Mathematics (2 cr.)
or
0200I: Master’s Project (3 cr.)

Total credits 39-40

SECONDARY MATHEMATICS EDUCATION

Stream A—Initial Certificate Program
The Initial Certification Program is for graduate students who have not taken education courses. This is a program to prepare students with an undergraduate math major to be secondary school mathematics teachers. It provides a broad background in the study of educational psychology, literacy, special education, teaching methodology and curricular issues related to mathematics; it links mathematical content and pedagogy; and it enhances the professional study of mathematics. The graduate program culminates with a master’s degree thesis or equivalent project.

Required Courses:
0500A: Adolescent Learning and Development 3
0501A: Field Work in Adolescent Learning and Development 1
0601A: Field Work in Issues for Secondary School Teachers 1
1200E: Reading and Writing Across the Curriculum 3
6100E: Teaching Mathematics in Secondary Schools 3
6400E: Curriculum and Instruction in Mathematics Education 3
0600G: Teaching Practicum in Secondary Education 3

Choose three of the following: 9
2700E: Teaching Corrective Mathematics (3 cr.)
6200E: Teaching Problem Solving Strategies in Mathematics (3 cr.)
6300E: Enriching the Teaching of Secondary School Mathematics (3 cr.)
6600E: Strategies for Using Computers in the Mathematics Class (3 cr.)
6800E: Teaching Mathematics Using Graphing Utilities (3 cr.)
6900E: The Teaching of Calculus (3 cr.)
MATH 1000E: History of Mathematics (3 cr.)
Two of the following, each chosen from a different area: 6

Algebra
MATH 2600E: Linear Algebra (3 cr.)
MATH 2900E: Theory of Equations (3 cr.)
MATH 7700E: Modern Algebra (3 cr.)

Geometry
MATH 0400E: Foundation of Geometry (3 cr.)
MATH 0800E: Transformation Geometry (3 cr.)
MATH 1100E: Advanced Euclidean Geometry (3 cr.)

Discrete Mathematics
MATH 0700E: Introduction to Discrete Mathematics (3 cr.)
MATH 2100E: Probability (3 cr.)
MATH 2200E: Mathematical Statistics (3 cr.)

Analysis
MATH 0500E: Classic Applications of Calculus I (3 cr.)
MATH 0600E: Classic Applications of Calculus II (3 cr.)
MATH 2800E: Numerical Analysis (3 cr.)
MATH 7500E: Classic Applications of Advanced Calculus (3 cr.)

Miscellaneous
MATH 2700E: Theory of Numbers (3 cr.)
MATH 3700E: Topology (3 cr.)
MATH 6500C: Mathematical Applications in Science & Industry (3 cr.)
MATH 3200F: Independent Study and Research in Mathematics (1-3 cr.)

Electives in Consultation with the advisor 9
One of the following options: 3-4
0000I: Introduction to Educational Research (2 cr.)
0100I: Independent Study and Research in Mathematics (2 cr.)
or
0200I: Master’s Project (3 cr.)

Total credits: 38-39

Stream B—Professional Certificate Program
The Professional Certification Program is for graduate students who have completed an undergraduate program preparing them to teach secondary school mathematics and are mutually certified. Students in this program enhance their prior study of mathematics by taking courses in areas not previously studied and more relevant to the secondary school mathematics curriculum. In addition, a wide range of courses linking mathematics content and pedagogy broadens their professional training. The program culminates with master’s degree thesis or an equivalent project.

Required Courses:
6400E: Curriculum and Instruction in Mathematics Education 3
Five of the following in consultation with the advisor: 15
2700E: Teaching Corrective Mathematics (3 cr.)
6200E: Teaching Problem Solving Strategies in Mathematics (3 cr.)
6300E: Enriching the Teaching of Secondary School Mathematics (3 cr.)
6600E: Strategies for Using Computers in the Mathematics Class (3 cr.)
6900E: The Teaching of Calculus (3 cr.)

Algebra
MATH 2600E: Linear Algebra (3 cr.)
MATH 2900E: Theory of Equations (3 cr.)
MATH 7700E: Modern Algebra (3 cr.)

Geometry
MATH 0400E: Foundation of Geometry (3 cr.)
MATH 0800E: Transformation Geometry (3 cr.)
MATH 1100E: Advanced Euclidean Geometry (3 cr.)

Discrete Mathematics
MATH 0700E: Introduction to Discrete Mathematics (3 cr.)
MATH 2100E: Probability (3 cr.)
MATH 2200E: Mathematical Statistics (3 cr.)

Analysis
MATH 0500E: Classic Applications of Calculus I (3 cr.)
MATH 0600E: Classic Applications of Calculus II (3 cr.)
MATH 2800E: Numerical Analysis (3 cr.)
MATH 7500E: Classic Applications of Advanced Calculus (3 cr.)

Miscellaneous
MATH 2700E: Theory of Numbers (3 cr.)

Electives in Consultation with the advisor 9
One of the following options: 3-4
0000I: Introduction to Educational Research (2 cr.)
0100I: Independent Study and Research in Mathematics (2 cr.)
or
0200I: Master’s Project (3 cr.)

Total credits: 30-31

Stream C—Advanced Certificate Program
The Advanced Certificate program is designed for students who already hold a master’s degree in mathematics and are interested in preparing for the teaching of mathematics in secondary schools. This program prepares potential secondary school mathematics teachers by giving them a broad background in the study of educational psychology, literacy, special education, teaching methodology and curricular issues related to mathematics.

Required Courses:
0500A: Adolescent Learning and Development 3
0501A: Field Work in Adolescent Learning and Development 1
0601A: Field Work in Issues for Secondary School Teachers: Special Education, Second Language Acquisition and Literacy 1
1200E: Reading and Writing Across the Curriculum 3
6100E: Teaching Mathematics in Middle and Secondary Schools 3
6400E: Curriculum Development in Secondary School Mathematics 3
0600G: Teaching Practicum in Secondary Education 3

Total credits: 20
MIDDLE SCHOOL SCIENCE EDUCATION

Stream A—Initial Certification Program

The Initial Certification Program in middle school science is for graduate students who are interested in teaching science in grades 5-9. This program provides a background in the study of education psychology, literacy, special education, teaching methodology, and curricular issues related to science. It links science content and pedagogy and provides the additional coursework in science needed to meet New York State certification requirements. The program culminates with a master’s degree thesis or an equivalent project.

**Required Courses:**
- 0500A: Adolescent Learning and Development 3
- 0501A: Fieldwork in Adolescent Learning and Development 1
- 0600A: Issues for Secondary School Teachers 3
- 0601A: Fieldwork in Issues for Secondary School Teachers 1
- 1201E: Literacy in Middle School 4
- 1500E: Teaching Science in Middle School 3
- 3900I: Curriculum and Instruction in Science 3
- 0600G: Teaching Practicum in Middle Level Education 3

Science electives, selected in consultation with a science education advisor 28

**Research**

*One of the following options:*
- 0200I: Master’s Project (3 cr.)
- 0000I: Introduction to Educational Research (2 cr.)

**Total Credits:** 52-53

Stream B—Professional Certificate Program

For graduate students who have completed an undergraduate major (or the equivalent) in biology, chemistry, earth science, or physics, plus already have initial certification, we offer a program leading to professional certification and a master’s degree in science education. This is a 30-31 credit program of courses in science and education.

**Required Courses:**
- 1200E: Reading and Writing Across the Curriculum 3
- 3100E: Teaching Science in Secondary Schools 3
- Nine graduate credits in science education plus six graduate credits in science 15
- Six additional graduate credits in science or education 6

**Research**

*One of the following options:*
- 0200I: Master’s Project (3 cr.)
- 0000I: Introduction to Educational Research (2 cr.)

**Total credits:** 30-31

Stream C—Advanced Certificate Program

For graduate students who have completed an undergraduate major (or the equivalent) in biology, chemistry, earth science, or physics, we offer an advanced certificate program leading to initial certification. This advanced cer-
The Initial Certification Program is for graduate students who have not taken education courses. This is a program that prepares students with either an undergraduate major in social science or history to teach social studies in the secondary school. Students majoring in a social science must have at least 21 hours in history, which should include six credit hours in World Civilization and six credit hours in American History. It provides a broad background in the study of educational psychology, literacy, special education, teaching methodology and curricular issues related to social studies; it links social studies content and pedagogy; and it enhances their professional study of social studies. The graduate program culminates with a master’s degree thesis or equivalent project.

Required Courses:
0500A: Adolescent Learning and Development 3
0501A: Field Work in Adolescent Learning and Development 1

0601A: Field Work in Issues for Secondary School Teachers 1
1200E: Reading and Writing Across the Curriculum 3
2100E: The Teaching of Social Studies in Secondary Schools 3
0600G: Teaching Practicum in Secondary Education 3
Graduate Courses offered in History, Economics, Political Science, Anthropology, Sociology with advisor’s approval 15

Research
One of the following: 3–4
02001: Master’s Project (3 cr.)
or
00001: Introduction to Educational Research (2 cr.)
01001: Individual Study in Educational Research (2 cr.)

Education content-pedagogy linked courses may be substituted for required liberal arts and social science courses with the advisor’s approval.

Total credits: 30–31

Stream C—Advanced Certificate Program
The Advanced Certificate program is designed for students who hold a master’s degree in history or a social science and are interested in preparing for the teaching of social studies in secondary schools. Social science majors should possess at least 21 credits hours in history, among them World Civilization and American History. This program prepares potential secondary school social studies teachers by giving them a broad background in the study of educational psychology, literacy, special education, teaching methodology and curricular issues related to social studies.

Required Courses:
0500A: Adolescent Learning and Development 3
0501A: Field Work in Adolescent Learning and Development 1
0601A: Field Work in Issues for Secondary School Teachers 1
1200E: Reading and Writing Across the Curriculum 3
2100E: The Teaching of Social Studies in Secondary Schools 3
Graduate courses in History, Economics, Political Science, Anthropology, Sociology with advisor’s approval 21

One of the following: 3–4
02001: Master’s project (3 cr.)
or
00001: Introduction to Educational Research (2 cr.)
01001: Individual Study in Educational Research (2 cr.)

Education content-pedagogy linked courses may be substituted for required liberal arts and social science courses with the advisor’s approval.

Total credits: 20
COURSE DESCRIPTIONS

Each of the following courses carries a designation of EDSE unless otherwise noted. The courses are arranged according to the last place letter.

0500A: Adolescent Learning and Development
The evolution of how theories and research on learning and development manifest themselves in urban settings for teachers of adolescents. Teacher-centered and student-centered, human and technology-based approaches, emphasizing those promoting independent, self-regulated adolescent learners. Theories, their cultural implications and their classroom applications: learning, intelligence, motivation, affect, parenting styles, classroom communications, and classroom management strategies. 3 HR./WK.; 3 CR.

0501A: Fieldwork in Adolescent Learning and Development
Structured fieldwork activities for students to implement in exemplary junior high and high school classrooms. The fieldwork component, in part, will be structured to meet State standards and to help prepare students to pass the ATS-W. Pre- or coreq: EDUC 0500a. 1 HR./WK.; 1 CR.

The nature of students with disabilities and health-care needs. Effects of disabilities on learning and behavior. Identifying strengths, individualizing instruction, and collaborating to prepare special-needs students for their highest levels of achievement, literacy and independence. Language acquisition and literacy development by native English speakers and English language learners. Developing listening, speaking, reading and writing. 3 HR./WK.; 3 CR.

0601A: Fieldwork in Issues for Secondary School Teachers
Forty-five hours of fieldwork related to the study of students with disabilities, students learning English as a second language, and literacy issues. Pre- or coreq: EDUC 0600A. 3 HR./WK.; 3 CR.

6400D: Educational Applications of Group Dynamics
Concepts and methods of group dynamics and social group work, and their application to school situations; use of group processes in meeting children’s needs for activity, socialization and emotional security; diagnostic and therapeutic implications. 3 HR./WK.; 3 CR.

0300E: Curriculum Development in Secondary School English
The variables, both societal and institutional, influencing the practice of high school English curriculum design. Topics include the psychology of writing, adolescent psychology and youth culture, popular culture, state mandates, the literary canon and the debates it raises. Students’ final project is a self-designed high school English curriculum informed by the semester’s inquiry. 3 HR./WK.; 3 CR.

1100E: Methods of Teaching English in Secondary Schools
This course explores the pedagogical theories, teaching practices, and curricular trends confronting English teachers in order to provide an understanding of the complex interactions between reading, writing, listening and speaking. The acquisition of methodological knowledge and the development of self-awareness are primary goals. How teaching methods affect what really happens in the classroom. 3 HR./WK.; 3 CR.

1200E: Reading and Writing Across the Curriculum
Explore how reading and writing can be modes of learning across the curriculum. Current research and theory will be discussed and methods of using reading and writing to learn will be developed. Not open to students who have completed EDUC 41200. 3 HR./WK.; 3 CR.

1201E: Middle School Literacy
This course will support candidates to learn how to: identify strengths of literacy learners in content classrooms; individualize instruction based on these assessments; and assess textual difficulty and guide students to develop reading and writing strategies and study skills. 4 HR./WK.; 4 CR.

1301E: Negotiating Curriculum Standards, Children’s Inquiries, and Appropriate
Multicultural materials for 5th to 12th Grade Examination of New York State English Language Arts and Content Area Standards for Grades 5-12; integration of literacy and content area curriculum development; and use of appropriate multicultural materials. 20 hours required fieldwork designing, activating and evaluating integrated curriculum. 3 HR./WK., PLUS 20 HR. FIELDWORK; 3 CR.

1400E: Oral and Written Communication in the Language Arts Program
The principles of linguistics viewed as the study of forms of communication. Their application to the development of oral and written modes of communication. 3 HR./WK.; 3 CR.

1500E: Teaching Writing in Secondary Schools
Students taking this course will write as a way to engage in the best practices of writing instruction while reflecting on this practice by examining the theoretical lens that informs its use. 3 HR./WK.; 3 CR.

2100E: Teaching Social Studies in Secondary Schools
Lesson planning, classroom management, co-operative learning, questioning, remediation, enrichment, motivation, homework, testing and assessment, reading, writing and note taking in social studies. Problem solving, the secondary school curriculum, technology, methodology for students with special needs, learning English as a second language, literacy in the social studies classroom. 3 HR./WK., PLUS 10 HR. FIELDWORK; 3 CR.

2200E: Study and Teaching of History
Designed for teachers of advanced placement courses in secondary schools. Examination of relevant source materials and examples of historical scholarship, with particular attention to their use in teaching superior students. 3 HR./WK.; 3 CR.

Examination of selected social studies projects and application of their methods and materials to students’ present teaching situations. Open only to matriculants or by special permission. 3 HR./WK.; 3 CR.

2700E: Practicum in Problems in Teaching Corrective Mathematics in the Secondary School
This course aims to correlate classroom teaching with methods and materials of corrective math. Teachers will research the area of math phobia, study corrective and preventative teaching algebra and geometry, learn to identify common error patterns and to correct them. 3 HR./WK.; 3 CR.

3100E: Teaching Science in Secondary Schools
Lesson planning, classroom management, cooperative learning, questioning, remediation, enrichment, motivation, homework, testing and assessment, reading, writing and note taking in science. Problem solving, the secondary school curriculum, technology, methodology for students with special needs, learning English as a second language, literacy in the science classroom. 3 HR./WK., PLUS 10 HR. FIELDWORK; 3 CR.
4200E: Problems in Teaching Art
Seminar and practicum in current problems in theory and practice of teaching art pre-K to 12. 3 HR./WK., PLUS 10 HR. FIELDWORK; 3 CR.

6100E: Teaching Mathematics in Middle and Secondary Schools
Lesson planning, classroom management, cooperative learning, questioning, remediation, enrichment, motivation, homework, testing and assessment, reading, writing and note taking in mathematics. Problem solving, the middle and secondary school curriculum, technology, methodology for students with special needs, learning English as a second language, literacy in the mathematics classroom. 3 HR./WK., 3 CR.

6200E: Teaching Problem Solving Strategies in Mathematics
This course is designed to expose and train mathematics teachers to a wide range of problem-solving strategies applicable to all parts of the secondary school curriculum. The goal of the course is to enable teachers to integrate this knowledge into the existing mathematics classroom. 3 HR./WK.; 3 CR.

6300E: Enriching the Teaching of Secondary School Mathematics
How the teaching of secondary school mathematics can be enriched by presenting non-traditional topics. Methods of implementation as well as source material to be provided. 3 HR./WK.; 3 CR.

6400E: Curriculum and Instruction in Mathematics Education
Theory of curriculum development, alternatives in teaching laboratory programmed instruction, multimedia materials and procedures, learning theories designed to help the teacher develop criteria and knowledge for implementing curriculum in schools. 3 HR./WK.; 3 CR.

6600E: Strategies for Using Computers in the Mathematics Classroom
Curriculum strategies and materials for introducing computer programming in the secondary school curriculum. Activities involve various levels of skills and techniques to solve mathematics problems using the computer. 3 HR./WK.; 3 CR.

6800E: Teaching Mathematics Using Graphing Utilities
This course is designed to familiarize students with the latest in graphing calculator technology and software, which can be used to improve the understanding of mathematical concepts. Applications of this technology for all secondary school levels will be explored. The goal of the course is to enable students to get a better understanding of mathematical concepts with the aid of the newest technology. 3 HR./WK.; 3 CR.

6900E: The Teaching of Calculus
The aim of this course is to provide in-service and prospective mathematics teachers with deeper insight into elementary differential and integral calculus concepts. Since the use of graphing calculators is a vital part of the Advanced Placement program, how to use them to teach calculus is emphasized. 3 HR./WK.; 3 CR.

4300F: Workshop in Art Education
Designed to assist art teachers in meeting selected problems growing out of elementary and secondary teaching of art, or in consulting or supervisory efforts to enhance the subject. Specific needs of students are considered in planning the coursework. 3 HR./WK.; 3 CR.

0600G: Teaching Practicum in Secondary Education
Students will be assigned under supervision to a secondary school as part-time teachers, 15 hours a week. Hours subject to regulations currently in force in the school system. Open only to matriculants. Advance approval required. Equivalent to 6 semester hours of undergraduate student teaching for 225 clock hours minimum. 3 CR.

0800G: Teaching Practicum in the Arts
Students teaching at the pre-K to 6 and 7 to 12 levels with a minimum of 20 days, 100 hours, in each setting. Accompanying seminar focuses on the practicum experience, reflecting on it in relation to the teacher preparation program. 1 HR./WK. PLUS MINIMUM OF 200 HOURS STUDENT TEACHING; 3 CR.

1900G: Child Abuse and Health Education Seminar
Definitions, indicators, and the impact of abuse and neglect on the child; reporting abuse. Health, safety, fire prevention and drug education. Coreq: 1900G. 2 HR./WK.; 0 CR.

0000: Introduction to Educational Research
The first semester of the research sequence covers the basic concepts needed to evaluate research critically and plan it effectively. Each student will identify a problem in his or her area, review the literature related to that problem, and design a project to study the problem. The study will be carried out during the second semester. This course should be taken no later than the semester prior to the one in which the student expects to complete the requirements for the degree. 2 HR./WK.; 2 CR.

0100: Individual Study in Educational Research
Second semester of research sequence. Consideration of the research design, sampling, instrumentation, data collection, statistical or qualitative data presentation. Students will execute the study developed during the first semester and prepare a written report, in research form, of the complete study. Prereq.: Educ 00001. 2 HR./WK.; 2 CR.

0200F: Master's Project
The objective of this course is to have students do a critical analysis of their evolving understanding of learning and teaching, and how these views influence what occurs in their own classrooms. This critical analysis will be the basis for their own extended written piece, which will serve as the culminating experience of the program. 3 HR./WK.; 3 CR.

3900: Curriculum and Instruction in Science Education
A course designed to discuss present curriculum trends in science education from a local, state-wide and national level with emphasis on the National Standards in Science and the process of selecting and evaluating curricular materials in science. 3 HR./WK.; 3 CR.

Anthropology

ANTH 2000E: Developmental Patterns in Different Cultures
Childrearing, training patterns. Cross-cultural comparisons. Effect of early training and later training on classroom behavior. 3 HR./WK.; 3 CR.

Art (Education students only)

ART 0000C: History of Design
Historical and cultural influences and technical developments in the design of objects for use. Art and Art Education majors require advisor’s permission. 3 HR./WK.; 3 CR.

ART 1000E: Contemporary Art Criticism
Problems of description, analysis, interpretation, and evaluation of the art object as an aesthetic and cultural phenomenon. Perceptual patterns of aesthetic response and their relationships to education. 2 HR./WK. PLUS GALLERY VISITS; 2 CR.

ART 1000F: Ceramics
Clay modeling and ceramics; pottery forms produced by pinch, slab and coil methods; glazing use of the kiln. 3 HR./WK.; 3 CR.
**ART 1000G: Ceramics: Advanced**
Design workshop, including use of potter's wheel, casting and glazing. 3 HR./WK.; 3 CR.

**ART 1100G: Design in Metal: Advanced Workshop**
Techniques and practices in creative design in a variety of metals. 3 HR./WK.; 3 CR.

**ART 1200G: Design in Wood: Advanced Workshop**
Design workshop in furniture. 3 HR./WK.; 3 CR.

**ART 1300F: Design in Wood and Metal**
Craft methods and processes; experiences with hand tools and power equipment. 3 HR./WK.; 3 CR.

**ART 1400G: Compositional Aspects of Photography**
Fundamental phases of photography, advancing to the art of enlarging, cropping, dodging, burning and composing; all the means by which a story-telling photograph is created. 3 HR./WK.; 3 CR.

**ART 1500G: Costume Design**
Principles and practices of costume design, including a survey of periods and periods and styles. Prereq.: special permission. 3 HR./WK.; 3 CR.

**ART 4100F: Advanced Design**
Design workshop in decorative and applied arts; techniques and practices of the craftsman designer. Open to majors in Industrial and Fine Arts. 3 HR./WK.; 3 CR.

**ART 5100F: Painting Mediums I**
Study and preparation of colors, medium, and grounds for painting in oils and emulsions. Prereq.: 6 credits in painting. Coreq: Art 6100F. 3 HR./WK.; 3 CR.

**ART 5200F: Painting Mediums II**
Study and preparation of colors for water and emulsion medium: egg tempera, gouache, distemper, caselin, fresco and transparent color. Preparation of paper and grounds. Prereq.: 6 credits in painting; coreq: Art 6200F. 3 HR./WK.; 3 CR.

**ART 5300C: New York as an Art Center**
Study of the development of the arts, their integration into the pattern of metropolitan culture. 3 HR./WK.; 3 CR.

**ART 5300E: Special Projects I**
Designed to give students the opportunity to pursue their specific interests in developing their art and teaching art K to 12. Students are required to design, execute and document their projects as well as present them in class. 3 HR./WK.; 3 CR.

**ART 6100E: Techniques of Oil Painting: Advanced**
Prereq.: Art 5100E. 30 hr., plus conf. 3 HR./WK.; 3 CR.

**ART 6100F: Painting Techniques I**
Methods of painting in transparent body color and related water mediums. Coreq: Art 5200F. 3 HR./WK.; 3 CR.

**ART 6200E: Water Color, Advanced**
Prereq.: Art 5200E. 3 HR./WK.; 3 CR.

**ART 6300E: Special Projects II**
Course is designed to give students the opportunity to pursue their specific interests in developing their art and teaching art K to 12. Students are required to design, execute and document their projects as well as present them in class. Art 5300E is prerequisite. 3 HR./WK.; 3 CR.

**ART A6501: Early Modern Art in Europe and the U.S.**
The development of early modern art styles in France, Germany, Italy, Russia and the U.S. including Fauvism, Cubism, Futurism, Constructivism, Expressionism, Dada, and Surrealism. 3 HR./WK.; 3 CR.

**ART A6603: Meso-American Art**
A survey of sculpture, architecture, the town plan, and crafts in selected pre-European cultures of the Caribbean Basin, the Andes, and Meso-America. 3 HR./WK.; 3 CR.

**ART B0100: Projects in Drawing I**
Investigation of various drawing media and techniques for the purpose of enlarging the student's conceptual scope and professional skills. 3 HR./WK.; 3 CR.

**ART B0200: Projects in Drawing II**
Investigation of various drawing media and techniques for the purpose of enlarging the student's conceptual scope and professional skills. 3 HR./WK.; 3 CR.

**ART B1101: Projects in Painting I**
Intensive work under faculty supervision. 3 HR./WK.; 3 CR.

**ART B1102: Projects in Painting II**
Intensive work under faculty supervision. 3 HR./WK.; 3 CR.

**ART B1801: Projects in Ceramic Design I**
Intensive work under faculty supervision. 3 HR./WK.; 3 CR.

**ART B1802: Projects in Ceramic Design II**
Intensive work under faculty supervision. 3 HR./WK.; 3 CR.

**ART B2301: Projects in Printmaking**
Intensive work under faculty supervision. 3 HR./WK.; 3 CR.

**BIO 0100E: Modern Concepts in Biology I**
A seminar designed for majors in science education to explore developments and their applications. Topics include physiology, endocrinology and pathology. 3 HR./WK.; 3 CR.

**BIO 0200E: Modern Concepts in Biology II**
A seminar designed for majors in science education to explore recent developments in biology and their applications. Topics include genetic engineering, evolution and marine study. May be taken independently of Bio 0100E. 3 HR./WK.; 3 CR.

**BIO 0500E: The Biological Foundations of Social Behavior**
To broaden the student’s understanding if the nature of social behavior by a comparative study of such behavior in animals and humans. An analysis of both neural and endocrine systems of vertebrates will be undertaken. 3 HR./WK.; 3 CR.

**BIO 0600E: Experimental Studies of Social Behavior in Animals**
Analysis of experimental studies of the role of physiological and experimental factors in the development of social behavioral responses in animals. May be taken independently of Bio 0500E. 3 HR./WK.; 3 CR.

**BIO 1500E: Field Biology**
Study of local plants and animals, their environmental relationships, and the use of the resources of the out-of-doors in teaching science in New York City. 4 HR./WK.; 4 CR.

**BIO 1600E: Environmental Field Studies**
Study of the biotechnosphere of the Greater New York area; included are field visits, sampling, laboratory analysis and research. Open to those teaching environmental sciences at the elementary or secondary level. 3 HR./WK.; 3 CR.

**BIO 1900E: Environmental Conservation**
Contribution of modern ecological knowledge to local, national and international problems of conservation of natural resources. Field visits are included. 3 HR./WK.; 3 CR.

**BIO 2000E: Genetics**
A study of the mechanisms of heredity, both Mendelian and modern, with application to plant and animal variation. 3 HR./WK.; 3 CR.
Chemistry (Education students only)

CHEM 0100E: Modern Concepts in Chemistry I
Chemistry approached from the basis of more recently developed theoretical concepts, with selected applications. Topics include biochemistry, physical chemistry. 3 HR./WK.; 3 CR.

CHEM 0200E: Modern Concepts in Chemistry II
A seminar designed for majors in science education to explore recent developments in chemistry and their application. Topics include chemical nutrition, industrial chemistry. Prereq.: One year of college chemistry. 3 HR./WK.; 3 CR.

CHEM 0600E: Principles of Physical Chemistry
Introduction of the basic principles and concepts of kinetic molecular theory, thermodynamics, solutions, solids and phase equilibria. 3 HR./WK.; 3 CR.

CHEM 0700E: Introduction to Modern Organic Chemistry
Introduction to the chemistry of compounds based upon the modern concepts of physical organic theory. Includes a presentation of major organic reactions and their application to synthesis. 3 HR./WK.; 3 CR.

CHEM 0800E: Elements of Biochemistry
Applications of chemical principles to the study of the living cell. Study of chemical compounds of biological importance and their metabolic interrelationships. Prereq.: Chem 0200E or one semester of organic chemistry. 3 HR./WK.; 3 CR.

CHEM 3200F: Independent Study and Research in Chemistry
Open to qualified graduate students in the School of Education interested in the study of special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. VARIABLE 1-3 CR./SEM. AND MAY BE REPEATED FOR A MAXIMUM OF SIX CREDITS.

Earth and Atmospheric Science

EAS 1500E: Meteorology
Principles of meteorology applied to weather analysis, and structure composition. Properties of the atmosphere with simple forecasting theory. Lab included. 3 HR./WK.; 3 CR.

EAS 1600E: Physical Climatology
Physical principles of climates of the past and present, the earth-sun relationships, heat transfer, and classification of climates. Statistical laboratory analysis of climate data. 4 HR./WK.; 4 CR.

EAS 1800E: Weather Prediction
Weather forecasting theory and practice; classical, objective, and long range methods. Weather control, numerical prediction, automatic weather station recording, radar, rocket and satellite meteorology. Prereq.: EAS 1500E. 3 HR./WK.; 3 CR.

EAS 3200F: Independent Study and Research in Earth and Atmospheric Science
Open to qualified graduate students in the School of Education interested in the study of special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. VARIABLE 1-3 CR./SEM. AND MAY BE REPEATED FOR A MAXIMUM OF SIX CREDITS.

EAS 5200E: Introduction to Meteorology
Principles and phenomena of weather and climate. Discussion of snow storms, hurricanes, rainbows, Ice Ages. Weather analysis and forecasting. 3 LECT., 3 LAB. HR./WK.; 4 CR.

EAS 6200E: The Ocean Environment
Explores oceans and ocean basins, submarine topography: properties of sea water; oceanographic instruments and research vessels. Water masses and currents; tides, waves and wave action: marine sediments. Lab/field trips included. 4 HR./WK.; 4 CR.

Economics

ECO 0200C: Modern Concepts in Economics
Designed for those teaching or preparing to teach high school economics. Only those analytical tools and refinements useful in high school teaching will be included. 3 HR./WK.; 3 CR.

ECO 0200D: Modern Concepts in Economics
Designed for those teaching or preparing to teach high school economics. Only those analytical tools and refinements useful in high school teaching will be included. 3 HR./WK.; 3 CR.

ECO 0300C: The Operation of the American Economy
Analysis of operation of the American economy and its efficiency, in the light of basic economic objectives. Designed for those with a limited background in economics or those who wish a review of essentials before taking further work in the field. 3 HR./WK.; 3 CR.

ECO 3200F: Independent Study and Research in Economics
Open to qualified graduate students in the School of Education interested in the study of special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. Variable 1-3 cr./sem. and may be repeated for a maximum of six credits.

ECO 6500C: Comparative Economic Systems
Principal types of economic organizations, i.e., liberal capitalism, the mixed systems, and authoritarian socialist systems. Critical examination of socioeconomic conceptions, theories and ideologies, blueprints, plans and typical problems. 3 HR./WK.; 3 CR.

English (Education Students Only)

ENGL 1100E: Creative Writing
One or more genres of creative writing, explored to develop the student's ability, learn about the process of teaching writing from the student's perspective, and develop
further critical insight into literature. 3 HR./WK.; 3 CR.

**ENGL 1200E: Fundamentals of English**
Intensive review of grammar, together with practice in writing. 3 HR./WK.; 3 CR.

**ENGL 1700C: The Technique of Poetry**
A close reading of poetic texts with emphasis on the effect of poetic technique on the reader and interpretation. 3 HR./WK.; 3 CR.

**ENGL 1800C: Criticism and Appreciation of Poetry**
Introduction of new critical devices which can be used in teaching poetry in the secondary schools. 3 HR./WK.; 3 CR.

**ENGL 4400E: Structure and Growth of the English Language**
Introductory course in philology; comparative study of English words and their use. 3 HR./WK.; 3 CR.

**ENGL 4500C: The Child and Adolescent in American Fiction**
The child as a major American literary theme. 3 HR./WK.; 3 CR.

**ENGL 4600C: The Adolescent in Literature**
The adolescent as a central figure in contemporary novels, biographies and plays, with emphasis on the literary treatment of adolescent problems. 3 HR./WK.; 3 CR.

**ENGL 6300C: The Modern Short Story**
Significant short stories of the twentieth century. 3 HR./WK.; 3 CR.

**ENGL 6500C: The Short Novel**
Analysis and explication of the novella in Western literature. 3 HR./WK.; 3 CR.

**History**

**HIST 0100F: Historical Method**
Evaluation of primary and secondary sources, with emphasis on internal criticism. A survey of American historiography. 3 HR./WK.; 3 CR.

**HIST 0500E: President and Congress**
The nature of executive and legislative power in American national government, with particular focus upon the constitution al bases, politics, and contemporary operation of the elective branches. 3 HR./WK.; 3 CR.

**HIST 1200C: Early America, 1492 to 1776**
Social and cultural development from 1492 to 1776. 3 CR.

**HIST 1700C: The Renaissance**
Social and cultural development from the 14th to the early 16th centuries. 3 HR./WK.; 3 CR.

**HIST 1800C: European Social and Cultural History, 1789 to 1919**
A survey of political, social and ideological currents during the age of emerging and maturing capitalism from the Industrial Revolution to World War I. 3 HR./WK.; 3 CR.

**HIST 1900C: Recent European Social and Cultural History**
A survey of social and cultural life in its political and economic contexts in the 20th century. 3 HR./WK.; 3 CR.

**HIST 3200F: Independent Study and Research in History**
Open to qualified graduate students in the School of Education interested in the study of special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. VARIABLE 1-3 CR./SEM. AND MAY BE REPEATED FOR A MAXIMUM OF SIX CREDITS.

**HIST 3400C: American Social and Cultural History to 1865**
Institutional and structural developments in social and cultural life, including the family, religion, ethnic patterns, recreation, working conditions and ideologies from the earliest settlements to the emerging capitalism of the 19th century. 3 HR./WK.; 3 CR.

**HIST 3400E: The United States in World Affairs**
The evolution of United States foreign policy and relations from colonial dealings with native Americans to military, economic and political involvement on a global scale. 3 HR./WK.; 3 CR.

**HIST 3500C: American Social and Cultural History Since 1865**
Concentrates on urbanization, industrialization, the new immigration, and the emergence of the modern corporate state. 3 HR./WK.; 3 CR.

**HIST 3500E: Problems in American History, 1900 to Present**
Traces the development of the American people since 1890. Analysis of factors, domestic and foreign, that led to the emergence of the United States as a world power. 3 HR./WK.; 3 CR.

**HIST 3600E: Ethnic Patterns and the Old Immigration in American History**
Immigration and ethnic interchange from the relations between Africans, the English, and native Americans in the 17th century through the Irish migration of the 19th century. Emphasis will be on cultural adaptations to and retentions in America. 3 HR./WK.; 3 CR.

**HIST 3700E: Ethnic Patterns and the New Immigration in American History**
Ethnic cultures and migratory movements, including the northward migration of Blacks, since the 1870s. Topics will include the similarities and differences among ethnic experiences in America, cultural adaptations to and retentions in a rapidly industrializing society. 3 HR./WK.; 3 CR.

**HIST 3900C: Modern Latin America**
History, politics and culture of Hispanic America; colonial and Indian background fused through independence movements into the history of modern Latin America. 3 HR./WK.; 3 CR.

**HIST 6000E: History of China and Japan**
Survey of development of Chinese and Japanese civilizations from ancient times to the 17th century. Emphasis on political and social institutions and culture. 3 HR./WK.; 3 CR.

**HIST 6100E: The Modern Far East**
Development of China and Japan from the 17th century to present; contact and conflict of occidental and oriental civilization: influence of Europe and America. 3 HR./WK.; 3 CR.

**HIST 6900C: African-American History to 1865**
The history of African-Americans in the United States, including West African backgrounds, a comparative study of hemispheric slavery, early Black institutional life, and efforts to resist slavery. 3 HR./WK.; 3 CR.

**HIST 7000C: African-American History since 1865**
Beginning with Reconstruction, African-American political, economic, cultural and ideological evolution will be traced to the present. 3 HR./WK.; 3 CR.

**HIST 80100: Historical Methods and Historiography**
Focus on the rise of social history in contemporary historiography. Approaches to the subject include the contributions of the British Marxists, the French Annales school, social-scientific historians, and women’s historians. Readings will cover United States, Latin America, Africa, Asia and Europe. 3 HR./WK.; 3 CR.

**Mathematics**

**MATH 4600C: Introduction to Mathematical Thinking**
This course discusses mathematical thinking and methods for theorem proving. It includes truth tables, basic set theory, equivalence relations and functions, mathematical induction and other techniques for discussing and proving mathematical statements. Material to be proven will be drawn primarily from basic number theory and elementary combinatorics. This course may be required of students with insufficient background in abstract mathematics. 3 HR./WK.; 3 CR.
MATH 4700C: Mathematical Foundations in Arithmetic
Survey of mathematical concepts and processes that underlie the curriculum in arithmetic of the elementary and junior high schools. Senior high school mathematics teachers may not take this course for graduate credit without permission of the mathematics advisor. 3 HR./WK.; 3 CR.

MATH 4800C: Mathematical Foundations in Algebra and Geometry
Continuation of Math 4700C. Further study of the theory of numbers, equations, inequalities, proof in a mathematical system, metric and non-metric geometry, topics in topology, probability and statistics. Senior high school mathematics teachers may not take this course for graduate credit without permission of the mathematics advisor. 3 HR./WK.; 3 CR.

MATH 6500C: Mathematical Applications in Science and Industry
Mathematics in contemporary science and industry, as illustrated in representative examples ranging through the mathematical subjects taught in secondary schools, but including other mathematics as well. Introduction to mathematics underlying instrumentation in science and technology. 3 HR./WK.; 3 CR.

MATH 0400E: Foundations of Geometry
The basic concepts of Euclidean Geometry and the underpinnings of non-Euclidean Geometry. 3 HR./WK.; 3 CR.

MATH 0500E: Classic Applications of Calculus I
Development of prediction techniques using various physical models developed by Newton, Leibniz and their successors. Models using one variable differential and integral calculus will be described and used to make predictions. Applications will be taken from fields of population growth, electrical circuits, interest rates, planetary motions and others. 3 HR./WK.; 3 CR.

MATH 0600E: Classic Applications of Calculus II
Further applications will be taken from fields of population growth, electrical circuits, interest rates, planetary motions and others. 3 HR./WK.; 3 CR.

MATH 0700E: Introduction to Discrete Mathematics
This course offers an introduction to the field of discrete mathematics beginning with review of number systems and set theory, functions and counting, and continuing with a review of vectors and matrices, Boolean algebra, algorithms and their efficiency. Other topics included graphs, bipartite graphs and matching problems, digraphs, networks, and flows, and appropriate related applications in discrete mathematics. 3 HR./WK.; 3 CR.

MATH 0800E: Transformational Geometry
The study of geometric transformation groups in the complex plane including similarities, isometries, translations, rotations, dilations. Applications of cosets and normal subgroups, invariants. 3 HR./WK.; 3 CR.

MATH 1000E: The History of Mathematics
Historical evaluation of mathematical concepts. Selected topics related to elementary geometry and algebra, analytic geometry and calculus, and the modern postulational viewpoint. 3 HR./WK.; 3 CR.

MATH 1100E: Advanced Euclidean Geometry
Extensions and generalization of elementary geometry; higher geometry of triangles, circles, quadrilaterals; constructions, classical problems. 3 HR./WK.; 3 CR.

MATH 1200E: Fundamental Concepts of Modern Mathematics
Limit, length, area, volume (non-limit/limit developments). Euler’s Theorem and consequences, angle-sum formulae (De-Gua) and generalization, isomorphic subdivisions. Pythagorean Theorem and Special Relativity. Combinational concepts. Foundations, axiomatics, proof-theory. 3 HR./WK.; 3 CR.

MATH 1900E: Mathematical Computer Software
Survey of mathematical computer software. Using Geometer’s Sketchpad to learn advanced geometry theorems. Sample programming problems drawn from scientific and mathematical applications. 3 HR./WK.; 3 CR.

MATH 2100E: Probability
Finite sample spaces; probability as set function; permutations, combinations, conditional probability and Bayes’s Theorem; independent events; random variables and distribution functions; expected values; Chebyshév’s inequality. 3 HR./WK.; 3 CR.

MATH 2200E: Mathematical Statistics
Frequency histograms, measures of location and dispersion, correlation and least squares, testing hypotheses, confidence intervals and estimation. Prereq.: a course in probability. 3 HR./WK.; 3 CR.

MATH 2600E: Linear Algebra
Vector spaces, matrices, systems of linear equations, determinants, linear transformations. 3 HR./WK.; 3 CR.

MATH 2700E: Theory of Numbers
A study of problems concerning numbers as well as properties of numbers. Included are: divisibility, continued fractions, diophantine equations, primes, congruences. Fermat’s and Euler’s Theorems, quadratic residues and reciprocity, number theoretic functions. 3 HR./WK.; 3 CR.

MATH 2800E: Numerical Analysis
Solution of algebraic equations by iteration interpolation; numerical integration; solution of ordinary differential equations. Prereq.: one year of calculus. 3 HR./WK.; 3 CR.

MATH 2900E: Topics in Higher Algebra
Topics include: polynomials and their properties, solution of third and fourth degree equations by formula and approximation, impossibility of solving equations of fifth degree or higher, real and complex roots of nth degree equations; other fundamental concepts of elementary algebra from an advanced standpoint. 3 HR./WK.; 3 CR.

MATH 3000F-3203F: Independent Study and Research in Mathematics
Open to qualified graduate students in the School of Education interested in the study of special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. VARIABLE 1-3 CR./SEM.; MAY BE REPEATED FOR A MAXIMUM OF SIX CREDITS.

MATH 3700E: Topology
Examples and classifications of surfaces; metric and topological spaces. 3 HR./WK.; 3 CR.

MATH 7700E: Modern Algebra
Sets, mappings, equivalence relations, operations, rings, integral domains, isomorphisms. Mathematical induction fields and groups. 3 HR./WK.; 3 CR.

MATH 7800E: Modern Algebra
Sets, mappings, equivalence relations, operations, rings, integral domains, isomorphisms. Mathematical induction fields and groups. 3 HR./WK.; 3 CR.

Physics (Education students only)

PHYS 0100E: Modern Concepts in Physics I
A seminar designed for majors in science education to explore recent developments in physics and their application. Topics include: plasma physics, sound and light. Prereq.: one year of college physics. 3 HR./WK.; 3 CR.
PHYS 0200E: Modern Concepts in Physics II
A seminar designed for majors in science education to explore recent developments in Physics and their application. Topics include: black hole phenomena, space physics, mechanics. Prereq.: One year of college physics. 3 HR./WK.; 3 CR.

PHYS 0300E: Introduction to Astronomy
Designed to introduce science educators to the universe, solar system and galaxy. Topics include quasars, pulsars, black holes. 3 HR./WK.; 3 CR.

PHYS 1401E: Development of Knowledge in Physics I
Selected topics in physics with emphasis on gaining a depth of understanding of the subject matter and an awareness of the development of skills essential to the scientific process. Background for teaching science in secondary schools or introductory college level. Integrated laboratory/discussion format. 3 HR./WK.; 3 CR.

PHYS 1402E: Development of Knowledge in Physics II
Selected topics in physics with emphasis on gaining a depth of understanding of the subject matter and an awareness of the development of skills essential to the scientific process. Background for teaching science in secondary schools or introductory college level. Integrated laboratory/discussion format. Prereq. PHYS 1401E. 3 HR./WK.; 3 CR.

PHYS 3200F: Independent Study and Research in Physics
Open to qualified graduate students in the School of Education interested in the study of special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. 3 HR./WK.; 3 CR.

PSC 0200E: President and Congress
The nature of executive and legislative power in American national government, with particular focus upon constitutional bases, politics, and contemporary operation of the elective branches. 3 HR./WK.; 3 CR.

PSC 0800C: American Political Thought
Development of political ideas in the United States, with particular relation to the forces and events that have influenced liberal and conservative theory. 3 HR./WK.; 3 CR.

PSC 1600C: Political Parties
Political parties in relation to the electoral process, pressure politics and democratic theory. Emphasis will be given to both the theory and dynamics of party politics. 3 HR./WK.; 3 CR.

PSC 3200F: Independent Study and Research in Political Science
Open to qualified graduate students in the School of Education interested in the study of special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. VARIABLE 1-3 CR./SEM. AND MAY BE REPEATED FOR A MAXIMUM OF SIX CREDITS.

PSC 5200C: The Governments of the New York Area
Government and administration of the central city and suburban communities. Emergence of regional forms of metropolitan government (e.g., the Port Authority) and of metropolitan planning as a means of metropolitan integration. Relation of local to state authority. 3 HR./WK.; 3 CR.

Science
SCI 0300E: Laboratory and Demonstration Techniques in the Biological Sciences
Designed to introduce educators to the various laboratory activities, materials and equipment used to demonstrate biological concepts. Construction and use of materials will be undertaken. 3 HR./WK.; 3 CR.

SCI 0400E: Laboratory and Demonstration Techniques in the Physical Sciences
Designed to introduce educators to the various laboratory activities, materials and equipment used to demonstrate physical science concepts. Construction and use of materials will be undertaken. 3 HR./WK.; 3 CR.

SCI 1300E: Introduction to Chemistry
Designed to bring together principles and applications of basic chemistry. Topics include inorganic, organic and physical chemistry. 30 HR., PLUS CONF. 3 HR./WK.; 3 CR.

SCI 1600E: Introduction to Physics
Designed to bring together principles and applications of basic physics. Topics include mechanics, electricity, sound, light and nuclear physics. 3 HR./WK.; 3 CR.

SCI 1700E: Environmental Energetics
A study of physical principles of energy; present and future national and international energy resources and the development of an energy policy. Topics include fusion, geothermal, solar, wind, tide and fossil fuels. 3 HR./WK.; 3 CR.

SCI 2100E: Introduction to Botany
A study of the structure and function, diversity and ecology of green and non-green plants. 3 HR./WK.; 3 CR.

SCI 2200E: Introduction to Zoology
A study of the structure and function, diversity and ecology of invertebrate and vertebrate animals. 3 HR./WK.; 3 CR.

SCI 2300E: Introduction to Microbiology
A study of the structure and function, diversity and ecology of bacteria, viruses and micro-organisms. 3 HR./WK.; 3 CR.

SCI 3100E: Aerospace Science
Introduction to aerospace science, including aerodynamics, instruments and systems, meteorology, basic navigation, radio navigation and communication and rocket/missile fundamentals. 3 HR./WK.; 3 CR.

SCI 4101E: Life Science for Middle School Teachers I
This course will cover general and specific aspects of cell biology, molecular biology, and genetics. It will also cover the approaches for studying cells and genes and how genetic and cellular processes relate to physiological processes in organisms. Students will study the chemical components of the cell, such as proteins, nucleic acids, lipids, etc. The course will facilitate life science teachers’ understanding of the principles and techniques of both biochemistry and genetics. 4 HR./WK.; 4 CR.
SCI 4102E: Life Science for Middle School Teachers II
The purpose of this course is to provide graduate students (who have had little undergraduate preparation in biology) with a solid conceptual grounding in ecology and evolutionary biology (EEB) in one semester. The content coverage of the course provides both empirical study and theoretical exploration of topics that are considered central to the life sciences (according to the National Science Education Standards). These topics include organismal biology, ecology, and evolution. 4 HR./WK.; 4 CR.

SCI 4103E: Life Science for Middle School Teachers III
This course will cover four topics relating to the nature of science: (1) the philosophy of science; (2) the social and economic context of science; (3) the history of science; and (4) scientific epistemology in teaching and learning. 3 HR./WK.; 3 CR.

SCI 3200F: Independent Study and Research in Science
Open to qualified graduate students in the School of Education interested in the study of special problems. Hours to be arranged. Requires sponsorship by an appropriate faculty member and approval of the Advisory Committee. May be taken for one, two, or three credits per semester, and may be repeated for a maximum of six credits. 3 HR./WK.; 3 CR.

SCI 6100F: Seminar in Environmental Sciences
A seminar in which current environmental issues affecting humans, technology and environment are discussed. Topics include population issues, pesticides, energy, wildlife conservation and natural resources. Prereq.: a course in ecology or conservation or permission of the instructor. 3 HR./WK.; 3 CR.

SCI 6200F: Salt Marsh Ecology
An on-site study of the energetics, diversity and structure of salt marshes in the Greater New York area. Field visits to marshes included. 1 HR./WK.; 1 CR.

SCI 6300F: Molecular Biology
The basic concepts at the cellular and molecular levels of living organisms including metabolism, structure, genetic continuity and response mechanisms. Prereq.: an introductory course in biology or permission of the instructor. 3 HR./WK.; 3 CR.

Sociology

SOC 2100C: Marriage and the Family
Marriage and the family as social institutions. Changing family forms in Western civilization. Demographic trends and family size. The modern family and its relation to the total society. Marriage and divorce. Given jointly with the Graduate Liberal Arts Program in Sociology. 3 HR./WK.; 3 CR.

SOC 3200F: Independent Study and Research in Sociology
Offered each semester in the evening. 3 HR./WK.; 3 CR.

SOC 5100C: The Metropolitan Community
Study of the metropolitan community as a whole, central city and suburbs. Class structure of the city and its satellites. Neighborhoods in the metropolis. 3 HR./WK.; 3 CR.

SOC 5200C: The People of the City of New York
The source and growth of the population, and population trends in the past and present. Composition of the population in terms of orthodox sociological variables. Marital status and family size. Immigration and outmigration. Vertical and horizontal mobility. The city as magnet and center of population. Demographic factors and future problems. 3 HR./WK.; 3 CR.

SOC 6400E: Educational Applications of Group Dynamics
Concepts and methods of group dynamics and social group work, and their application to school situations’ use of group process in meeting children’s needs for activity, socialization and emotional security; diagnostic and therapeutic implications. 3 HR./WK.; 3 CR.

Spanish

SPAN 0200E: Contemporary Spanish Literature
Surveys the novel, drama, poetry and short story in twentieth century Spain, especially works of major authors studied in secondary schools. Intended for teachers of foreign languages. Conducted in Spanish. 3 HR./WK.; 3 CR.

SPAN 0300E: Contemporary Spanish-American Literature
Study of the principal novelists, playwrights, poets and short-story writers currently read in secondary schools, to provide a broader understanding of 20th century Spanish-America. Conducted in Spanish. 3 HR./WK.; 3 CR.

SPAN 0400E: Hispanic Literature for High School Students
Analysis of selected literary works suitable for high school classes, with emphasis on teaching literary techniques and methods. Conducted in Spanish. 3 HR./WK.; 3 CR.
FACULTY

Tanya Manning, Assistant Professor
B.A. Rutgers Univ.; M.A., SUNY (Albany), Ph.D.

Ross Nehm, Assistant Professor
B.A., Univ. of Wisconsin, Madison; M.Ed., Teachers College, Columbia Univ.; Ph.D., Univ. of California, Berkeley

Alfred S. Posamentier, Professor and Dean
A.B., Hunter College; M.A., The City College; Ph.D., Fordham Univ.

Andrew Ratner, Assistant Professor
B.A. (Semiotics/Art), Brown Univ.; M.A., Teachers College, Columbia Univ.

Elizabeth Rorschach, Associate Professor
B.A., Carleton College; M.A., Columbia Univ.; Ph.D., New York Univ.

Michael Salwen, Assistant Professor
B.A., Hunter College; M.A., CUNY, Ph.D.

Susan Semel, Professor and Chair
A.B., Wheaton College; M.A., Teachers College, Columbia Univ., Ed.D.

Beverly Smith, Assistant Professor
B.S., SUNY (Plattsburg); M.A., Teachers College, Columbia Univ.; M.S., Union College; Ph.D., Clarkson Univ.; Ed.D., Teachers College, Columbia Univ.

Richard N. Steinberg, Professor
B.S., SUNY Binghampton; M.S., Yale Univ., Ph.D.

Despina A. Stylianou, Assistant Professor
B.S., Boston University, M.Ed.; M.A., Mathematics, Univ. of Pittsburgh; Ed.D., Univ. of Pittsburgh

Lynn Tarlow, Assistant Professor
B.S., Brooklyn College; M.S., Fordham University; Ed.D., Rutgers University

Susan Weil, Assistant Professor
B.A., Hamline Univ.; M.A.T., Trenton State College; Ph.D., New York Univ.

PROFESSORS EMERITI

Bernard Bernstein
Augustine Brezina
George R. Keane
Robert Lento
Joel Mansbach
Martin Marin
James R. McDermott
Harold J. McKenna
Julius Pastor
Anne S. Peskin
Howard Sasson
School of Engineering
Graduate courses are offered in engineering and computer science. Master’s and doctoral degrees are awarded for satisfactory completion of approved work in these disciplines.

In addition, the School of Engineering offers twelve credit (4 course) programs leading to Advanced Certificates in Special Topics in Civil and Electrical Engineering as well as Engineering Management.

To offer more latitude to the industry-oriented engineer, the engineering departments have enlarged their curriculum with a number of applied engineering courses. The resulting Professional Master’s programs lead to the M.E. degree, and are available to students who enter with a B.E. or a B.S. degree from an accredited engineering curriculum.*

Qualified students with other B.S. degrees will be awarded M.S. (Engineering) degrees upon completion of 30 credits of approved work.

The doctoral programs in the engineering disciplines and in computer science are administered by The Graduate School and University Center of The City University of New York (CUNY), with the course work, advising, and most of the research carried out at City College. Thus, the School of Engineering provides programs that start from the freshman level and continue on to the highest academic levels, with entry possible at many points in the curriculum, utilizing transfer credits or degrees earned at other institutions.

David B. Steinman Hall (coded T on maps) is the primary engineering building. Visit or write the Graduate Office, School of Engineering, T-152, for information and necessary forms. Additional information is also available on bulletin boards located in Steinman Hall and on our website: http://www.ccny.cuny.edu

The Associate Dean for Graduate Studies, Professor M. K. Kassir, T-152, is responsible for the administration of the master’s programs in Biomedical, Chemical, Civil, Electrical, and Mechanical Engineering as well as in Computer Science.

The Executive Officer for the Ph.D. programs in Biomedical, Chemical, Civil, Electrical and Mechanical Engineering is also Professor M. K. Kassir, T-152. The Executive Officer of the Ph.D. program in Computer Science is Professor T. Brown, who is located at the CUNY Graduate Center.

For information regarding the Advanced Certificate in Special Topics contact Dr. Edward Camp, T-137.

The School of Engineering is an institutional member of the American Society for Engineering Education. It participates in the Society’s Engineering College Administrative Council and in its Engineering College Research Council. The College reserves the right to change curricular requirements subject to fiscal and/or resource constraints. Inquire at the Graduate Office for specific information on current requirements.

* Some courses taken for the Professional Master’s degree may not be transferable to the Ph.D. degree.

**ACCRREDITATION**

All undergraduate engineering curricula leading to the baccalaureate degree are fully accredited by the Accreditation Board for Engineering and Technology (ABET). The undergraduate curricula leading to the bachelor’s degree in engineering are registered by the N.Y. State Department of Education as meeting educational requirements for eligibility to take the Fundamentals of Engineering Examination. The graduate curricula leading to the master’s degree in engineering are registered by the N.Y. State Department of Education as meeting educational requirements which serve as the equivalent of one year of engineering experience for eligibility to take the examination for the license of Professional Engineer in the State of New York. The City College as a whole is also accredited by the N.Y. State Department of Education and by the Middle States Association of Colleges and Secondary Schools.

**GRADUATE DEGREES OFFERED**

**Master of Engineering (M.E.)**
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Mechanical Engineering

**Master of Science (M.S.)**
- Biomedical Engineering
- Computer Science
- Engineering

**Advanced Certificate in Special Topics**
- Civil Engineering
- Electrical Engineering
- Engineering Management

**Doctor of Philosophy (through the Graduate Center) (Ph.D.)**
- Biomedical Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Mechanical Engineering
- Computer Science
THE MASTER'S PROGRAM

The programs of course offerings at the master's level fill three vital current needs:

1. to provide qualified graduates of accredited undergraduate engineering and computer science programs with an opportunity to continue their professional training at an advanced level;
2. to allow engineers and computer scientists currently employed in industry to enhance their professional training by bringing to them the latest developments in theory, and their applications to industrial practice;
3. to provide graduate students working toward the doctorate and a career in research with a firm grounding in the theoretical foundations necessary for such work.

GRADUATE DEGREES IN ENGINEERING

Requirements for Enrollment in Graduate Courses

a. Graduate courses are open to everyone who, in the opinion of the Associate Dean for Graduate Studies and the department concerned, is qualified by education and experience to benefit from them. Where specific courses are listed as prerequisites, equivalent knowledge or experience may be accepted instead. In general, any applicant for admission to the engineering program should possess a minimum qualification a degree of Bachelor of Engineering or the equivalent. Applicants for the computer science programs should possess a Bachelor of Arts or Science degree with a major in computer science.

b. In exceptional cases where a transcript of the applicant's college record is required but is not immediately available, admission may be granted contingent upon subsequent evaluation of the transcript.

c. It should be clearly understood that admission to graduate courses is not equivalent to matriculation for a master's degree, nor does it carry with it any presumption of subsequent matriculation.

d. An applicant whose record is satisfactory but who has specific background deficiencies may be admitted as a matriculated student with conditions. These conditions must be met at the earliest possible time. Students may then apply for matriculation if they have a satisfactory academic average of B or better.

e. An applicant whose record is unsatisfactory or who does not desire a degree, but who wishes credit for one or more courses may, by permission of the Associate Dean for Graduate Studies, enroll as a non-matriculated (non-degree) student. Non-matriculated students may not enroll for more than six credits in one semester. Except for those students who already have a master's degree in their field of study, non-matriculated students may not complete more than 15 graduate credits. All students must maintain at least a B average. Non-matriculated students may apply for matriculation if they complete all entrance deficiencies and complete nine graduate credits in an approved planned program with an average of B or better. It is therefore necessary that students who are interested in applying for matriculation meet with a departmental advisor to devise a planned program.

f. Applicants interested only in specific courses of special interest to practicing engineers may also be admitted as a special student or may enroll in the Advanced Certificates in Special Topics program.

g. An applicant who does not desire credit for graduate courses may be enrolled as an auditor. Enrollment as an auditor must be approved by the Chair of the department or his or her authorized representatives. The decision to enroll as an auditor must be made at the time the applicant registers. Auditors will not be required to take any examinations, and the amount of problem work, reports, and other formal preparation they may do is discretionary. No quality grade will be awarded for audited courses and a grade of AUD will be assigned. Audited courses cannot be used for credit. An auditor will pay the same fees as a non-degree student.

h. Students who have taken graduate work at other institutions may receive up to six transfer credits (nine with the approval of the Committee on Course and Standing) provided that the material is equivalent to a graduate course taught at the College and that it was completed with a grade of B or better within a five-year period preceding matriculation at The City College.

Registration for any course in the graduate program may be permitted only with the specific approval of the department concerned.

Requirements for Matriculation for the Master's Degree

Application for matriculation for the master's degree shall be made to the Dean of the School of Engineering and shall be accompanied by an official transcript from the college awarding the Bachelor's degree. For matriculation, the undergraduate record shall be in an accredited scholastic curriculum or in one acceptable to the Chair of the department concerned. The applicant's scholastic record must show a minimum average of B in the undergraduate field of specialization and an overall undergraduate minimum average of B minus. Applicants are required to take the Graduate Record Examination (verbal, quantitative and analytical sections). Evidence of ability to profit from graduate work, as documented by faculty recommendations, is also required. Official transcripts of graduate work completed at other institutions, if any, are also required and will be evaluated. All international students with baccalaureate degrees from non-English speaking countries must submit a TOEFL score to be considered for admission. At present, a minimum paper score of 500 or computer-based score of 173 is required for admission.

Requirements for the Master's Degree

Each candidate for a master's degree must complete at least 30 credits as approved by the department and the Dean. Some students may be required to complete satisfactorily more than 30 credits because of a lack of specific courses or inadequate preparation in a particular area of study. No course may
be credited toward a degree unless specifically approved for that purpose. It is expected that graduate students will maintain a high scholastic standing. Irregularity in attendance or failure to maintain satisfactory scholastic standing will be sufficient grounds for asking a student to withdraw. Satisfactory scholastic standing will be interpreted to mean at least a B average. For graduate work the following grades will be assigned.

A, B, C  passing grades (includes + and − grades)
P  passing, with credit (for graduate seminars or non-credit report)
AUD  auditor, no credit
F  failure
W  resignation without penalty (Not assigned by instructor. Registrar assigns this grade with Dean’s approval and recommendation of instructor.)
WU  failure due to excessive absences
INC  incomplete (temporary grade)
ABS  absent from final exam (temporary grade)
SP  satisfactory progress in thesis (temporary grade)
FIN  F due to unresolved INC
FAB  F due to unresolved ABS

If a student is absent from the final examination (whether oral or written) in any course, a special examination may be granted only by the engineering faculty Committee on Course and Standing, and normally is granted by that committee only upon the submission of written evidence showing that the student was physically unable to be present at the stated examination. Such application is to be made directly following the absence, and the special examination must be taken in the Fall term by October 15th and in the Spring term by March 15th. The grade ABS shall automatically become FAB if not removed by the time of reexamination following the date the ABS was received. An INC will become an FIN if the work is not completed by six weeks into the second semester following the INC grade. These grades are treated the same as F.

The grade of SP, when assigned for a research course, shall stand until the research is completed to the satisfaction of the department concerned and a grade assigned.

The master’s candidate must complete the required course work within a period of five years from the date of admission.

The department Chair will appoint departmental graduate advisors who will make recommendations for the courses to be taken for the degree. These recommendations will be subject to the approval of the department Chair and the Dean of the School of Engineering or their appointed representatives. Students will be required to complete one of the following non-course options within the approved program for the degree:

1. a master’s thesis carrying six credits;*
2. a project carrying three credits;**
3. a report carrying no credit;**
4. a seminar carrying one credit.**
   * generally reserved for Ph.D. preparation.
   ** for Professional Master’s degree.

Thesis and project credits will be counted towards the 30-credit degree requirement. The seminar credit may be counted towards the 30-credit degree.

The master’s thesis, project or report must be completed before the scheduled final examination week so that a proper grade may be assigned at the end of the final examination period. Respective departments may prescribe these options in greater detail as a part of their respective degree requirements.

Any student working toward a master’s degree must be matriculated for the last 12 credits toward the degree. Effective current academic rules, requirements and procedures governing transfer credits, program adjustments, and course grade corrections will be available from the School of Engineering Graduate Office, T-152.

In addition, regulations governing certification of full-time status, leaves of absence, readmission, and en-route master’s degrees are described elsewhere in this bulletin.

If a student expects to be graduated at the end of a given term, he/she must file an “Application for Degree” at the Registrar’s office on or before the date set for this purpose during the given term.

Programs
Qualified students may complete the requirements for the master’s degree in the following departments:

Biomedical Engineering
Chemical Engineering
Civil Engineering
Computer Science
Electrical Engineering
Mechanical Engineering

Graduate Citation
Master’s graduates who have attained a GPA of 3.75 or better for the required 30 credits (taken at City University) will receive the School of Engineering Graduate Citation.

ADVANCED CERTIFICATES IN SPECIAL TOPICS

The School of Engineering offers 12 credit (4 course) programs leading to Advanced Certificates in Special Topics in Civil, and Electrical Engineering as well as Engineering Management. These programs are organized for degree practicing engineers who may be entering disciplines requiring knowledge beyond their previous education, and for which they wish to prepare in a short time. They also make it possible to keep abreast of the latest advances in engineering to gain recognition for it without a lengthy commitment to a traditional graduate program. Acceptable undergraduate preparation is, of course, required to enter the program.

An Advanced Certificate in Special Topics is awarded by the School of Engineering on satisfactory completion of the course work (minimum GPA of 3.00). In most cases, students completing an advanced certificate program in a department are eligible to enter the master’s program in that
department as matriculated students and apply the twelve (12) certificate credits towards a Master’s degree.* Students with undergraduate degrees in fields different than those of their certificate may be required to make up any undergraduate courses they are lacking on a non-credit basis.

* With the permission of the department, a maximum of 6 credits of the Advanced Certificate in Special Topics in the Engineering Management program may be applied towards a Professional Master’s degree in the engineering discipline.

Each department offers a variety of such programs (for details see individual departmental sections):

**Civil Engineering**
A. Structures  
B. Environmental Engineering  
C. Water Resources  
D. Transportation Planning  
E. Traffic Engineering  
F. Highway Engineering  
G. Transportation Network Analysis

**Electrical Engineering**
A. Computer Engineering  
B. Systems Engineering  
C. Telecommunications Engineering  
D. Photonics Engineering

**School of Engineering**
Engineering Management

The School of Engineering offers an Advanced Certificate in Special Topics in Engineering Management to make it possible for the practicing engineer to acquire fundamental business skills and managerial knowledge.

*Choose any four of the following:*
ENGR F3800: Management Concepts for Engineers  
ENGR F9300: Economics and Investment Analysis of Engineering Projects  
ENGR G7600: Engineering Law  
ENGR G8500: Project Management  
ENGR G9400: Telecommunications Management  
ENGR I8000: Decision and Planning Techniques for Engineering Management

With the approval of the advisor and the Dean, students may substitute CE H0200 (Transportation Economics) and CE I2400 (Analytical Techniques in Transportation) for ENGR F9300 and ENGR I8000, respectively.

**Requirements for Admission to the Advanced Certificate in Special Topics Programs**

The requirements for admission to the Advanced Certificate in Special Topics programs are similar to those for matriculation for the Professional Master’s degree. Application for the program shall be made to the Dean of Engineering by way of the City College Graduate Studies Application, indicating the field of study and the specific certificate desired. The application shall be accompanied by an official transcript from the college awarding the bachelor’s degree. The undergraduate record shall be from an accredited scholastic curriculum in the appropriate field. For unconditional admission, the applicant’s scholastic record must show a minimum average of “B” in the undergraduate field of specialization and an overall undergraduate minimum average of “B-“.

All international students with baccalaureate degrees from non-English speaking countries must submit a TOEFL score of at least 500, if paper based, and of 173, if computer based, to be considered.

**Time for Completion of Advanced Certificate Work**

While subject to enrollment, it is expected that a sufficient number of classes will be offered each term so that the certificate work can be completed in one year.

**Advanced Certificate in Special Topics for Master’s Students**

If a student who was originally accepted for a Professional Master’s degree program has to interrupt his/her studies after having taken the right combination of courses, he/she is eligible to receive the associated Advanced Certificate. In addition, some Professional Master’s students may opt for obtaining such a certificate as an intermediate credential in their major field, or as an additional credential in a related field.

**THE DOCTOR OF PHILOSOPHY DEGREE**

The degree is offered under the authority of The Graduate School and University Center of The City University of New York. For admission forms and further information, consult with or write to the Executive Officer, Ph.D. Program in Engineering, Graduate Office, School of Engineering T-152, The City College, New York, N.Y. 10031. Additional information is available at www.gc.cuny.edu/engineering

**Requirements for Admission to the Ph.D. Programs**

a. A bachelor’s degree from a college or university of accredited standing in a branch of engineering, or a closely related area, appropriate to the applicant’s intended field of study.

b. An academic record demonstrating promise of superior performance in advanced study and research.

c. Adequate preparation in specific courses as may be required by the individual departments.

**Additional Requirements for the Ph.D.**

**Guidance and Program Planning**

1. Soon after being notified of admission, and preferably before registration, the student should arrange for an appointment with a departmental advisor. This can be done through the Graduate Engineering Office. This advisor will help the student plan an approved sequence of courses.

2. Soon after completing 30 credits, or soon after admission with this level of work, a student must obtain the consent of a faculty member to act as his or her research mentor and must then request the Dean to assign a guidance committee. The student’s planned program of courses and research program must be submitted to the guidance committee for approval.

**Residence Requirements**

The student is required to be in residence for the equivalent of six full-time semesters. The possession of a master’s degree from an accredited institution, or the completion of graduate work equivalent to the master’s
degree may, by approval of the Executive Officer, reduce the residence requirement to the equivalent of four semesters. At least two consecutive semesters must be in full-time residence.

Approval of Research
Prior to undertaking a research program, the student must request approval from his or her guidance committee.

University Requirements
The student will be required to comply with the University “Requirements for Admission and for Graduate Degrees” as printed in the bulletin of The Graduate College of The City University of New York. It is also helpful to consult the Graduate School Student Handbook. These requirements include the following:

1. A student may continue in a doctoral program in The City University after he or she has completed 45 credits only if he or she has passed a First Examination in the area of specialization with a grade of excellence or high pass.
2. Satisfactory completion of 60 credits of approved graduate work, of which at least 30 must be taken at The City University.
3. Completion of the course requirements in the field of specialization.
4. Satisfactory completion of a Second Examination of at least two hours’ duration usually taken after the completion of course requirements. The student may be admitted to the second examination only upon the recommendation of a mentor.
5. The student shall demonstrate proficiency in those research tools considered appropriate by the faculty in the field of specialization.
6. Satisfactory completion, not later than eight years after matriculation, of a dissertation which embodies original research. For a student who is matriculated after the completion of at least 30 credits of acceptable work, this time will be reduced to seven years.
7. The dissertation will be defended at an oral final examination.

Course Designations
Courses are listed under the School of Engineering Departments of Biomedical, Chemical, Civil, Electrical and Mechanical Engineering, and Computer Science. Courses with a departmental designation will usually be taught by a member of that department and the class will usually consist of students associated with that department. Courses with the designation “Engineering” are expected to be of interest to more than one of the conventional branches and are listed both in the following group and by departments. The instructor may be drawn from among the several departments and the students may comprise a group associated with several departments.

F0000 series: Advanced senior-first year graduate courses. No more than two such courses may generally be credited toward a graduate degree. Three courses are allowed in Electrical Engineering.

G0000 series: Special or experimental courses offered a limited number of times prior to approval by the faculty for inclusion in one of the series below.

H0000 series: Courses in terminal programs generally credited only toward a master’s degree after approval by the student’s advisor and the department.

J0000 series: Master’s and doctoral courses.

K0000 series: Advanced courses. Note: The five-digit courses occasionally referred to as prerequisites are undergraduate courses in the School of Engineering. Full descriptions of these may be found in the Undergraduate Bulletin of The City College.

ENGINEERING GRADUATE COURSES
The courses in Engineering (designated ENGR) may be taken in any of the engineering master’s curricula. With approval of the Department and the Dean, these courses may be offered for the degree in lieu of the equivalent number of credits in the student’s major field of study.

G0000: Selected Topics in Engineering
Advanced topics in engineering chosen for their current interest to graduate students. Prereq: departmental approval. 3 HR./WK.; 3 CR.

I0000: Seminars
Recent developments in engineering. The students report on assigned subjects. Prereq: departmental approval. CREDIT VARIES.

I0600: Applied Algebra
The fundamentals of topics from algebra that are important in system theory, control theory, network theory and computer science. The topics include set theory, rings, groups, finite-dimensional vector spaces, matrices, Boolean algebra and linear graphs. Prereq: Math 39200. 3 HR./WK.; 3 CR.

I0800: Foundations of Fluid Mechanics I
Extensive physical background; introduction to basic theorems and concepts. Application of vector calculus and tensor analysis to inviscid and viscous steady and unsteady flow. Navier-Stokes equations and Prandtl boundary layer theory; application to incompressible fluid motions. Prereq: ME 25600 or ChE 34200 or CE 35000. 3 HR./WK.; 3 CR.

I0900: Foundations of Fluid Mechanics II
General theory of compressible, steady and unsteady flows, theory of characteristics. Linear and nonlinear wave propagation. Hypersonic flow. Prereq: ENGR I0800. 3 HR./WK.; 3 CR.

I1100: Introduction to Engineering Analysis

I1200: Functions of a Complex Variable

I1300: Transform Methods in Engineering
**I1400: Applied Partial Differential Equations**


**I1500: Introduction to Numerical Methods**


**I1600: Advanced Numerical Analysis**


**I1700: Finite Element Methods in Engineering**

Equilibrium and variational formulations of finite element methods. Plane, axisymmetric, and shell elements. Isoparametric elements. Static and transient response of structures. Applications in potential flow, electrostatic, thermal conduction field problems, and diffusion equations. Students are expected to use available work stations. Prereq: Math 39200, CE I5400, or home department advisor’s approval. 3 HR./WK.; 3 CR.


Introduction to probability theory. Random processes: ergodic, stationary and non-stationary processes. Autocorrelation and cross-correlation functions, power and cross spectra, correlation coefficients. Input-output relationships for linear and nonlinear oscillators. Discrete and continuous systems. Zero-crossing and up-crossing problem. Stochastic characteristics of maximum response. Applications to vibrations, earthquake and wind engineering. Prereqs.: ENGR I1100 and CE 59802 or ME 54200 or equivalent. 3 HR./WK.; 3 CR.

**I2400: Turbulent Flows**

Origins of turbulence and the qualitative features of turbulent flow. Prandtl’s mixing length theory, von Karman’s similarity hypothesis, and entrainment theories. Calculations of the behavior of free turbulent flows, including jets, wakes and plumes. Calculations of bounded turbulent flows, including pipe flow and boundary layers. Turbulent dispersion and diffusion. Prereq: ME 25600 or ChE 34100. 3 HR./WK.; 3 CR.

**I3200: Statistical Thermodynamics**

An introduction to equilibrium statistical mechanics; ensembles, partition function, relation to classical thermodynamics. Evaluation of thermodynamic and transport properties of dense gases and liquids from molecular theory. Prereq: ChE I2800 or ME I3300. 3 HR./WK.; 3 CR.

**I4200: Continuum Mechanics**

Continuum kinematics, formulation of physical principles in the continuum context, the formulation of constitutive equations, the theories of elastic solids, viscous fluids and viscoelastic solids. At the end of the course there will be an emphasis on either deformable porous media or finite deformation elasticity, depending on student interest. Prerequisites: Basic undergraduate courses in Mechanics of Materials, Fluid Mechanics and Linear Algebra (including vector field theory). 3 HR./WK.; 3 CR.

**I5200: Behavior of Inelastic Bodies and Structures**

Linear theory of viscoelasticity with applications to vibrations and buckling. Introduction to the theory of plasticity. Physical basis, yield conditions. Perfectly plastic and strain hardening materials. Drucker’s postulates, flow rule. Upper and lower bound theorems. Applications to torsion, indentation and plate theory. Numerical solutions. Prereq: CE I3500. 3 HR./WK.; 3 CR.

**I6400: Wave Propagation in Fluids and Solids**

Hyperbolic and dispersive, linear and nonlinear waves. Hyperbolic waves: the wave equation, stationary waves, breaking waves, shock waves. Dispersive waves: dispersion relations, group and phase velocities. Nonlinear waves and chaos in wave fields. Application to (1) water waves, (2) stress waves in solids (dilation and distortion waves, Rayleigh waves). Prereq: ENGR I1100 or equivalent. 3 HR./WK.; 3 CR.

**I9100: Mass Transfer**

Definitions of concentrations, velocities and mass fluxes. Conservation of species equation; multicomponent diffusion; Stefan-Maxwell equations. Transient diffusion in semi-infinite media. Definition of transfer coefficients with mass addition. Application of film, penetration and boundary layer theory. Diffusion with homogeneous and heterogeneous chemical reaction. Interphase transport. Prereq: ENGR I0800. 3 HR./WK.; 3 CR.

**J0100: Fluid Dynamic Stability**


**J3100: Irreversible Thermodynamics**


**J4000: Perturbation Techniques**

The application of perturbation methods in the solution of solid mechanics, fluid mechanics and heat transfer problems. Formulation of the mathematical techniques in perturbation theory. Topics include: regular and singular problems, the method of strained coordinates, and matched asymptotic expansions. Applications to viscous flow at low and high Reynolds numbers, mechanical vibrations, and celestial mechanics problems. Prereqs.: ENGR I1100 and ENGR I0800. 3 HR./WK.; 3 CR.

**J5000: Theory of Elasticity**

SPECIAL TOPICS
IN ENGINEERING
MANAGEMENT

F3800: Management Concepts for Engineers
An analysis of the basic concepts of planning, leading, controlling and organizing in a high technology environment is presented. Topics include: developing team based organizations, improving communications and interpersonal relations, engineering ethics, decision-making techniques, handling conflicts and effective time management, motivating workforces and developing leadership style. 3 HR./WK.; 3 CR.

F9300: Economics and Investment Analysis of Engineering Projects
The practical aspects of economic analysis of engineering projects and their salient investment features. It includes relevant aspects of basic engineering economics and factors affecting project investment decisions. Value of money, present worth and rate of return concepts will be examined. Use of these concepts in project decisions and consideration of alternatives will be discussed. Examples will be taken from state-of-the-art electrical engineering industries. 3 HR./WK.; 3 CR.

G7600: Engineering and Business Law
Environmental law (E.L.) and Contract law (C.L.) are major components. The E.L. portion deals with salient features, particularly important to engineers, of the Clean Air Act, the Clean Water Act and the Resource Conservation and Recovery Act. The C.L. portion deals with engineers’ liabilities, contracts and breaches thereof, bids, bonds, subcontracts, assignments, extra work disputes and arbitration. 3 HR./WK.; 3 CR.

G8500: Project Management
The practical aspects of total engineering project management are discussed and a functional approach for present and future project managers to assure project performance is presented. The course emphasizes the key role of project managers to assure project completion on time and within cost and quality requirements. Techniques of project planning, budgeting, contracting and control are emphasized. 3 HR./WK.; 3 CR.

G9400: Telecommunications Management
Different aspects of the management of telecommunication networks, including network management functions, instruments and human resources. Topics include: the basic network management function, fault management, performance management, configuration management, security management, accounting and planning. In addition, there will be an overview of network management systems and products. Prereq: EE G6000/46000 or equivalent. 3 HR./WK.; 3 CR.

I8000: Decision and Planning Techniques for Engineering Management
Application of quantitative decision and planning tools to the problems of engineering management. Probability concepts. Decision making using probabilities. Inventory management and Just-In-Time tactics. Linear programming for optimal planning. Transportation and assignment problems. Job Shop scheduling. PERT/CPM and project management. Waiting lines. Statistical concepts with applications to quality control. Reliability analysis and maintenance strategy. 3 HR./WK.; 3 CR.
The City College offers the following master’s degree in Biomedical Engineering:

**M.S. (BME)**

**DEGREE REQUIREMENTS**

To obtain the M.S. degree in Biomedical Engineering a student must complete the 30-credit course program described below. The 30 credits of core and elective courses are in four areas: science, biomedical engineering, mathematics and traditional engineering. They are distributed as follows:

**Required Courses**

Four or five from the following: 12-15

- Biomedical Engineering:
  - I2000: Cell and Tissue Engineering
  - I2200: Cell and Tissue Transport
  - I3000: Neural Engineering and Applied Bioelectricity
  - I4200: Organ Transport and Pharmacokinetics
  - I5000: Medical Imaging and Image Processing
  - I5100: Biomedical Signal Processing
  - I5200: Biomedical Imaging and Image Processing
  - I7100: Biomedical Signal Processing
  - I7200: Cell and Tissue Mechanics
  - I7300: Cell and Tissue-Biomaterial Interactions
  - I7700: Microfluidic Devices in Biotechnology

- Chemical Engineering:
  - ChE G5300: Bioprocess Engineering: Principles and Applications

**Elective Courses:**

Three to five courses from the following: 9-15

- Traditional engineering electives (3-6 cr.)
- Mathematics electives from the following (3-6 cr.):
  - ENGR I1100: Introduction to Engineering Analysis
  - ENGR I1400: Applied Partial Differential Equations
  - ENGR I1500: Introduction to Numerical Methods
  - ENGR I1700: Finite Element Methods in Engineering
- Biomedical science electives (physiology, biophysics, molecular genetics, neurobiology, microbial biology, cell biology, biochemistry, protein structure and crystallography and medical physics.) related to a research effort. (3-6)

**Additional Requirements**

3-6

Students may complete a 6-credit thesis on a topic approved by the Biomedical Engineering Executive Committee. It is anticipated that the 6-credit thesis will report on research in biomedical engineering conducted at City College or at a local research hospital with affiliated faculty. In special circumstances, a student may replace the 6-credit thesis by a 3-credit report and an additional course.

**Total credits**

30

Note: with departmental approval, students may register for one 50000-level undergraduate course towards the master’s degree. These undergraduate courses will not be included in the calculation of the G.P.A.

**FACILITIES**

There are currently eight Biomedical Engineering research laboratories at City College. These facilities at CCNY are greatly amplified by the extensive laboratories at our hospital partners where many of our students do their experimental research.

**Cardiovascular Dynamics and Biomolecular Transport Laboratory**

The Wallace Coulter Laboratory for Cardiovascular Dynamics and Biomolecular Transport studies the role of fluid mechanics and transport processes in the physiological and pathophysiological functions of the cardiovascular system. One of our major efforts is to understand the influence of fluid dynamics in the initiation and progression of atherosclerosis, a degenerative disease of the large human arteries which leads to heart attacks and strokes. We are investigating the fluid mechanics of arteries and the response of arterial cells (endothelial and smooth muscle cells) to fluid mechanical forces using cell culture models in vitro and computer simulations. We were the first group to compute the fluid flow shear stresses on smooth muscle cells (SMC’s) induced by transmural flow and have subsequently exposed cultured SMC’s to similar stress environments in defined flow fields to determine their biomolecular responses.

In complementary research, we have pioneered in vitro studies of convection and diffusion of macromolecules across monolayers of endothelial cells which form the blood contacting surface of all blood vessels. We were the first group to clearly demonstrate that the transport properties of the
endothelial layer are very sensitive to their fluid mechanical environment and will respond to changes in fluid shear stress. Studies of the biomolecular mechanisms underlying these responses are in progress.

Microfluidic Devices Laboratory  
Our laboratory develops microfluidic devices that enable measurement, analysis, and imaging of both macromolecules and entire cells. Our devices have been used for DNA sequencing and fingerprinting, and have yielded increased resolution and read-length of DNA bases detected, as well as spurred the development of innovative high voltage injection protocols now widely implemented for optimized DNA separations. Imaging within our channels has also yielded data to physically describe the electrophoretic phenomenon of “stacking” and have produced a graphical model that enables manipulation of DNA stacking to optimize separations. Our laboratory researchers were recently awarded a grant from the Department of Defense to establish the infrastructure for the first Micro and Nanoscale Fabrication Facility on the CCNY campus. Via these critical pieces of manufacturing equipment, we have been developing microfluidic devices to facilitate in vitro studies of cellular chemotaxis, adhesion, proliferation, and changes in cell morphology needed during tissue repair. A newly-developed microfluidic device for these types of experimental testing is currently under review for a commercial patent in order to market the instrument to New York’s premier researchers in tissue repair. Our laboratory is currently adapting these microfluidic devices to foster the growth of micrometer-diameter cell-based structures with ligament-like properties for use in future surgical grafts of injured ligaments.

Neural Engineering Studies  
Neural Engineering includes the application of engineering principles to answer fundamental questions in neuroscience and to develop effective treatments for neurological disorders. Our neural engineering group at CCNY uses state-of-the-art techniques to analyze nervous system function at multiple levels including; single channel, single cell, tissue, whole animal, and human cognitive levels. Our research iteratively integrates insights gained from the experimental approach with computational modeling. In addition, clinical collaboration through the NYCBE consortium of hospitals provides a unique basis for translational research in these areas.

Tissue Mechanics Laboratory  
The focus of the Tissue Mechanics Laboratory is to understand the adaptive response of bone to altered mechanical loading, including bone’s mechanosensory system. A major focus of the lab is to investigate fluid flow in bone as a possible mechanism of mechanical signal transduction. The facility is also used to study the microstructure of bone tissue and relate it to the gross structure, material properties, and behavior of whole bones. Equipment in the laboratory includes a bone tissue lathe, diamond-blade saw, hard tissue microtome, freezer, microscopes, digital oscilloscope, CCD camera with copy stand, screw-driven uniaxial materials testing system, PCs, and an MTS Mini-Bionix servohydraulic materials testing system.

Biosensors and Biomaterials Laboratory  
This laboratory focuses on the design of novel biomaterials and biosensors from molecules of cellular origin. These molecules include nanostructured self-assembling proteins, membrane protein receptors, and thermostable phospholipids. In most cases the molecules are obtained from cell culture in a lab-scale bioreactor. Molecular engineering and bioconjugate chemistry approaches are applied to alter the properties of the parent molecules purified from cells. In some cases we are building in spectroscopic reporter groups so that the design process is both guided and monitored using biomolecular spectroscopy and surface analysis techniques. The main instrumentation in use in the laboratory are a bioreactor for cell culture and a time-resolved fluorescence microspectrometer for biomaterial imaging and spectroscopy. The lab is also fully equipped for protein purification, with an HPLC/FPLC setup and prep-scale 2D electrophoresis.

Laboratory for Cardiovascular Studies  
The focus of this laboratory is the study of the transport of water and macromolecules from the blood stream and the accumulation of the latter in the walls of arteries, veins and valve leaflets. The purpose is to understand the roles that vessel ultrastructure and conditions, e.g., transmural pressure and macromolecular concentration, play in these transport and accumulation processes and to correlate such early accumulation with vessel proclivity towards atherosclerosis. Such an understanding could in principle lead to patient-specific criteria for the choice of bypass vessel. The laboratory is equipped with facilities for animal experimentation. All embedding for electron and light microscopy is done in the lab, which has benches, a hood, an oven, a centrifuge and will soon have a fluorescence microscope with an oil immersion lens. The laboratory also has two Leitz dissecting microscopes, a physiological polygraph, working FT-IR spectrophotometers, and all standard small laboratory equipment.

COURSE DESCRIPTIONS

I2000: Cell and Tissue Engineering  
Application and design of cellular and biomaterial microstructures for use in biomedical engineering applications. This course begins with an introduction to the structure, function, and biosynthesis of cell surface macromolecules, followed by the discussion of current methods and applications in cell and tissue engineering. Topics include matrix molecules and their ligands, construction of biomimetic environments, biomaterials for tissue engineering, tissue engineering in bone and cartilage, and genetic approaches in cell and tissue engineering. Prereq: Undergraduate cell and molecular biology and biochemistry. 3 HR./WK.; 3 CR.

I2200: Cell and Tissue Transport  
The course will start with an analysis of water, solute, gas, and heat exchange in
the microcirculation and the relationship between structure and function. Active transport across membranes will be considered and applied to the kidney and secretory organs. Transport in biological porous media will be examined and applied to bone, cartilage, and arterial wall. An introduction to receptors and their role in transport, cell adhesion, and intracellular signaling will be presented. The course will conclude with student presentations on topics of current interest. Prereq: Undergraduate fluid mechanics or transport course. 3 HR./WK.; 3 CR.

I3000: Neural Engineering and Applied Bioelectricity
An overview of the field of neural engineering including neuronal biophysics, synaptic and non-synaptic communication, electrophysiological techniques, field potential and current source density analysis. The course introduces fundamentals of applied bioelectricity/electrical prosthetic (FES) including electric field-neuronal interactions and electrocution hazards. Prereq.: An undergraduate circuits course. 3 HR./WK.; 3 CR.

I4200: Organ Transport and Pharmacokinetics
Application of basic transport principles (conservation of mass and momentum equations) to major animal and human organ systems. Topics include mechanisms of regulation and homeostasis, anatomical, physiological, and pathological features of the cerebral, respiratory, renal, cutaneous and gastrointestinal systems. Basic concepts in pharmacokinetic analysis for drug administration are also discussed. Related and recent research articles will be discussed. Students will be guided to write up a proposal for their interested topics. Prereqs.: Undergraduate fluid mechanics or transport course. 3 HR./WK.; 3 CR.

I5000: Medical Imaging and Image Processing
This course introduces basic medical imaging methods such as computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET). Students will gain understanding in the basic physics of image acquisition and the algorithms required for image generation. Basic image enhancement, and image analysis will be presented in the context of X-ray imaging and microscopy. The course will include linear systems, random variables, and estimation theory. Students will gain hands-on experience in image processing through MATLAB programming in class and in assignments. Prereqs.: An undergraduate linear systems course and an undergraduate linear algebra course. 3 HR./WK.; 3 CR.

I5100: Biomedical Signal Processing
This course introduces two fundamental concepts of signal processing: linear systems and stochastic processes. Various estimation, detection and filtering methods are developed and demonstrated on biomedical signals. The methods include harmonic analysis, auto-regressive model, Wiener and Matched filters, linear discriminates, and independent components. All methods will be developed to answer concrete questions on specific data sets such as electro-cadiograms, eletro-encephalography, acoustic signals, or neural spike trains. The lectures will be accompanied by data analysis assignments using MATLAB. Prereqs: An undergraduate linear systems course and an undergraduate linear algebra course. 3 HR./WK.; 3 CR.

I7100: Cell and Tissue Mechanics
Mechanical properties of hard and soft tissue are presented with emphasis on the stress adaptive processes that enable cells to adapt the mechanical/structural properties of tissue in which they live to the environment they experience. Topics to be covered include whole body biomechanics, occupational and sports injury, impact biomechanics, and tissue level biomechanics. The biomechanics of implants and cell biomechanics will be described briefly and their interrelationship explored. The mechanical properties of tissues will be reviewed, with an emphasis on the structure-function relationship. The stress adaptive mechanisms of tissues will be noted, with special emphasis on the stress adaptation observed in bone (Wolff's law) and in the arterial wall (Murray's law). The structural properties of cells, including their strength, deformability, and adhesive properties, will be covered, as well as the adaptation of cell structural properties. Cell receptors and cell signaling mechanisms will be described. Prereq: Undergraduate strength of materials course and ME I4200. 3 HR./WK.; 3 CR.

I7700: Microfluidic Devices in Biotechnology
Fundamentals of modern microfluidic devices with applications to biomedical measurements, e.g., electrokinetic systems, flow cytometers, and immunoassays. Review of fundamental properties of microfluidic systems including the effects of fluid mechanics, heat transfer, and electromagnetic phenomena on biological systems. Theory of Navier-Stokes, Nerst-Planck and convection transfer equations will be discussed. Critical overview of design, manufacture, and operation of micrometer scale systems that use photolithographic and surface treatment techniques for device development. Special projects will also be used to analyze biomedical inventions on the horizon. Prereq: BME 31000 and ME 46100; or ME 43300, ME 46100 and BIO 32100; or CHE 31000, CHE 34200, and BIO32100. 3 HR./WK.; 3 CR.

J9700: Report
In-depth analysis of a specific biomedical engineering topic by means of a written report that utilizes a number of technical sources. Topics to be chosen by the student in consultation with a supervising faculty member. Prereq: Completion of 12 credits toward the master's degree in Biomedical Engineering. 0 CR.

J9800: Project
A research project performed under the supervision of a faculty mentor. A final written report is required. Prereq: approval of the departmental advisor. 3 CR.

J9900: Research for Master's Thesis
Prereq: approval of the departmental advisor. 3-6 CR.

J9900: Research for Doctoral Dissertation
Prereq: approval of the departmental Ph.D. advisor. VARIABLE CR.

Che G5300: Bioprocess Engineering: Principles and Applications
Future advances in bioprocess engineering will extend the leading edge of biotechnology and spur crucial developments in biomedicine, chemical reaction engineering, and materials science. This course covers the basic biochemical engineering concepts underlying the behavior of bioprocesses. Topics include enzyme kinetics and biocatalysis, microbial growth and product formation, bioreactor design, transport in bioreactors, and bioproduct recovery. In the final part of the course we examine recent applications in industrial enzyme catalysis, immobilized enzymes and cells, and production of therapeutic proteins. 3 HR./WK.; 3 CR.
The Biomedical Engineering programs are offered by the faculty of the Department of Biomedical Engineering along with faculty from the Departments of Chemical, Electrical, and Mechanical Engineering, Biology, Chemistry and Physics, and from the CUNY Medical School. Additional faculty are drawn from the local research hospitals that are part of the New York Center for Biomedical Engineering consortium (see next section).

Marom Bikson, Assistant Professor
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Susannah P. Fritton, Associate Professor
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B.E. (BME), National Polytechnic Institute (Mexico); Ph.D., University of Paris

Lucas Parra, Associate Professor
B.S. (Physics), Ludwig Maximilian Univ. (Germany), Ph.D., Physics

John Tarbell, Distinguished Professor and Chair
B.S. (Ch. E.), Rutgers University; Ph.D. (Ch.E), U. of Delaware

Maribel Vazquez, Assistant Professor
B.S. (M.E.), Cornell Univ.; M.S. (M.E.), Massachusetts Inst. of Tech., Sc.D.
The CUNY Institute for Biomedical Engineering, or New York Center for Biomedical Engineering (NYCBE), is a consortium of the School of Engineering at The City College and several of the prominent health care institutions in New York City. It was formed in 1994 with the support of the Whitaker foundation.

A unique feature of this effort is that it involves a synergistic cooperation between the nation’s largest urban public university and a consortium of highly endowed, world-class private medical institutions. The current consortium in the NYCBE consists of the School of Engineering and the Sophie Davis School of Biomedical Education at CCNY, the CUNY Graduate School, and a citywide network of collaborators at most of the premier health care institutions in New York City, where CCNY undergraduate and graduate students are actively engaged in research.

Our current NYCBE partners are:

- Albert Einstein College of Medicine
- Columbia College of Physicians and Surgeons
- Hospital for Special Surgery/Weill Medical College of Cornell University
- Mount Sinai School of Medicine
- New York University School of Medicine
- Saint Luke’s-Roosevelt Hospital
- Memorial Sloan-Kettering Cancer Center

The NYCBE has an internationally recognized faculty of more than 30 researchers (from CUNY and seven affiliated institutions) in the areas of arterial fluid mechanics and transport, cartilage and ligament mechanics, tissue-biomaterial interaction, bioheat transfer, microvascular exchange, bone remodeling, renal modeling, laser applications in biomedicine, quantitative image analysis for diagnostic pathology, biomedical signal processing and instrumentation, pattern recognition and vision. The outstanding quality and diversity of the faculty are reflected in their society affiliations, membership on select panels of the National Institutes of Health, National Research Council, NASA, and editorships and associate editorships of major journals. The faculty have won many of the most prestigious awards and honors in fields related to biomedical engineering, including election to the National Academy of Science, the National Academy of Engineering, and the Institute of Medicine.

CUNY Distinguished Professor Stephen Cowin is the director of the NYCBE.

FACULTY

In addition to the Department of Biomedical Engineering faculty listed in the previous section of this Bulletin, the NYCBE faculty includes more than twenty-five members from CCNY and its affiliated institutions:

- **John M. Abrahams, M.D.**
  Assistant Professor, Neurosurgery, Montefiore Medical Center
  M.D., New York Medical College

- **Mitra Basu**
  Associate Professor, Electrical Engineering, The City College
  Ph.D. (Electrical Engineering), Purdue Univ.

- **Adele Boesky**
  Associate Professor, Electrical Engineering, The City College
  Ph.D. (Electrical Engineering), Purdue Univ.

- **George Brandon**
  Director of Research, The Hospital for Special Surgery
  Ph.D., (Physical Chemistry), Boston Univ.

- **Rochelle Buffenstein**
  Professor, Biology, The City College
  Ph.D. (Zoology), Univ. of Cape Town

- **Candido Cabo**
  Assistant Professor, Computer Systems Technology, New York City College of Technology
  Ph.D. (Biomedical Engineering), Duke Univ.

- **Nancy Pleshko Camacho**
  Scientist, The Hospital for Special Surgery
  Ph.D. (Chemistry), Rutgers Univ.

- **Edward J. Ciaccio**
  Associate Research Scientist, Pharmacology, Columbia College of Physicians and Surgeons
  Ph.D. (Biomedical Engineering), Rutgers Univ.

- **Stephen B. Doty**
  Senior Scientist, The Hospital for Special Surgery
  Ph.D. (Biology), Rice Univ.

- **Jay Edelman**
  Assistant Professor, Biology, The City College
  Ph.D. (Bioengineering), Univ. of Calif. Berkeley

- **Marilyn Gunner**
  Professor, Physics, The City College
  Ph.D. (Biophysics), Univ. of Pennsylvania

- **Vernon Houston**
  Associate Professor, Rehabilitation Medicine, New York University
  Ph.D. (Electrical Engineering), Columbia University

- **Kung-Ming Jan**
  Associate Professor, Orthopedics, Mount Sinai School of Medicine
  Ph.D. (Biomedical Engineering), Univ. of Michigan

- **Themis Lazaridis**
  Associate Professor, Chemistry, The City College
  Ph.D. (Chemical Engineering), The City College

- **Daniel E. Lemons**
  Professor, Biology, The City College
  Ph.D. (Pharmacology), Columbia Univ.
Elizabeth Myers
Associate Scientist, Hospital for Special Surgery, Associate Professor of Applied Biomechanics, Weill Medical College, Cornell University
Ph.D. (Mechanical Engineering) Rensselaer Polytechnic Institute

David S. Rumschitzki
Professor, Chemical Engineering, The City College
Ph.D. (Chemical Engineering), Univ. of Calif. Berkeley

Ali Sadegh
Professor, Mechanical Engineering, The City College
Ph.D. (Mechanics), Michigan State Univ.

Mitchell Schaffler
Professor, Orthopaedics, Mount Sinai School of Medicine
Ph.D. (Anatomy), West Virginia Univ.

Lawrence Sirovich
Professor, Biomathematical Sciences, Mount Sinai School of Medicine
Ph.D. (Fluid Mechanics), Johns Hopkins Univ.

David Spray
Professor, Neuroscience, Albert Einstein College of Medicine
Ph.D. (Physiology), Univ. of Florida College of Medicine

Carol A. Steiner
Professor, Chemical Engineering, The City College
Ph.D. (Chemical Engineering), Univ. of Pennsylvania

Peter A. Torzilli
Senior Scientist, The Hospital for Special Surgery
Ph.D. (Mechanics), Rensselaer Polytechnic Institute

Alan Weinstein
Professor, Physiology and Medicine, Weill Medical College of Cornell University
M.D., Harvard Medical School

Timothy Wright
Senior Scientist, Hospital for Special Surgery, Professor of Applied Biomechanics, Weill Medical College of Cornell University
Ph.D. (Materials Science and Engineering), Stanford Univ.
The City College offers the following master's degrees in Chemical Engineering:

**M.E. (Ch.E.) (Professional Master's Degree)**

**M.S. (Engineering)**

### DEGREE REQUIREMENTS

#### Professional Master’s Degree

**Engineering Core Courses:** 6  
ChE I3300: Advanced Chemical Reaction Engineering (3 cr.)  
ChE I4100: Chemical Process Economics (3 cr.)

**Engineering Management** 6  
Two of the following:  
ENGR F3800: Management Concepts for Engineers (3 cr.)  
ENGR G7600: Engineering Law (3 cr.)  
ENGR I8000: Decision and Planning Techniques for Engineers (3 cr.)

**Focus Areas in Chemical Engineering** 9  
Three courses in one of the following focus areas:  
A. Polymers and Materials  
ChE I5500: Interfacial Phenomena (3 cr.)  
ChE I6100: Advanced Topics in Polymer Science and Engineering (3 cr.)  
ChE I6200: Polymer Surfaces and Interfaces (3 cr.)  
ChE I6300: Thin Organic Films and their Analysis (3 cr.)  
ChE I6400: Rheology of Soft Materials (3 cr.)  
ChE I6500: Mechanics of Polymer Melt Processing (3 cr.)  
ChE I7700: Advanced Materials (3 cr.)  
ChE I8900: Nanotechnology (3 cr.)  
ChE I7700: Mass Transfer (3 cr.)  
ChE I9200: Soft Materials Lab (3 cr.)

B. Solids Processing  
ChE I5200: Powder Science and Technology (3 cr.)  
ChE I6500: Mechanics of Polymer Melt Processing (3 cr.)  
ChE I8100: Fluid-Particle Systems (3 cr.)

C. Systems Engineering  
ChE I3000: Chemical Process Simulation (3 cr.)  
ChE I4000: Energy Systems Engineering for Global Sustainability (3 cr.)  
ChE I5800: Molecular Simulation (3 cr.)  
ChE I7700: Process Dynamics and Control (3 cr.)  
ChE I8600: Equilibrium Staged Separations (3 cr.)  
ChE I8800: Bioseparations (3 cr.)  
ChE I9000: Bioprocess Engineering (3 cr.)

**Technical Electives** 9  
Any other three courses in Chemical Engineering. Courses in other areas by approval of the department.

**Report** 0  
ChE I9700: Report

#### M.S. (Engineering) Degree in Chemical Engineering:

**Required Courses** 18-19  
ENGR I1100: Introduction to Engineering Analysis (3 cr.)  
ChE I0000: Seminar (1 cr.)  
ChE I2800: Advanced Chemical Thermodynamics (3 cr.)  
ChE I3300: Advanced Chemical Reaction Engineering (3 cr.)

Two of the following three courses:  
ENGR I0800: Foundations of Fluid Mechanics (3 cr.)  
ME I3700: Convection Heat Transfer  
ChE I9100: Mass Transfer

**Elective Courses** 9-15  
Three to five additional courses in Chemical Engineering.

One of the following:  
ChE I9700: Report (0 cr.)  
ChE I9900: Thesis Research (3-6 cr.)  
ChE I9800: Master’s Project (3 cr.)

### Total Credits 30

#### Additional Requirements

All full-time graduate students are expected to engage in research.  
**Thesis:** Optional. Requires prior departmental approval.

#### Admisement

Masters Program: Professor G. Tardos and J. Lee  
Doctoral Program: Professor D. Rumschitzki

#### DEPARTMENT FACILITIES

In addition to the laboratories operated by the School of Engineering in Steinman Hall, the Department of Chemical Engineering provides separate teaching laboratories for the study of powder technology and soft materials. In addition, it has facilities for a number of advanced experiments in materials science, a work-station based computation center as well as numerous laboratories for advanced research.

#### Powder Science and Technology Laboratory

This laboratory is attached to the course with the same name (ChE-I052) and is given together with it as demonstration of theoretical principles presented in class. The students are first introduced to powder characterization such as particle size, size distribution (using standard sieves and a light scattering instrument) and shape and surface structure using optical and electron microscopes. Instruments to measure powder specific surface area...
and pore volume using gas adsorption (BET and gas pycnometry) and mercury intrusion are also presented. Characterization of bulk powders properties is achieved in the Jenike Shear Cell used to measure powder-yield loci at different initial compression levels. This is a special instrument, characteristic of powder engineering, used to determine powder flowability as well as for the design of powder storage vessels such as hoppers and bins. Finally, the MikroPul Hosokawa Micron Powder Characteristics Tester provides six mechanical measurements with one easy-to-use instrument, including 1) angle of repose, 2) compressibility, 3) angle of spatula, 4) cohesiveness, 5) angle of fall and 6) disperse-ability. Measuring such properties has great importance in the design of storage hoppers, feeders, conveyors and other powder processing equipment. The laboratory also has a significant research component dedicated to the measurement of dry powder flows in different geometries and the study of powder granulation (size-enlargement). Principles of these processes are also demonstrated to students using the existing research equipment.

Interfacial Chemistry Laboratory
The course provides students with exposure to some surface modification chemistry and the standard techniques used for the characterization of surface properties. Written and verbal reports are required. In addition to use of instrumentation, students will familiarize themselves with surface preparation and modification techniques, including self-assembly, evaporation, spin coating, and Langmuir-Blodgett techniques. The modules currently available are:

Contact angle goniometry will be used to measure the surface energy for various materials. Students will compare the surface properties of hydrophilic and hydrophobic surfaces and mixed surfaces prepared via self-assembly and Langmuir-Blodgett transfer techniques and/or plasma or corona treatment.

Air-liquid and liquid-liquid interfacial tension measurement using shape characterization (pendant drop and bubble techniques) and the interfacial balance (Kahn Balance). The effects of surfactants present at these interfaces will be investigated, as well as surfactant transport to the interfaces.

Fluorescence imaging and Brewster Angle Microscopy (BAM) investigation of surfactant phase behavior at fluid-fluid interfaces and its effect on the interfacial properties of the system. Spectroscopy (reflection infrared spectroscopy) will be used to determine the surface coverage and ordering of surfaces prepared by the students. Ellipsometric measurement of thin films fabricated by the students via evaporation, spin coating, Langmuir-Blodgett films, and self-assembly. Students will utilize atomic force microscopy (AFM) characterization of surfaces, and compare the constant force, lateral force, and tapping modes. Colloidal particle size distribution measurement and particle stability using light backscattering.

Materials Science
State-of-the-art equipment is available for advanced materials science laboratory experiments. These include two Fourier-Transform Infra-Red spectrometers, a Differential Scanning Calorimeter, a Thermal Mechanical Analyzer, an Atomic Force Microscope, Single-wavelength Ellipsometer, three Langmuir-Blodgett Troughs, Fluorosence Microscope, High-Speed Video Camera (1000 fps), three high resolution optical microscopes with image analysis capabilities, Contact Angle Goniometer, Argon Plasma Cleaner, Light Scattering, UV-spectrometer, Atomic Absorption Spectrometer, Refractometer.

The A.X. Schmidt Computer Laboratory
The Chemical Engineering Department is equipped with a network of 30 PC workstations, half of which are designated for student’s coursework. All students have access to the Internet and E-mail. Application software available on the network includes ASPEN, Mathematica, Matlab, and DYSIM, a dynamic simulation program developed at City College. Many courses make use of the computer network and software. The laboratory is available for unlimited student use. All students are expected to become proficient in its use.

COURSE DESCRIPTIONS

F6700: Polymer Science and Engineering
The chemistry and physics of polymeric materials. The kinetics and control of polymerization reactions. Analysis of the mechanical, thermal and flow behavior of polymeric solids and melts. Prereqs: Chem 34200, Chem 26300, ChE 32800, ChE 43000, ChE 43200. This course is not open to students who have taken ChE 46700 or its equivalent. 3 HR./WK.; 3 CR.

G0000: Selected Topics in Chemical Engineering
Advanced topics selected for their current interest to graduate students. 3 HR./WK.; 3 CR.

G2400: Viscous Flow I

G2500: Viscous Flow II

G2900: Dynamics and Stability of Chemically Reacting Systems

G3600: Catalyst Design and Catalytic Reaction Engineering

I0000: Seminar
Invited speakers and reports of graduate student research. 1 HR./WK.; 1 CR.

I2300: Non-Newtonian Fluid Mechanics
Review of the general concepts of continuum mechanics and tensor analysis. The rheology of non-Newtonian fluids. Viscometric flows. Linear viscoelasticity. Constitutive equation theory and codeforming and correlating formalisms. Applications include the treatment of particle motions in non-Newtonian fluids. Prereq: ENGR I0800. 3 HR./WK.; 3 CR.

I2800: Advanced Chemical Thermodynamics
Classical thermodynamics; batch and flow systems; homogeneous and heterogeneous systems, physical and chemical equilibria, energy effects. Correlation and approximation methods. Prereq: ChE 43000 or ME 33100. 3 HR./WK.; 3 CR.

I3000: Chemical Process Simulation
Steady-state simulation using ASPEN Plus for flow sheet calculations and economic evaluations. Dynamic simulation for process control studies, hazard analyses and batch process scheduling. Special purpose simulations of reactors and separation systems. Emphasis on the underlying numerical methods and sensitivity to modeling errors. 3 HR./WK.; 3 CR.
I3200: Statistical Mechanics I
Introduction to equilibrium statistical mechanics: Liouville’s Theorem, ergodic hypothesis, ensembles, connection to classical thermodynamics. Distinguishable and indistinguishable particles, Boltzmann statistics, quantum gases, semi-classical limit. Real gases: cluster and virial expansions. Graphical methods. Prereq: ChE I2800 or ME I3300. 3 HR./WK.; 3 CR.

I3300: Advanced Chemical Reaction Engineering
The analysis of non-ideal chemical reactor systems. Both homogeneous and heterogeneous reactor systems. Industrial catalytic reactor design and troubleshooting. Prereq: ChE 43200. 3 HR./WK.; 3 CR.

I3500: Statistical Mechanics II

I4000: Energy Systems Engineering for Global Sustainability
This course is intended to provide students with the background and tools to analyze energy choices for the future. World energy supplies, demand, and trends. The politics of energy. The scientific basis for anthropogenic global warming and its impact on climate and planetary ecosystems. Characterization and analysis of conventional sources of energy and fuels production including refineries, fossil fuel fired power plants, and gas turbine combined-cycle systems from both thermodynamic and environmental points of view. Alternate sources of power including nuclear, wind farms, solar (both photovoltaic and thermal), and biomass. Energy consumption by the transportation, manufacturing, and space heating and cooling segments of the economy. The hydrogen economy. Social barriers such as denial, lock-in, and NIMBY. Prereq.: Undergraduate degree in engineering, or permission of the instructor. 3 HR./WK.; 3 CR.

I4100: Chemical Process Economics
Basic principles; break-even and shut-down studies; profitability criteria; plant location; market research; project analysis and optimization. 3 HR./WK.; 3 CR.

I5200: Powder Science and Technology
Powder metrology: Characterization of particles and particle assemblies; packing of granular solids; interparticle forces and tribology in particulate systems; continuum powder mechanics; design of hoppers; population balance modeling of mixing, segregation, agglomeration and comminution. Bulk Powder handling: conveying and storing. 3 HR./WK.; 3 CR.

I5500: Interfacial Phenomena
Interfacial thermodynamics. The theory of the electrical double layer. Interfacial statics and the Young-Laplace equation. Interfacial fluid mechanics and stability. Applications such as surface waves and Marangoni flows are included. 3 HR./WK.; 3 CR.

I5700: Advanced Materials Engineering
Microscopic level interactions in solid materials. The geometric structure of materials: metals, semiconductors, ceramics, and polymers. Structure determination. The thermodynamic foundation of phase diagrams. Material properties: thermal, electrical, and optical. Surface properties. Synthesis and characterization of “high tech” materials with emphasis on nanoscale technology. Prereq: ChE 31000 or permission of instructor. 3 HR./WK.; 3 CR.

I5800: Molecular Simulation
Theory and practice of numerical techniques for the simulation of material properties and transport phenomena at the molecular level. Introduction to ab initio and empirical force fields, theoretical background on Monte Carlo, molecular dynamics, and related methods. Introduction to biased and accelerated methods, simulation of fluid flows, long-range interactions, phase equilibrium, and other topics of current interest. Exercises will emphasize computational practice, writing code for particular applications, and the analysis of numerical results. Prereq: ChE I3200 or permission of the instructor. 3 HR./WK.; 3 CR.

I6100: Advanced Topics in Polymer Science and Engineering
Statistical mechanics of polymer chains. Polymer rheology. Scaling concepts in polymer solutions. Behavior of polymer blends, interpenetrating polymer networks, and polymer/mixed solvent systems. Polymer/particle interactions. Prereq: ChE 46700, ChE F6700, or permission of instructor. 3 HR./WK.; 3 CR.

I6200: Polymer Surfaces and Interfaces
This course introduces the students to surface phenomena related to polymers. Topics covered are: Statistical Nature of Polymers, Polydispersity & Branching; Molecular Weight and its Distribution; Flexibility; Global versus Local Properties; Average Dimensions of Polymer; Polymer Structure and Physical Properties; Diffusion Modes-Reconfiguration and Center of Mass Transport; Interfacial Thermodynamics; Molecular Interactions in Polymers (Van der Waals Forces, Additivity and Fractional Contributions of Various Types of Molecular Forces, Introduction to Mean-field and Monte Carlo approximation to polymer molecular configurations); Surface Energetics of Polymers (Measurement of Surface Tension, Calculation of Surface tension, Measurement of Solubility, Calculation of Solubility); Polymer-Liquid Interactions (Equilibrium Spreading Pressure, Polarity of Liquids, Contact Angle, Measurement and Prediction); Polymer-Polymer Interactions (Solubility of Polymers, Measurement of Solubility, Calculation of Solubility, Prediction of Interfacial Tension of Polymers, in the melt and solid state); Applications (Adhesion, Blending, Adsorption, Permeation). Prereq.: Undergraduate degree in engineering, or permission of the instructor. 3 HR./WK.; 3 CR.

ChE I6300 Thin Organic Films and Their Analysis
This course introduces the students to the concepts of supported thin organic films and their analysis: Langmuir-Blodgett Films; Self-Assembled Monolayers; Polymer Films; Homopolymers; Block Copolymers; Polyelectrolytes (Layer by Layer); Optical Techniques (Ellipsometry, Second Harmonic Generation); Electroanalytical Techniques (Surface Potential); Physicochemical Techniques (Wetting); Spectroscopic Techniques (Infrared Spectroscopy (FT-IR), Raman Spectroscopy, X-Ray Photoelectron Spectroscopy (XPS), Secondary Ion Mass Spectroscopy (SIMS)); Scanning Probe Microscopy (Atomic Force, Scanning Tunneling): Scattering Techniques (Neutron Scattering, X-Ray Scattering, X-Ray, Diffraction, Light Scattering). Prereq.: Undergraduate degree in engineering, or permission of the instructor. 3 HR./WK.; 3 CR.

I6400 Rheology of Soft Materials
Rheological measurement. Linear and nonlinear viscoelasticity. Rheology of polymers, liquid crystals, emulsions, gels, and other complex fluids and soft solids. Continuum and molecular theories of viscoelasticity. Prereq.: Undergraduate degree in a physical science or engineering discipline, or permission of instructor. 3 HR./WK.; 3 CR.

I6500 Mechanics of Polymer Melt Processing
polymer processing. Injection and compression molding. Fiber spinning. Numerical simulation. Effects of viscoelasticity on processing. Stability and sensitivity. Prereq.: Undergraduate degree in engineering, or permission of the instructor. 3 HR./WK.; 3 CR.

I7700: Process Dynamics and Control
Dynamic Behavior and control of process equipment and flow systems. Behavior and stability of linear and non-linear systems with examples from chemical reactors, distillation columns and heat transfer equipment. Prereq.: Engr I9700 or EE 37100. 3 HR./WK.; 3 CR.

I8100: Fluid Particle Systems
Basic equations of multi-phase systems; transport processes of rigid and deformable particles; drag coefficients; heat and mass transfer rates; turbulence effects; transport properties of clouds of particles; pipe flow of a suspension; filtration of aerosols; industrial filters. 3 HR./WK.; 3 CR.

I8600: Equilibrium Staged Separations
Analysis, design and simulation of the major separation operations of distillation, absorption and extraction. Both staged and continuous countercurrent modes of operation are covered. Choice of vapor-liquid and liquid-liquid equilibria models, data regression and prediction methods. Process synthesis of sequences of separation operations; heat integration for efficient energy utilization. Introduction to column dynamics and control strategies. 3 HR./WK.; 3 CR.

I8800: Bioseparations
Modeling and simulation of the dynamic behavior of staged and plug flow separation operations. Batch distillation. Adsorption techniques including chromatographic separations and pressure swing adsorption. Membrane technologies such as reverse osmosis and gas separation. Separations involving solids including filtration and crystallization. Separations for biotechnology. 3 HR./WK.; 3 CR.

I8900: Nanotechnology
Introduction to nanotechnology and its applications in the development and synthesis of soft materials. Prereq.: ChE I2800 and Engr I9100. 3 HR./WK.; 3 CR.

I9000: Bioprocess Engineering: Mammalian Cell Biotechnology
Basics of biochemistry and cell structure with emphasis on eucaryotic cells. Introduction to recombinant DNA technology and protein engineering. Introduction to cell culture bioreactors. Production of glycosylated proteins. Biochemical engineering aspects of stem cells. Prereq.: ChE I2800 and Engr I9100. 3 HR./WK.; 3 CR.

I9100: Mass Transfer

I9200: Soft Materials Lab
The course provides students with exposure to some surface modification chemistry and the standard techniques used for the characterization of surface properties. In addition to use of instrumentation, students will familiarize themselves with surface preparation and modification techniques, including self-assembly, evaporation, spin coating, and Langmuir-Blodgett techniques. There are seven experimental modules: contact angle goniometry; air-liquid and liquid-liquid interfacial tension measurement; fluorescence imaging and Brewer Angle Microscopy, reflection infrared spectroscopic determination of surface coverage; ellipsometric measurement of thin films; atomic force microscopy (AFM) characterization of surfaces; and colloidal particle size distribution measurement and particle stability using light backscattering. Written and verbal reports are required. Prereq.: Undergraduate degree in engineering or permission of the instructor. 3 HR./WK.; 3 CR.

I9700: Report
In-depth analysis by means of written reports of a number of technical papers, reports or articles on a specific topic of interest to chemical engineers. Topics to be chosen by the student after consultation with a professor in the department. An oral presentation of the written report may be required at the departmental seminar. Prereq: completion of 12 credits toward the master’s degree in ChE. Not applicable for credit toward the Ph.D. 0 CR.

I9800: Master’s Project
Theoretical or experimental project under the supervision of a faculty advisor. Student submits a written proposal, performs the required work, and submits a written final report. Prereq: written departmental approval. 3 CR.

I9900: Research for the Master’s Thesis
VARIABLE CR., UP TO 6 CR.

J0000: Research for the Doctoral Dissertation
VARIABLE CR., UP TO 12 CR.

Other Engineering Courses
Other appropriate Engineering courses are listed under Graduate Engineering courses in the front section of the School of Engineering.

I0800: Foundations of Fluid Mechanics I
I0900: Foundations of Fluid Mechanics II
I1100: Introduction to Engineering Analysis
I1200: Functions of a Complex Variable
I1300: Transform Methods in Engineering
I1400: Applied Partial Differential Equations
I1500: Introduction to Numerical Methods
I2200: Biofluid Mechanics
I2400: Turbulent Flows
I3600: Conduction Heat Transfer
I3700: Convection Heat Transfer
I3800: Radiation Heat Transfer
I8000: Decision and Planning Techniques for Engineering Management
I9100: Mass Transfer
J0100: Fluid Dynamic Stability

FACULTY

Alexander Couzis, Herbert G. Kayser
Professor
B.S. (Ch.E.), National Technical Univ. (Greece); M.S., (Ch.E.) Univ. of Michigan, Ph.D (Ch.E.)

Morton M. Denn, Albert Einstein
Professor
B.S.E. (Ch.E.), Princeton Univ.; Ph.D., Univ. of Minnesota (Ch.E.)

M. Lane Gilchrist, Jr., Assistant Professor
B.Ch.E., Louisiana State Univ.; Ph.D., Univ. Of California at Davis (Chemistry)

Leslie L. Isaacs, Professor
B.Sc.(Ch.E.), Columbia Univ.; Ph.D., M.I.T. (Physics)

Iolina Kretzschmar, Assistant Professor
Diploma (Chemistry), Technical Univ. of Berlin, D.Sc. (Chemistry)

Jae W. Lee, Assistant Professor
B.S. (Ch.E.), Seoul National Univ.; Ph.D., Carnegie Mellon Univ. (Chem.E.)

Charles Maldarelli, Professor
B.S. (Ch.E.), Columbia Univ., M.S.(Ch.E.), D.Eng.Sc. (Ch.E.)
Jeffrey Morris, Associate Professor
B.A., Georgia Institute of Technology; M.S.,
California Institute of Technology, Ph.D.
(Ch.E.)
Irven Rinard, Professor and Chair
B.Ch.E., Univ. of Delaware; M.Sc., M.I.T.,
D.Sc. (Ch.E.)
David S. Rumschitski, Herbert G. Kayser,
Professor
B.S. (Math/Ch.E.), Cooper Union; M.S.
(Ch.E.), Univ. of California (Berkeley), Ph.D.
(Ch.E.)
Reuel Shinnar, Distinguished Professor
B.Sc. (Ch.E.), Technion, Israel, Dipl. Eng.,
M.Sc. (Ch.E.); D.Eng.Sc., Columbia Univ.
(Ch.E.)
Carol A. Steiner, Professor
Engrg.), Univ. of Pennsylvania, Ph.D.
(Ch.E.)
Gabriel Tardos, Professor
Dipl. Eng., Polytech. Bucharest, Roumania;
M.Sc. (M.E.), Technion, Israel, D.Sc. (M.E.)

PROFESSORS EMERITI
Andreas Acrivos
Robert A. Graff
Morris Kolodney
Harvey L. List
Robert Pfeffer
Herbert Weinstein
The Benjamin Levich Institute for Physico-Chemical Hydrodynamics, an internationally recognized research center for the study of fundamental problems of flow and transport in complex fluids, fluid-like media and interfaces headed by Albert Einstein Professor Morton Denn, includes faculty from the Departments of Chemical Engineering and Physics. The current scope of the Institute’s research is in five major areas: granular flows, low Reynolds number hydrodynamics, non-Newtonian fluid mechanics, computational fluid mechanics, and transport along interfaces. Examples include experimental granular kinetic theory, granular compaction, particle migration in concentrated suspensions undergoing shear, the influence of surfactants on the motion of drops and bubbles, microscopic fluid mechanics using molecular dynamics simulations, and droplet mechanics in liquid-crystalline polymer blends. The Institute has excellent laboratory and computational facilities.
THE CITY COLLEGE OFFERS THE FOLLOWING MASTER'S DEGREES IN CIVIL ENGINEERING:

**M.E. (C.E.) (PROFESSIONAL MASTER'S DEGREE)**

**M.S. (ENGINEERING) (DEGREE IS AWARDED TO STUDENTS WHO DO NOT HAVE A BACHELOR'S DEGREE IN ENGINEERING)**

**PROGRAMS AND OBJECTIVES**

For the Professional Master's degree, the Department of Civil Engineering offers programs of graduate study in the following areas:

**Structural Engineering and Mechanics**

**Water Resources and Environmental Engineering**

**Transportation**

**DEGREE REQUIREMENTS**

**Required Courses by Specialization**

**Structural Engineering and Mechanics**

Civil Engineering:
- H1000: Analytical Methods in Civil Engineering 3
- I3000: Structural Dynamics 3
- I1700: Finite Element Methods in Engineering 3
- I3500: Applied Elasticity and Plasticity 3

**Water Resources and Environmental Engineering**

Civil Engineering:
- H1000: Analytical Methods in Civil Engineering 3
- H0700: Advanced Hydraulics 3
- H6300: Groundwater Hydrology and Contamination 3
- H7500: Unit Operations in Environmental Engineering 3

**Transportation**

Civil Engineering:
- H1000: Analytical Methods in Civil Engineering 3
- H0200: Transportation Economics 3
- I2200: Transportation Asset Management 3
- I2400: Analytical Techniques in Transportation 3
- I2600: Urban Transportation Planning 3

**Elective Courses**

Other graduate courses 12-18
Report/Project/Thesis 0-6

At least one of the following courses:
- I0000: Seminar (1 cr.)
- I9700: Master's Report (0 cr.)
- I9800: Master's Project (3 cr.)
- I9900: Master's Thesis (6 cr.)

**Total Credits** 30

Note: with departmental approval, students may register for two 50000-level undergraduate courses towards the master's degree (grades of B or better only). These undergraduate courses will not be included in the calculation of the G.P.A.

**ADVISEMENT**

**Environmental Engineering**

Professor V. Diyamandoglu

**Water Resources Engineering**

Professor R. Khanbilvardi

**Structural Engineering and Mechanics**

Professor F.B. Lin

**Transportation**

Professor C. McKnight

**ADVANCED CERTIFICATE IN SPECIAL TOPICS IN CIVIL ENGINEERING**

The Department of Civil Engineering offers Advanced Certificates in Special Topics in the seven areas listed below.

**A. STRUCTURES**

H5300: Advanced Structural Design
55000: Advanced Reinforced Concrete
I5400: Elastic and Inelastic Analysis of Structures

And one of the following:
- H5200: Bridge Engineering
- H5100: Prestressed Concrete
- 59000: Foundation Engineering

**B. ENVIRONMENTAL ENGINEERING**

57100: Environmental Engineering Analysis
H7500: Unit Operations in Environmental Engineering
H7600: Unit Processes in Environmental Engineering

And one of the following:
- H7400: Industrial Wastewater Treatment
- I7000: Wastewater Treatment Plant Design

**C. WATER RESOURCES ENGINEERING**

H6300: Groundwater Hydrology and Contamination
H0700: Advanced Hydraulics
H1200: Engineering Hydrology

And one of the following:
- I6300: Water Resource Modeling
- H0800: Applied Hydraulics in Engineering

**D. TRANSPORTATION PLANNING**

I2600: Urban Transportation Planning
I4500: Advanced Transportation Planning
Approved Transportation Elective

And one of the following two:
- I2900: Transportation Project Evaluation
- I2700: Transportation Policy

For more information contact the Chair of the Department.
E. Traffic Engineering
H2500: Geometric Design
H3500: Traffic Engineering Studies
I4000: Traffic Control
Approved Transportation Elective

F. Highway Engineering
G4700: Pavement Management Systems
H2100: Rigid and Flexible Pavements
Approved Transportation Elective

And one of the following two:
H2500: Geometric Design
H3500: Traffic Engineering Studies

G. Transportation Network Analysis
H0200: Transportation Economics
I2000: Travel Demand Forecasting
I2400: Analytic Techniques in Transportation
I4500: Advanced Transportation Planning

LABORATORIES

Computational Facilities
The Department has two computational laboratories equipped with PC’s. A separate laboratory, equipped with high speed workstations, supports the research activities of faculty and Ph.D candidates. All workstations are networked and connected to the Internet.

Materials of Engineering Laboratory
The Materials of Engineering Laboratory houses an Instron 8500 series Testing Machine. This is a computer controlled servo-hydraulic machine and capable of applying 55 kips (250 kN) dynamic loads. Supporting electronic control, data acquisition and computer software systems are available. Additional equipment for the static, dynamic and fatigue testing of materials include testing machines for tension, compression, transverse-bending and torsion investigation. The laboratory contains hardness testing machines, impact testers, strain signal conditioning consoles, and assorted peripheral equipment. Facilities for preparing and curing concrete include walk-in temperature humidity control chambers. Optical Systems for surface strain measurements using digital image correlation are available. Electrochemical facilities for determining the rate of corrosion of steel allow for potentiostatic, galvanostatic and frequency response analysis.

Nondestructive testing facilities include 4-channel acoustic emission facilities for early detection of incipient defect growth, ultrasonic V-meter, ultrasonic signal generation, digitalization and analysis capabilities.

Soil Mechanics Laboratory
The Soil Mechanics Laboratory is equipped to perform standard identification tests of soils, such as grain size distribution, liquid and plastic limits and compaction properties. In addition, facilities to perform detailed testing of undistributed samples (consolidation and triaxial shear) are available. A moist room is available for long term sample storage.

Fluid Mechanics Laboratory
The Fluid Mechanics Laboratory is equipped for studying both compressible and incompressible fluid media. Flow rates of up to 5 cubic feet per second of water are provided by each of the three independent high-pressure systems equipped with constant head controls. Two constant-head supply tanks located in the laboratory provide needed discharge capacities. The laboratory contains a tilting flume 52 ft. long, a water tunnel, pumps, turbines, a hydraulic bench, and various units for the study of frictional phenomena involving water and oil. A one-dimensional Laser Doppler Anemometer is used for the study of flow velocities in pipes and near boundaries. In addition, the Lab has a state-of-the-art wave tank. This tank is 6 feet wide by 4 feet high and 40 feet long. It is equipped with computer controlled five-paddle generator. This system can produce single waves, random waves, and angle waves. A two-dimensional Laser Doppler Velocimeter (LDV) equipped with computer controlled 3-D traverse and fully automated data acquisition system are used in the wave tank for studying beach hydraulics and offshore similitudes. In addition, a Particle Image Velocimeter (PIV) is available for analysis of particles in a flow field. The Lab is also equipped with a titling sand flume for studying flow through porous media and groundwater contamination. A fully automated freeze and thaw machine is also available for graduate research work.

Environmental Engineering Laboratory
The Environmental Engineering Laboratory is equipped for experimental evaluation of unit processes and operations in water and wastewater treatment as well as analysis of all physical, chemical and microbiological water quality parameters. The experimental facilities include settling columns, suspended and attached growth biological reactors, computer controlled bioreactors for kinetic studies, a bench scale UV chamber, a 12 gpm 15-foot bubble contactor for ozone studies complete with ozone generator, gas and liquid phase ozone residual monitors and off-gas destructor, a 1000-ft. pipe loop system for biostability studies in drinking water and all conventional experimental devices used in determination of chemical dose requirements. An environmental chamber for temperature controlled experiments is also available.

The analytical capabilities of the laboratory include gas chromatograph-mass spectrometer/ECD with purge/trap, inductive coupled plasma spectrometer (ICP) gas chromatograph with EC and FID detectors, total organic carbon analyzer, ion chromatograph, water quality autoanalyzer, UV-visible double beam spectrophotometer with stopped-flow device, and phase contrast/epifluorescence research microscope. Field monitoring equipment includes water quality monitors with multiple probes and fluorometers.

Transportation Engineering Laboratory
The Transportation Engineering Laboratory has personal computers with peripherals to provide students with opportunities to work with traffic and transportation software for course work and transportation research. The laboratory has a variety of software, including SOAP84, HCS, PASSER II-90, TRANSYT-7F, NETSIM, AIP, PRIMAVERA, and Maptitude for GIS. The Laboratory also contains basic equipment necessary to conduct traffic engineering studies such as traffic counters and measuring wheels.
Highway and Airfield Laboratory
The Highway and Airfield Laboratory offers facilities for investigating the properties of the basic materials and mixtures that comprise pavements. A variety of strength and stability equipment, and other apparatus are available for determining rheological and physical properties and for experiments in designing and testing bituminous mixes. The additional facilities of the Soils and Materials Laboratory make possible the study of mineral aggregates and their blends, soil-stabilization phenomena, and mix-design and properties of Portland cement concrete. Other facilities in the Chemical Engineering Department’s Materials Research Laboratory extend the capacity to conduct thermo-analytic studies on standard and composite materials.

Dynamics and Structural Control Laboratory
The Dynamics and Structural Control Laboratory (DSCL) facilitates advanced research in earthquake engineering, and the development of smart and intelligent structural systems. A smart and intelligent structural system has in-built capability to sense the vibration due to natural hazards such as earthquakes and extreme wind loads, and modify its behavior to minimize vibration, damage and discomfort to occupants of the structure. The DSCL is equipped with a 30 feet by 15 feet strong floor system with 100 kips inserts for static and dynamic testing of structures, a state-of-the-art 10,000 lb one directional (horizontal) shaking table system capable of simulating near-field ground motions with velocities up to 2 meters per second, a 6 story building frame model with replaceable elements to simulated non-linear response of structures, 24 channel 2 MHz simultaneous data acquisition system, 24 channel d-space controller for real time implementation of controllers using MATLAB, a strong frame system for quasi-static and dynamic testing of structural systems and a computer based visualization and image correlation system for damage detection in structural systems being tested on the strong floor.

COURSE DESCRIPTIONS

G0000: Selected Topics in Civil Engineering
Advanced topics chosen for their current interest to graduate students. 3 HR./WK.; 3 CR.

G1300: Wind Effects on Structures

G1900: Advanced Finite Elements

G2100: Condition Assessment and Rehabilitation of Structures

G2500: Construction Engineering

G3400: Impacts of Transportation Systems

G4200: GIS Transportation Data Modeling

G4500: Advanced Transportation Analysis

G4700: Pavement Management Systems

G7300: Surface Water Quality Modeling

G7400: Remediation Technologies for Hazardous Wastes and Sites

G9100: Water Resources Systems Analysis

H0100: Introduction to Transportation Overview of various modes; their operating and design techniques. Demand and supply modeling; costs; short and long term planning, impact on land use; environmental issues. Prereqs: basic college statistics and economics. 3 HR./WK.; 3 CR.

H0200: Transportation Economics
The basic economics of transportation and the tools of economic analysis used to analyze transportation activities, firms and government policies. Prereqs: undergraduate courses in economics and calculus. 3 HR./WK.; 3 CR.

H0700: Advanced Hydraulics
Open channel hydraulics of artificial and natural water-courses, including roughness and shape characteristics; surface curve calculation by step methods and by integration methods. Delivery of canals. Hydraulics of spillways and stilling basins, including chute spillways, drop structures, gate and side channel spillways. Prereq: CE 45000. 3 HR./WK.; 3 CR.

H0800: Applied Hydraulics in Engineering
Hydraulic principles utilized in design of structures, such as spillways, dams, drop structures, gate and side channel spillways, and water transport systems. Studies of erosion, sediments, their transport and deposition. Similarity, dimensional analysis, and modeling techniques as applied to hydraulic systems. Prereq: CE 45000. 3 HR./WK.; 3 CR.

H1000: Analytical Methods in Civil Engineering
Survey of analytical methods encountered in Civil Engineering: ordinary differential equations (first and second order), linear algebra (inverse matrices, eigenvectors), differential equations systems, partial differential equations, Laplace transforms, Fourier Analysis, vector analysis (line and surface integrals, Green, Stokes and Gauss theorems), probability and statistics (probability distributions, sampling distributions of mean and standard deviation), and optimization (gradient search, simplex method). Applications in Structural, Geotechnical, Environmental, Water Resources, and Transportation Engineering. 3 HR./WK.; 3 CR.

H1200: Engineering Hydrology

H2400: Airport Design and Planning
Planning of individual airports and statewide airport systems. Functional design of air and landscape facilities. Orientation, number, and length of runways. Concepts of airport capacity. Passenger and freight terminal facility requirements. Airport access systems. FAA operating requirements. Financial, safety, and security issues. Design and planning for maintenance, rehabilitation and upgrading. 3 HR./WK.; 3 CR.

H4100: Highway and Airport Construction
Overview of highway and airport engineering and construction; highway vs. airports; urban vs. rural highways. Construction planning, organization and cost estimating; construction scheduling using computer packages, e.g. Primavera; construction tracking. Construction operations; mobilization, removal, disposal, placement; management of equipment, material, labor, money; cash flow accounting. Construction specifications; quality assurance/quality control (QA/QC); investigation of environmental impacts and mitigation measures. Site investigation and project preparation. Prereq: CE 33500. 3 HR./WK.; 3 CR.
H4500: Urban Public Transportation
Historic development of urban transportation, including rail, bus, shared ride, and demand response modes, and market; multi and intermodal and system issues. 3 HR./WK.; 3 CR.

H4600: Environmental Issues in Transportation
Survey of transportation-related environmental issues. The pollutants and their impacts on human health and welfare. Environmental law and regulations. Air pollution, water pollution, noise. Environmental impact statement. 3 HR./WK.; 3 CR.

H5100: Prestressed Concrete

H5200: Bridge Engineering

H5300: Advanced Structural Design

H6300: Groundwater Hydrology and Contamination
Course provides introduction to governing equations of flow and transport in groundwater. Topics include Darcy’s Law, the flow equation, piezometric contours, confined and unconfined flow in aquifers, radial flow towards wells, flow through leaky layers and transient flow due to compressibility effects. Flow and retention in the unsaturated zone, soil-water characteristic curves and the Richards equation are examined. Course also covers material on contaminant transport in groundwater including the advection-dispersion equation, transport through heterogeneous media and the transformation and retardation of solutes. Prereq: CE 36100. 3 HR./WK.; 3 CR.

H6400: Environmental Engineering Analysis
Study of microorganisms and biochemical reactions involved in the purification of wastewaters by both aerobic and anaerobic treatment systems. Metabolic reactions, growth patterns and population dynamics. Review of chemical reactions as they relate to the analysis and purification of water. Data collection and interpretation. Prereq: CE 48000 or departmental approval. 3 HR./WK.; 3 CR.

H6500: Statistical Methods in Water Resources
Application of statistics to water resources and environmental pollution studies/monitoring. Sampling environmental population, sampling design, simple random sampling, stratified random sampling, systematic sampling, locating hot spots, quantities, proportions, means. Topics include analysis of trends, seasonality, outlier detection, normal and log normal distribution, and time series. Prereq: graduate standing. 3 HR./WK.; 3 CR.

H7400: Industrial Wastewater Treatment
Sources, volumes, and characteristics of industrial wastewaters. Federal and local pretreatment regulations, including categorical standards. Uses of applicable biological, absorption, stripping, precipitation, chemical oxidation, reverse osmosis, ultrafiltration processes. Recovery methods and sludge handling and disposal. Prereq: CE 57100. 3 HR./WK.; 3 CR.

H7500: Unit Operations in Environmental Engineering
Physical-chemical unit operations in drinking water and wastewater purification. Process kinetics, ideal/nonideal reactor design, mixing, coagulation/flocculation, discrete/floculant settling, filtration, air stripping, disinfection, adsorption, ion exchange and membrane technologies. Prereq: CE 57100. 3 HR./WK.; 3 CR.

H7600: Unit Processes in Environmental Engineering
Biological processes used to treat municipal wastewaters for BOD and nutrient removal; Activated sludge, trickling filters, rotating biological contactors, secondary settling and sludge thickening. Sludge stabilization processes, chemical and biological both aerobic and anaerobic. Prereq: CE 57100; coreq: CE H7700. 3 HR./WK.; 3 CR.

H7700: Biological Systems in Environmental Engineering
Prokaryotic and eukaryotic cell structure, origin and evolution of modern eukaryotes, microbial diversity and classification. Energy sources, chemolithotrophs, chemoorganotrophs, fermentation, respiration. Culture of microorganisms, types of culture media, enumeration of microbes in natural populations. Effects of environmental factors on growth. Virus structure, quantification, replication lysogeny, microbial genetics, mutations, recombinations, transformations, eukaryotic microbial genetics. Biogeochemical mineral cycling, detritus, wastewater microbiology, eutrophication. 3 HR./WK.; 3 CR.

H8300: Air Pollution and Control

H8400: Solid Waste Management

H9000: Advanced Foundation Engineering

I0000: Seminars
Recent developments in civil engineering; students report on assigned subjects. Topics to be announced. VARIABLE CR.

I1700: Finite Element Methods in Engineering
Equilibrium and variational formulations of finite element methods. Plane, axisymmetric, and shell elements. Isoparametric elements. Static and transient response of structures. Applications in potential flow, electrostatic thermal conduction field problems, and diffusion equations. Prereqs: CE 44000, and CE 53000; pre- or co-req.: H1000. 3 HR./WK.; 3 CR.

I2000: Travel Demand Forecasting
Consumer demand theory. Travel demand functions. Transportation cost and supply functions. Disaggregate and aggregate travel destination, route and modal choice models. Illustrations in practical situations
for various modes. Prereq: CE I2400, or approval of the instructor. 3 HR./WK.; 3 CR.

I2200: Transportation Asset Management
Definition of asset and asset management systems: definition, attributes, components, goals and objectives, benefits; consequences of poor asset management.
Transportation assets: physical plant, equipment, real estate, employees, customer goodwill, investments, funding sources.
Valuation and preservation of value: replacement asset value vs. depreciated asset value; minimizing real depreciation, maintaining asset value. Direct vs. indirect revenues; balance sheets: assets and liabilities, revenues and expenditures, return on investment; cash flow and income statements; depreciation schedules. Life-cycle cost analysis. Application to road, rail, airport, port, bridges, buses, trains, utilities, human resources, etc., with student projects and presentations. Prereq: ENGR 27600 & MATH 20100. 3 HR./WK.; 3 CR.

I2400: Analytical Techniques in Transportation
A survey of quantitative methods useful in transportation and traffic engineering.
Network analysis. Decision theory. Data analysis and statistical inference. Computer simulation. Prereq: basic probability and statistics (e.g. CE 26400). 3 HR./WK.; 3 CR.

I2600: Urban Transportation Planning
Transportation planning in context of U.S. policy, TEA21 and legislative planning mandates. The structure of the transportation planning process. Travel behavior, accessibility, mobility and land use. Role of demand and supply models. Evaluation of alternatives. Air quality and congestion and their impacts. Role of revenue and funding. Regional examples. 3 HR./WK.; 3 CR.

I2700: Transportation Policy
Role of policy and policy makers.
Legislation and its impact on transportation systems, system performance, and land use. Transportation institutions and their responsibilities. Models of policy formulation and policy analysis. Regional examples. 3 HR./WK.; 3 CR.

I2800: Transit Systems: Planning and Operations
Basic techniques of service area analysis, route development, scheduling, revenue estimation, and service improvements for fixed route bus and rail transit. Integration of fixed route transit with paratransit, matching mode with service area, relationship of transportation department with other departments, budgeting, and policy setting also will be discussed. 3 HR./WK.; 3 CR.

I2900: Transportation Project Evaluation
Methods of evaluating proposed projects including cost benefit analysis and alternative methods. How to value non-monetary impacts, e.g., time, life, clean air. Role of project evaluation within the planning process; evaluation criteria. Monitoring and evaluation of existing projects. 3 HR./WK.; 3 CR.

I3000: Structural Dynamics
Vibrations of elastic structures: Single degree and multi-degree-of-freedom systems; free and forced vibration; harmonic, impulsive and arbitrary loading; lumped parameter models. Analysis of dynamic response: Modal superposition; Numerical integration: introduction to inelastic behavior. Structural response to earthquake and wind loads. Damping characteristics of structures: Viscous, Viscoelastic and Friction Damping. Tuned mass dampers, passive energy dissipation systems. Prereq: CE 43500 and CE 44400; pre- or co-req.: H1000. 3 HR./WK.; 3 CR.

I3500: Applied Elasticity and Plasticity

I3600: Fracture Mechanics
Review of fracture patterns in solids. Griffith-Irwin crack theory; stress analysis and crack tip stress-intensity factors; fracture toughness; crack extension force. Surface flows; plate thickness, and temperature effects; fatigue-crack propagation and stress-corrosion cracking. Application to structural analysis and design to avoid failures; fracture control plans. Prereq: CE I3500. 3 HR./WK.; 3 CR.

I3800: Plates and Shells
Exact and approximate methods of solution for various types of supports and various shapes of plates in polar and rectangular coordinates. Effect of large deflections. Cylindrical and spherical shells; elastic and inelastic buckling of shells. Thermal stresses in plates and shells. Prereq: or co-req.: H1000. 3 HR./WK.; 3 CR.

I3900: Composites in Modern Structures

I4000: Traffic Control
Traffic laws and ordinances; regulatory measures; traffic control devices; markings, signs and signals; timing of isolated signals; timing and coordination of arterial signal systems; operational controls; flow, speed, parking; principles of Transportation System Management/Administration; highway lighting. State-of-the-art surveillance and detection devices and techniques. Prereq: CE H3500. 3 HR./WK.; 3 CR.

I4100: Intelligent Transportation Systems (ITS) : Fundamentals and Applications
Historical background of ITS, ITS functional areas and interrelationships; Advanced Traveler Information Systems (ATIS), Commercial Vehicle Operations (CVO), etc. ITS system architecture requirements. ITS technology and operational and implementation issues. Due to the cutting edge nature of the course, it is taught in a collaborative manner with outside speakers giving presentations on ITS implementation and technology and students presenting papers. 3 HR./WK.; 3 CR.

I4500: Advanced Transportation Planning
Current techniques of planning will be applied to a regional case study. Survey techniques, travel behavior, travel demand management strategies, project evaluation and ISTEA/CAA constraints will be reviewed for the study. 3 HR./WK.; 3 CR.

I4700: Planning and Design of Passenger Terminals
Passenger terminal as modal interface. Concepts of passenger levels of service. Simulation and queuing theory. Issues of security, access, location, and role in community. 3 HR./WK.; 3 CR.

I5400: Elastic and Inelastic Analysis of Structures
I5500: Stability of Structures

I5600: Earthquake Engineering

I5800: Structural Reliability

I6300: Water Resources Modeling
Finite-difference modeling and its application to groundwater flow problems. Topics include classification of second order partial differential equations, boundary and initial conditions, method of characteristics, Taylor series and control volume approaches to discretization, truncation and roundoff errors, and numerical stability, convergence and consistency. Numerical schemes are principally applied to the groundwater flow and advection-dispersion equations. Methods of integrating physical and hydrogeologic data into groundwater flow models are examined. Course also provides introduction to commercial groundwater flow software. Prereqs: CE 56100, CE H1000; knowledge of a programming language. 3 HR./WK.; 3 CR.

I7000: Wastewater Treatment Plant Design
Codes, regulations, and current practices used in design of municipal wastewater treatment facilities. Total facility planning and component design layout on typical site. Hydraulic profile, site grading, outline specifications, and preliminary report preparation. Field trips required. Prereq: CE H6400. 3 HR./WK.; 3 CR.

I9100: Soil Dynamics

I9200: Advanced Soil Mechanics

I9700: Report
Examinations, exploration, analysis, and chronicle of an engineering design, project, or system, from its inception through its development, consummation and consequent impacts. Written final report. Prereq: completion of nine CE credits applicable to master’s degree. 0 CR.

I9800: Project
Analytical or experimental project, preferably of student’s own choice. Under direction of a faculty advisor, student submits written proposal, performs the required task, and submits a written final report. Prereq: completion of nine CE credits applicable to master’s degree. 0 CR.

I9900: Research for the Master’s Thesis
6 CR.

J9900: Research for the Doctoral Dissertation
VARIABLE CR.

OTHER ENGINEERING COURSES
Other appropriate Engineering courses are listed under Graduate Engineering courses in the front section of the School of Engineering.

I0800: Foundations of Fluid Mechanics I

I1100: Introduction to Engineering Analysis

I1400: Applied Partial Differential Equations


I5200: Behavior of Inelastic Bodies and Structures

I6400: Wave Propagation in Fluids and Solids

J3000: Perturbation Techniques

J5000: Theory of Elasticity

FACULTY

Anil Agrawal, Associate Professor
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Dean of Engineering
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Megan B. Wiley, Assistant Professor
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Ann E. (Beth) Wittig, Assistant Professor
B.S., Univ. of California (L.A.); Ph.D., Univ. of Texas (Austin)

PROFESSORS EMERITI

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Anselm Cefola
Carl J. Costantino
Charles W. Cunningham
Norman C. Jen
Charles A. Miller
Gerald Palevsky
George Papoulas
Ming L. Pei
Joseph Pistrang
Eli Plaxe
Morris Silberberg
James R. Steven
The Institute for Municipal Waste Research, a University-wide institute chartered in 1991, is headquartered in the School of Engineering. It was formed to mobilize the intellectual resources of the university to assist New York City and other urban communities across the nation in finding and implementing solutions to the problems of municipal waste. It conducts research on the generation, treatment, processing, recycling, and disposal of municipal waste, as well as on other related topics. The research encompasses both technical and federal agencies having responsibility for municipal waste, as well as on other related topics. The research encompasses both technical and federal agencies having responsibility for municipal waste, as well as organizations representing the public interest. Areas of current technical interest include improved methods for water and waste treatment, heat treatment of sewage sludge to increase methane production, ground water contamination, incinerator modeling and simulation, and alternatives to landfill disposal (e.g., utilization of incinerator ash in concrete).

**Current Research Areas**

The Institute is currently involved in several projects that are funded by federal, state and city agencies. These projects are primarily involved with water quality issues. Water disinfection and biostability of drinking water systems are of primary concern. Different disinfection alternatives using chlorine and ozone are being considered. Byproduct formation and identification during disinfection is an additional area of interest in on-going and proposed projects.

Water pollution control represents another active area of research that is currently funded. As a result of the Long Island Sound Study, nitrogen has been identified as the limiting nutrient of concern in the Sound. A mass balance performed on the Sound indicated that point sources such as discharges from wastewater treatment plants are significant contributors of nitrogen. The Institute, working with the New York City Department of Environmental Protection, is developing and testing innovative technologies that can be implemented at existing treatment plants to improve nitrogen removal from municipal wastewaters. The studies involve bench-scale experiments and demonstration of selected technologies in full scale treatment facilities.

**Graduate Study in Environmental Engineering and Water Resources**

Graduate programs in environmental engineering and water resources are offered by the Department of Civil Engineering. Students with a Bachelor of Engineering or Bachelor of Science degree can enroll in the graduate program and earn either a Master of Science or a Master of Engineering degree. Professionals who are currently practicing in different disciplines of Engineering may also enroll in the Department and earn a Certificate of Advanced Study in environmental engineering or water resources. Further information may be obtained from the Civil Engineering Department.
The CUNY Institute for Transportation Systems is a multi-disciplinary inter-college effort which addresses transportation issues affecting the economic and social life of the city, state, and region. Institute activities include pure and applied research, policy analysis, analysis of urban transportation systems, pavement and bridge asset management systems, intelligent transportation systems, transportation economics, modeling, forecasting, professional training and development, outreach to inform and attract students to careers in engineering and transportation, and outreach to inform and empower the public concerning transportation issues.

Founded in 1985, the Institute conducts research on all forms of surface transportation including the movement of people and goods, and the provision of services. Among the objectives of the Institute are to disseminate research findings and to serve as a resource to New York City and New York State agencies involved with transportation issues. Some of the current research topics are recycled and composite materials for pavements, life cycle cost analysis of new and rehabilitated pavements, non-destructive testing of urban street pavements, utility cut restoration techniques, urban pavement management systems, transit management, incident management and urban goods movement. Several laboratories are affiliated with the Institute, including Transportation Engineering (Civil Engineering), Powder Technology (Chemical Engineering), and Materials Characterization (Mechanical Engineering).

The Institute’s current outreach efforts include the Transportation Careers (TRAC) program and the Federal Highway Administration-sponsored Summer Transportation Institute (STI) targeting high school students; and the development of a plain English transportation empowerment guide for grass roots community dissemination. Past outreach efforts included the U. S. Department of Transportation Office of Small Business Development Utilization-sponsored Electronic Training and Technical Assistance Program (ETTAP) targeting S/DBE’s, and the Metranet Project (1986 to 1990), a program which fostered communication between public officials and private providers of transportation. The Metranet project sponsored forums, conferences and workshops, and published a newsletter. Over 5,000 people were involved in the Metranet programs, which were sponsored by the Urban Mass Transportation Administration of the U. S. Department of Transportation.

The Institute offers an ongoing professional training program for foreign transportation professionals in cooperation with the International Road Federation, with funding from such multinational agencies as the World Bank and the African Development Bank. These programs are normally intensive menus of coursework, individualized instruction and on-site exposure and training, specifically tailored to the needs of one or more individuals from a designated highway or road authority, and extend from 12 weeks to 18 months. To date these professionals have included officials from Korea, Japan, West Bank, Ethiopia, China, Taiwan, Eritrea, Ghana, Zambia, Tanzania, Lesotho and Syria.

Professional training is also offered to city, state and regional agency/industry professionals in the form of both short and “long” courses, some of which are tailored to the specific needs of a requesting agency.

The CUNY Institute for Transportation Systems is the lead institution for a consortium of twelve universities that have been designated as a federally sponsored University Transportation Research Center (Region II). The Center serves New York, New Jersey, Puerto Rico, and the Virgin Islands. Consortium members include: Princeton, Cornell, New York University, Polytechnic University, Rensselaer Polytechnic Institute, New Jersey Institute of Technology, Rutgers University, University of Puerto Rico, and University of the Virgin Islands. Participating CUNY colleges in the Institute are City, Baruch, Bronx Community, the Graduate School, Hunter, John Jay, LaGuardia Community and New York City Technical. The Institute also includes Hostos and Lehman colleges in its outreach programs. The Institute is located at The City College.

The Institute is an active member in a number of professional associations such as the American Road and Transportation Builders Association, the International Road Federation, New York Public Transit Association, the American Public Transit Association, and the Women’s Transportation Seminar.
Center for Water Resources and Environmental Research (International Center for Environmental Resources and Development)

Professor Reza M. Khanbilvardi, Director • Office: Steinman 107 • Tel: 212-650-8200

General Information

The Center for Water Resources and Environmental Research (CWRER) coordinates the resources of the College’s world-class engineering and science faculty as well as those at other CUNY campuses and professional communities to address a broad array of environmental problems.

CWRER is tackling the diverse problems of water resources and environmental issues with broad approaches beginning with research on the sources of natural hazards, pollution movement, surface water and groundwater cleanup, wetland preservation, reservoir protection, environmental remote sensing, hydraulics and hydrology of natural flow systems, non-point source pollution, preservation of ecology, and related topics. Included are both technical and social/political issues arising from these problems.

The Center’s objectives are:

To develop and execute training programs in corporate and community communications, marketing and international business and financial management.

CWRER comprises two divisions:

Water Resources and Environmental Research
In addition to water resources and environmental research, this division focuses on air and water pollution crisis management, remote sensing and global change impact, environmental technology and research, and education and training programs within economic, political and social contexts.

The division also offers educational course work in water resources, environmental engineering and ecology for career development, operator training and public information.

Remote Sensing Science and Technology
A program which provides scholarships to recruit and educate students from underrepresented minorities for professional opportunities within the National Oceanic and Atmospheric Administration, and to conduct research consistent with NOAA’s mission: environmental assessment; prediction; and stewardship. A multi-institutional center (NOAA-CREST) led by The City University of New York (CUNY), including The City College, Lehman College, the CUNY Graduate Center and Bronx Community College, in collaboration with Hampton University in Virginia, the University of Puerto Rico at Mayaguez, the University of Maryland Baltimore County, Bowie State University in Maryland and Columbia University.

CWRER activities cover the following areas:

Groundwater Problems
Pore-scale and field-scale modeling of contaminant transport in unsaturated and saturated soils
Experimental studies for parameter estimation in porous media
Development of technology for contaminant detection and monitoring in groundwater systems

Waste Treatment Problems
Treatment and disposal of municipal and industrial wastewater and solid waste
Alternative disinfection in wastewater treatment

Surface Water Problems
Application of advanced technology, such as Geographic Information Systems and remote sensing, for hydrological evaluation of watersheds
Development of mathematical models for prediction and evaluation of non-point source pollution
Development of alternatives for proper water resources planning and management
Effect of climate changes on hydraulics and hydrology of water resources

Environmental Remote Sensing
Assessment of regional air quality
Monitoring diverse conditions of coastal and inland waters
Improve climate and environmental observation to predict changes in the Earth’s environment

Land and Coastal Problems
Development of technology for beach protection
Mathematical modeling for evaluation and protection of tidal wetlands
Theoretical and experimental studies of beach erosion

Studies of soil erosion and its control

Land loss processes, such as landslides: study and control

**Water Treatment Problems**

Chemistry of ozonation and chloramination in combined application

Application of aeration processes for the removal of volatile organics

Removal of lead

**Ecological and Health Problems**

New methods and technologies of detecting contaminants in the air

Job-related solid particles in the air and their health importance

Studying the fate of radioactive wastes

Pollution ecology of water bodies

Relationship between aquaculture and environment

Geographically, the Center is not only active in the USA, but foreign countries as well. Agreements on multinational cooperation have been reached with some former republics of the USSR and Macedonia.

**Facilities Available for the Center**

Hydraulics Laboratory

Soil Mechanics Laboratory

Environmental Engineering Laboratory

Experimental Fluid Mechanics and Aerodynamics Laboratory

Weather Station

Photonics Engineering Laboratories

Environmental Remote Sensing Laboratory

Biology Department Facilities:

  - Laboratory for Invertebrate Ecology
  - Laboratory for Microbial Ecology
  - Laboratory for Genetics of Phytoplankton
  - Laboratory for Wetland Ecology
  - Biomathematical Laboratory
  - Electron Microscope Laboratory
  - Radiobiology Laboratory
  - Biological Media and Sterilization Center
  - Biosolid Mechanics Laboratory

Computing Facilities

**New Facilities**

Recently three major facilities have been implemented: (a) a state-of-the-art wave tank with fully automated 2-D Laser Doppler Anemometer and Particle Image Velocimetry devices, (b) a mobile laboratory equipped with laser and electronic sensors for field monitoring and pollution detection in natural water bodies, and (c) Geographical Information Science (GIS) laboratory, funded by NASA, with a multimedia classroom facility and computational facilities for remote sensing and GIS applications. These two last additions are believed to be the only ones in the Northeast.

**Funding Agencies**

Below is a list of some agencies providing funding for the projects carried out by faculty members of the CWRER:

- US Department of Agriculture
- US Agency for International Development
- US Department of Transportation
- US Army Corps of Engineers
- National Science Foundation
- NASA
- NOAA
- EarthWatch
- New York City Department of Environmental Protection
- New York City Department of Sanitation
- New York State Energy Research and Development Authority
- New York State Institute for Solid Waste Combustion
- Suffolk County Department of Public Works
- Civilian Research and Development Corporation
- Sloan Foundation
The City College offers the following master’s degree in Computer Science:

**M.S. (C.Sc.)**

### DEGREE REQUIREMENTS

#### Required Courses

Choose eight courses (3 cr. each) from those listed below with at least one course in each area.

**24**

**Algorithms and Complexity**

*Computer Science:*
- I0500: Computer Graphics
- I0600: Fundamental Algorithms
- I0900: Graph Theory and Algorithms
- I1200: Topics in Algorithms
- I1300: Searching and Sorting
- I1400: Analysis of Parallel Algorithms
- I2600: Computational Complexity

**Software and Information Systems**

*Computer Science:*
- I0400: Operating Systems
- I0700: Compiler Construction
- I0800: Topics in Software Systems
- I1000: Database Systems I
- I1100: Database Systems II
- I3100: Seminar in Information Systems

**Intelligent Systems**

*Computer Science:*
- I1500: Artificial Intelligence
- I1600: Natural Language Processing
- I1800: Topics in Artificial Intelligence
- I1900: Pattern Recognition and Machine Learning

**Theoretical Computer Science**

*Computer Science:*
- I2000: Introduction to Theoretical Computer Science
- I2100: Finite Automata and Models of Computation
- I2200: Theory of Computability
- I2300: Symbolic Computation
- I2400: Formal Language Theory
- I2800: Topics in the Theory of Computing

**Computer Architecture and Communications**

*Computer Science:*
- I4200: Computer Architecture
- I4300: Computer Communication
- I4330: Advanced Topics in Internet Programming
- I4600: Topics in Computer Architecture
- I4700: Topics in Computer Communications
- I4800: Algebraic Coding Theory
- I4900: Computer Security

**Scientific and Statistical Computing**

*Computer Science:*
- I6000: Mathematics for the Analysis of Algorithms
- I6100: Mathematical Programming I
- I6200: Mathematical Programming II
- I6300: Decision Analysis
- I6400: Topics in System Simulation
- I6600: Probabilistic Models in Computer Science
- I6700: Topics in Scientific and Statistical Computing

**Additional Requirements**

Students must either:

* complete a 6 credit thesis (CSc I9900) under the direction of a member of the faculty, or:
* complete both a 3 credit project (CSc I9800) under the direction of a member of the faculty and an additional 3 credit course numbered I1000-I6800 in Computer Science; or
* complete both CSc I9600 (3 credits) and the report CSc I9700 (0 credits) and an additional 3 credit course numbered I1000-I6800 in Computer Science as an elective. Note that CSc I9600 and CSc I9700 must be taken in the same semester.

With the approval of the student’s graduate advisor, a course in another Engineering discipline may be substituted for the elective Computer Science course in the second and third options.

**Total Credits**

30

### COMPUTING FACILITIES

An extensive array of computing facilities is available to Computer Science students. The Department has several laboratories equipped with state-of-the-art computers and workstations which support teaching and research. These computers are connected to the School of Engineering network which is linked to the Internet.

### COURSE DESCRIPTIONS

**G9700: Report**

0 CR.; SATISFIES NON-COURSE REQUIREMENT

**I0000: Seminars in Computer Science**

Recent developments in computer science. Students report on assigned subjects. Topics to be announced. VARIABLE CR.

**I0102: Database Security and Integrity**

The course will cover topics such as: database concepts, architecture, and models, plus database security and integrity in general. Specific areas include: privacy, models of database security, authorization languages and classes, data integrity, auditing and controls, and enforcement design (IMS, DB2, INGRES; distributed database systems, and object-oriented database systems). 3 HR./WK.; 3 CR.

**I0400: Operating Systems**

Underlying theoretical structure of operating systems; input-output and storage systems, data management and processing; assembly and executive systems, monitors; multiprogramming. Prereq: CSc 33200 or an equivalent undergraduate course. 3 HR./WK.; 3 CR.

**I0500: Computer Graphics**

An intensive introduction to computer graphics hardware, design of graphics packages, geometric transformations, 3D viewing
and projections, raster scan conversion, visible surface determination, lighting and shading, 3D shape representation, and splines. Emphasis is on implementation of important graphics algorithms. Prereqs: Csc 32200 and Math 34600 or equivalent. 3 HR./WK.; 3 CR.

I0600: Fundamental Algorithms
An intensive study of advanced non-numerical programming techniques. Data representation; list, tree and string manipulation algorithms. Recursive programming. Introduction to searching and sorting. Storage management algorithms. Comparative efficiency of algorithms. Prereq: Csc 22000 or equivalent. 3 HR./WK.; 3 CR.

I0700: Compiler Construction
Techniques involved in analysis of source languages and generation of efficient object code. Parsing methods, storage allocation, programming language semantics, optimization techniques, interpreters, study of existing compilers and their special features. Prereqs: Csc 22000 and Csc 30400 or equivalent. 3 HR./WK.; 3 CR.

I0800: Topics in Software Systems
Selected topics from meta-compilers, concurrent operating systems, semantics of programming languages, information networks, and advanced database systems (database logic and relational databases). Prereqs: departmental approval and Csc 33200 or equivalent. 3 HR./WK.; 3 CR.

I0807 Image Processing
An intensive introduction to imaging intended for graduate students and advanced undergraduates. Topics include digital filtering theory, image enhancement, image reconstruction, anti-aliasing, warping, and state-of-the-art special effects. These topics form the basis of high quality rendering in computer graphics, as well as low-level processing for computer vision, remote sensing, and medical imaging. Emphasizes computational techniques for implementing useful image processing functions. Programming assignments will reinforce material covered in class. Prereq: Csc 32200 or equivalent. 3 HR./WK; 3 CR.

I0900: Graph Theory and Algorithms

I1000: Database Systems I
An introduction to database architecture. Levels of abstraction in a database system, physical data organization, abstract data models, relational database systems, and their query language. Prereqs: Csc 22000 and Csc 33200 or equivalent. 3 HR./WK.; 3 CR.

I1100: Database Systems II
Logical models for database management systems, especially relational, hierarchical and network. Case studies illustrating their implications for applications system development. Physical implementation of advanced data and storage structures. Prereq: Csc I1000 or equivalent. 3 HR./WK.; 3 CR.

I1200: Topics in Algorithms
Recent developments in the design, analysis and implementation of concrete algorithms and their applications. Topics chosen from sequential, parallel, probabilistic, combinatorial and approximate algorithms. Prereqs: Csc 22000 and Csc 30400 or equivalent. 3 HR./WK.; 3 CR.

I1300: Searching and Sorting
Analysis of algorithms for manipulating advanced internal and external data and storage structures. Analysis of internal and external sorting procedures. Particular emphasis on application system development. Prereqs: Csc 22000 or equivalent. 3 HR./WK.; 3 CR.

I1400: Parallel Algorithms
Techniques of efficient program design. Analysis of parallel algorithms chosen from information storage and retrieval, graph theory, pattern matching, matrix operations, etc. as to their time, space, and other resource requirements. Lower bounds for the intrinsic computational difficulty of some of these programs. Prereqs: Csc 22000, Csc 30400 and Csc 44800 or equivalent. 3 HR./WK.; 3 CR.

I1500: Artificial Intelligence
The study of how to make the computer behave “intelligently.” State-space methods of problem solving, heuristic search techniques, representation and use of knowledge, mechanical theorem proving, psychological implications. Examples of games playing, problem solving, or other systems. Prereqs: Csc 22000, Csc 30400 and Csc 44800 or equivalent. 3 HR./WK.; 3 CR.

I1600: Natural Language Processing
Methods for processing English texts and dialogues on the computer. Parsing, transformational analysis, semantic analysis, interfacing: examples of natural language systems for carrying on dialogues and performing tests. Prereqs: Csc 44800, or Csc I1500 or equivalent. 3 HR./WK.; 3 CR.

I1800: Topics in Artificial Intelligence
Selected topics from expert systems, automated systems and robotics; automated reasoning; computer vision. Prereq: Csc 44800 or Csc I1500 or equivalent. 3 HR./WK.; 3 CR.

I1896: Computer Vision
A survey of the techniques used in computer vision, which recovers information from images. There will be theoretical and programming homework, exams, and an individually chosen final project. The course will cover the geometry of image formation; multiple 2D techniques for feature detection, image segmentation, object recognition, and texture; and 3D shape from shading, stereo and motion. Some mathematical maturity is assumed, including familiarity with linear algebra, multidimensional calculus and simple statistics. Prereqs: Csc 22000, 22100 and Math 34600 or equivalent. 3 HR./WK.; 3 CR.

I1900: Pattern Recognition and Machine Learning
Generalization and classification; pattern recognition and perception; concept formation; remembering and forgetting; learning and hypothesis formation. Prereq: Csc 44800 or Csc I1500 or equivalent, and knowledge of Linear Algebra. 3 HR./WK.; 3 CR.

I2000: Introduction to Theoretical Computer Science
Fundamental concepts from logic, models of computation, and complexity theory. Scope and limitations of various formalisms. The Chomsky hierarchy of languages and machines. Basic ideas for recursive functions. Impact on programming systems. Prereqs: Csc 30400 or equivalent. 3 HR./WK.; 3 CR.

I2100: Finite Automata and Models of Computation
Structure of finite state and combinational sequential machines. Partition and the substitution property. Homing and diagnosing experiments. Linear vs. non-linear machines. Deterministic vs. probabilistic machines. Impact on the design of efficient, reliable, and secure switching systems. Prereq: Csc 30400 or Csc I5200 or equivalent. 3 HR./WK.; 3 CR.

I2200: Theory of Computability
Formulations of effective computability: Sheperdson-Sturgis machines. Turing type models, recursive functions, and semi-Thue systems. The equivalence of the various formulations. Church’s Thesis. Fundamental theorems of computability: universal machines, S-M-N, and recursion theorem. Unsolvable problems. Recursive and r.e. sets. Prereq: Csc 30400 or Csc I2000 or equivalent. 3 HR./WK.; 3 CR.
12300: Symbolic Computation
A comparative study of the structure and use of various functional, logical and sequential languages used in non-traditional applications and artificial intelligence. Choice of appropriate programming tools for specific applications. Comparison of user/machine interfaces. Prereqs: CSc 30400 or CSc I2000, or equivalent. 3 HR./WK.; 3 CR.

12400: Formal Language Theory
Classification of languages by grammars and automata. The Chomsky hierarchy: regular, context free, context sensitive and recursively enumerable languages and their associated grammars and automata. Decision properties for families of languages. Decision problems for grammars and automata. Prereq: CSc 30400 or CSc I2000 or equivalent. 3 HR./WK.; 3 CR.

12600: Computational Complexity
Complexity measures for algorithmic systems, determinism vs. non-determinism, time vs. space, complexity hierarchies, aspects of the P-NP question, inherent complexity of specific algorithmic problems, recent applications to cryptography. Prereqs: Csc 30400 and Csc 22000 or Csc I0600. 3 HR./WK.; 3 CR.

12800: Topics in the Theory of Computing
Topics of current interest, such as program correctness, mechanical theorem proving, parallel computation, automata theory, advanced topics in abstract complexity, formal systems and their decision problems. Prereq: Csc I2000 or departmental approval. 3 HR./WK.; 3 CR.

13100: Seminar in Information Systems
Discussion will focus on current topics of interest (e.g., database security, information networks, natural language query systems). Students are required to submit a paper on an approved topic. There will be a number of invited speakers from industry. Prereqs: Csc I1000. 3 HR./WK.; 3 CR.

13110: The Information Marketplace
All aspects of the market for computer-based information products and services. Course objectives are to define and characterize the information marketplace, to present concepts and methods for analyzing behavior within the marketplace, and review public and private policy implications of the information marketplace. Prereq: strong background in Economics and permission of the instructor. 3 HR./WK.; 3 CR.

14200: Computer Architecture
Computer arithmetic and logic, storage system structure. Data-flow logic. Control and sequencing. Input-output in a multiprogramming system. Prereq: CSc 34000 or equivalent. 3 HR./WK.; 3 CR.

14300: Computer Communications
Introduction to the structure of teleprocessing systems with real time capability. Properties of terminals, data sets, communication control units, and concentrators. Existing common carriers, communication facilities, standard data transmission codes, and line control procedures. Supervisory programs to control flow of data and allocation of resources in the central processing unit. Message flow tracing and bottleneck identification. Prereqs: Csc 34200 and Csc 32200 or equivalent. 3 HR./WK.; 3 CR.

14330: Advanced Topics in Internet Programming
The first part of the course will deal with platform independent software and data for Internet programming. The second part will address Web Services—messaging over standard web protocols. Students will be exposed to current technologies and standards. Topics discussed may include: distributed objects and remote invocation, messaging, name services, security. Prereq: Csc 22100 or equivalent. 3 HR./WK.; 3 CR.

14600: Topics in Computer Architecture
Selected topics from parallel architectures, VLSI systems, teleprocessing, and fault tolerant systems. Prereq: Csc 34002 or Csc I4200 or equivalent. 3 HR./WK.; 3 CR.

14633: Multimedia
Algorithms and software that handle and manipulate interactively digital sound, image, animation and video. Topics covered include digital sound formats and conversion factors affecting sound quality, digital image formats and conversion, image compression and factors affecting image quality, digital video formats and standards, video compression methods, videoconferencing and interactive media. Prereqs: Csc 32200 and good programming knowledge. 3 HR./WK.; 3 CR.

14700: Topics in Computer Communications
Advanced concepts in computer organization and an introduction to the fundamental principles of computer communication networks. Microprogramming, multiprocessing and parallel processing. Resource sharing, packet switching techniques and ARPANET. Computer network software to implement protocols, flow control and performance measurements. Techniques for network optimization, including switch location and communication channel capacity assignments. Prereq: Csc I4300 or equivalent. 3 HR./WK.; 3 CR.

14800: Codes, Cryptography, and Secure Communication
Concepts from probability and information theory, entropy, codes for compression, error-correcting codes, secrecy codes, block ciphers and public key cryptosystems, cryptographic protocols for secure communication, introduction to quantum cryptography. Prereqs: Csc 30400 and Csc 34200 or equivalent. 3 HR./WK.; 3 CR.

14900: Computer Security
An introduction to the principles and practices of computer security in various computing environments. Conventional encryption systems and classical cryptography. Confidentiality using conventional encryption. Public key encryption and protocols for authentication and digital signatures. Recent cryptanalytic attacks on conventional and public key systems. Intruders, viruses, and trusted systems. Firewalls and internetwork security. A survey of applications and problems arising in contemporary computer security. Prereqs: Csc 30400 and Csc 22000 or equivalent. 3 HR./WK.; 3 CR.

16000: Mathematics for the Analysis of Algorithms
Those areas of mathematics necessary for the advanced analysis of algorithms: manipulation of sums, solving recurrences, number theory, binomial coefficients, special sequences, generating functions, and asymptotics. Prereq: Csc 22000 or Csc I0600. 3 HR./WK.; 3 CR.

16100: Mathematical Programming I

16200: Mathematical Programming II
Convex functions and convex sets, Gradient, conjugant gradient, and variable metric methods. Kuhn-Tucker and duality theory. Nonlinear programming algorithms. Integer programming, branch and bound methods. Dynamic programming. Prereq: Csc I6100. 3 HR./WK.; 3 CR.

16300: Decision Analysis
An introduction to decision-making under uncertainty. Bayes and minimax criteria. Utility theory, treatment of risk, and the value of information. Two-person and n-person games, stochastic linear programming models, policy improvement algorithm. Markovian decision processes. Application to system design, management,
and production. Prereqs: CSc 22000 or CSc I0600, and an undergraduate course in probability. 3 HR./WK.; 3 CR.

I6400: Topics in System Simulation
Simulation methodology, design, and analysis of simulation experiments. Generation and testing of random variates. Variance reduction techniques. Simulation languages. Analysis of queuing models on computer systems simulation. Prereqs: CSc 22000 and 21700 or equivalent. 3 HR./WK.; 3 CR.

I6600: Probabilistic Models in Computer Science
Introduction to queuing theory. Birth and death processes. Single server and multiple server queuing systems. Priority disciplines. Time sharing and multiprogramming models. Selected topics in system reliability theory. Prereq: CSc 22000 or CSc I0600. 3 HR./WK.; 3 CR.

I6700: Topics in Scientific and Statistical Computing
Selected topics from computer algebra, advanced numerical methods, advanced numerical computation, advanced operations research topics, combinatorial computing, graph algorithms, cryptography. Prereq: CSc 22000 or CSc I0600. 3 HR./WK.; 3 CR.

I6730: Data Reduction in the Physical Sciences
A course in the reduction of data sets gathered by government agencies (NOAA and NASA). Data comes from satellite remote sensing and other atmospheric and oceanographic measuring systems. Prereq: Permission of the instructor. 3 HR./WK.; 3 CR.

I6744: Neural Computing
An introduction to neural networks and their applications. Material to be covered includes: models of a neuron, network architectures, visualization processes and artificial intelligence in neural networks, learning processes, the perceptron, multi-layer perceptrons. Prereqs: Math 20300, 34600 and a working knowledge of C or Fortran. 3 HR./WK; 3 CR.

I1896: Computer Vision
A survey of the techniques used in computer vision, which recovers information from images. There will be theoretical and programming homework, exams, and an individually chosen final project. The course will cover the geometry of image formation; multiple 2D techniques for feature detection, image segmentation, object recognition, and texture; and 3D shape from shading, stereo and motion. Some mathematical maturity is assumed, including familiarity with linear algebra, multidimensional calculus and simple statistics. Prerequisites: Equivalent of course work up to CSc 22000 and 22100 and Math 34600. 3 HR./WK; 3 CR.

I9600: Special Topics in Contemporary Computer Science
A research seminar course, focusing on a specialized and contemporary topical area of computer science. The course will present research articles and technology papers to students in the chosen topic, actively engaging them in the presented materials through their interactive discussions, writing of short summary reports, team projects, literature search and/or exams. Prereq: advanced graduate standing and permission of the instructor; coreq: CSc G9700 (zero-credit report). 3 HR./WK.; 3 CR.

I9800: Project
Experimental or theoretical project, under the direction of a faculty advisor. Student submits proposal, performs the required studies, and submits a written final report. Prereq: departmental approval. 3 CR.; SATISFIES NON-COURSE REQUIREMENT

I9900: Research for Master's Thesis
A research seminar course, focusing on a specialized and contemporary topical area of computer science. The course will present research articles and technology papers to students in the chosen topic, actively engaging them in the presented materials through their interactive discussions, writing of short summary reports, team projects, literature search and/or exams. Prereq: advanced graduate standing and permission of the instructor; coreq: CSc G9700 (zero-credit report). 3 HR./WK.; 3 CR.

FACULTY

Michael Anshel, Professor
B.A. (Math), Adelphi Univ., M.S., Ph.D.
Octavio Betancourt, Professor
B.S. (Engr.), Univ. of Chile, M.S. (Math); Ph.D. (Math), New York Univ.
Gary S. Bloom, Professor
A.B. (Phys.), Oberlin College; M.S. (Phys.), Univ. of Arizona; Ph.D. (E.E.), Univ. of Southern California
Peter Brass, Associate Professor
Dipl. Math, Dr. Reer Nat. (Math), Technical Univ. of Braunschweig
Stefan A. Burr, Professor
A.B. (Math), Univ. of California (Berkeley); M.A., Princeton Univ., Ph.D.
Izidor Gertner, Professor
M.S. (E.E.), KPI, Kaunas, Lithuania; Ph.D. (ECE), Technion (Israel)
Irina Gladkova, Associate Professor
B.S. (Mathematics), Donetsk State Univ.; Ph.D. (Mathematics) CUNY
Michael D. Grossberg, Assistant Professor
B.A., Univ. of Penn.; Ph.D., MIT
Akira Kawaguchi, Associate Professor
B.S. (Admin. Engr.), Keio Univ (Japan), M.S.; M.S., Columbia Univ., Ph.D.

Devendra Kumar, Associate Professor
B.Tech. (E.E.), Indian Institute of Technology (Kanpur); M.A. (C.Sc.), Univ. of Texas at Austin, Ph.D.
Esther Levin, Professor
Ph.D. (EE), Technion, Israeli Institute of Technology
Stephen Lucci, Associate Professor
B.S. (Math), SUNY (Stony Brook); M.S. (C.Sc.), The City College; Ph.D. (C.Sc.), CUNY
Daniel McCracken, Professor
B.A. (Math), Central Washington Univ., B.A. (Chem); M.Div., Union Theological Seminary
Abbe Mowshowitz, Professor
B.S. (Math), Univ. of Chicago; M.S. (Math), Univ. of Michigan, Ph.D. (C.Sc.)
Janos Pach, Distinguished Professor
M.S., Eotvos Univ., Ph.D.; Candidate’s Degree, Hungarian Academy of Sciences
Kaliappa Ravindran, Associate Professor
B.E. (E.E.), Indian Institute of Science, M.E. (C.Sc.); Ph.D. (C.Sc.), Univ. of British Columbia
George G. Ross, Professor
B.S. (Ch.E.), Cooper Union; M.S. (Ch.E.), New York Univ., M.S. (Math), Ph.D.
Douglas R. Troeger, Associate Professor and Chair
A.B. (Phil), Brown Univ., Sc. B. (Chem); Ph.D. (Math), Stevens Inst. of Tech.
Michael Vulis, Associate Professor
B.S. (Math), Leningrad State Univ. (Russia); M.S. (C.Sc.), CUNY, Ph.D. (Math)
Jie Wei, Associate Professor
B.S. (C.Sc.), Univ. of Sci. & Tech. of China (China); M.S. (C.Sc.), Chinese Academy of Sciences (China); Ph.D. (C.Sc.), Simon Fraser Univ. (Canada)
George Wolberg, Professor
B.E. (EE), Cooper Union, M.E. (EE); Ph.D. (C.Sc.), Columbia Univ.
Zhigang Zhu, Associate Professor
B.S., (C.Sc.), Tsinghua Univ., M.E., Ph.D.

PROFESSORS EMERITI

Stanley Habib
Valentin F. Turchin
The City College offers the following master's degrees in Electrical Engineering:

M.E. (E.E.) (Professional Master's Degree)
M.S. (Engineering) (Degree is awarded to students who do not have a bachelor's degree in engineering)

DEGREE REQUIREMENTS

Professional Master's Degree

Engineering Core Courses 12

Four courses from one of the following concentrations (all courses are three credits):

A. Computer Engineering
F5700: Digital Integrated Circuits
F6000: Computer Communications Systems
F6400: Computer-Aided Digital VLSI Design
G3300: Advanced Topics in Mobile Robotics
G3800: VLSI Design for Testability Technology I
G3900: VLSI Design for Testability Technology II
G5501: Introduction to Robotics
G6000: Communications Protocol Engineering
G9400: High Speed Networks
I2200: Image Processing
I2300: Digital Computers I
I2400: Digital Computers II
I2700: Parallel Computer Architecture
I4700: Introduction to Neural Networks
I6100: Integrated Circuits: Design and Fabrication I
I6200: Integrated Circuits: Design and Fabrication II
I7000: Local Area Networks

B. Systems Engineering
F5300: Digital Signal Processing
F5600: Elements of Control Theory
G3400: Analysis of Random Systems
I0100: Probability and Stochastic Processes
I0200: Random Functions
I0400: Signal Theory
I0500: Theory of Linear Systems
I1600: Digital Signal Processing Algorithms
I2200: Image Processing
I4100: Introduction to Modern Control Theory
I4700: Introduction to Neural Networks

C. Telecommunications Engineering
F5100: Communication Electronics
F5200: Fiber Optic Communications I
F6000: Computer Communication Systems
F6300: Wireless Communication
G6000: Communications Protocol Engineering
G6700: IP Routing
G7100: Statistical Communication Theory
I0100: Probability and Stochastic Processes
I7000: Local Area Networks
I7100: Statistical Communication Theory
I7300: Digital Communication
I7400: Data Communications
I8300: Fiber Optic Communications II

D. Photonics Engineering
F5200: Fiber Optic Communications I
F5400: Physical Electronics I
F5800: Introduction to Lasers
F6200: Principles of Photonics Engineering
I0300: Electrodynamics
I0800: Physical Electronics II
I1800: Electro-Optics
I8300: Fiber Optic Communications II
I8500: Optical Signal Processing

E. Electronics/Communication
F5100: Communication Electronics
F5200: Fiber Optic Communications I
F5400: Physical Electronics I
F5700: Digital Integrated Circuits
F6300: Wireless Communications
F6400: Computer-Aided Digital VLSI Design
I0100: Probability and Stochastic Processes
I0800: Physical Electronics II
I3200: Analog Integrated Circuits
I3600: MOS Devices and Circuits
I6100: Integrated Circuits: Design and Fabrication I
I6200: Integrated Circuits: Design and Fabrication II
I7100: Statistical Communication
I8300: Fiber Optic Communications II

Engineering Management Courses 6

Two courses from the following:
ENGR F3800: Management Concepts for Engineers
ENGR F9300: Economics and Investment Analysis of Engineering Projects
ENGR G7600: Engineering Business and Law
ENGR G8500: Project Management
ENGR G9400: Telecommunications Management
ENGR I8000: Decision and Planning Techniques for Engineering Management

Technical Electives: 6-12

Take courses from any of the above concentration areas, or any I0000 and J0000 course that may be offered except Engineering Management courses, with the restriction that a maximum of nine credits from EE F0000 series may be credited towards the degree.

Report/Project/Thesis: 0-6
Electrical Engineering
At least one of the following courses:
- I0000: Seminar (1 cr.)
- I9600: Master’s Report (0 cr.)
- I9700: Master’s Project (3 cr.)
- I9600: Master’s Thesis (6 cr.)

Total Credits 30
Note: A minimum GPA of 3.0 is required for graduation.

M.S. (Engineering) Degree
At least four courses from one of the specific concentration areas A, B, C, D, or E above:
12

At least three of the following courses:
Electrical Engineering:
- I0100: Probability and Stochastic Processes
- I0500: Theory of Linear Systems
- I0600: Applied Algebra
- I1100: Engineering Analysis
- I1200: Functions of Complex Variables

At least one of the following courses:
Electrical Engineering:
- I0000: Seminar (1 cr.)
- I9600: Master’s Report (0 cr.)
- I9700: Master’s Project (3 cr.)
- I9900: Master’s Thesis (6 cr.)

Elective Courses 0-6
Additional Graduate Electrical Engineering courses (from F0000, I0000, and J0000 sequence) except Engineering Management Courses. Prior approval of master’s advisor is needed for non-EE electives.

Note: A maximum of nine credits from the F0000 series may be credited towards the degree.

Note: A minimum GPA of 3.0 is required for graduation.

Total Credits 30

ADVICEMENT

Master’s Program
Professor Yi Sun

Doctoral Program
Professor Samir Ahmed

DEPARTMENT FACILITIES

Current EE Research Laboratories include:

Sponsored Centers:
- Cooperative Remote Sensing Science and Technology (CREST) Center sponsored by National Oceanographic and Atmospheric Administration (NOAA) is a consortium of five universities led by CCNY.
- University Research Center for Optical Sensing and Imaging (COSI) sponsored by NASA.
- Communication and Networks Alliance sponsored by Army Research Lab; this consortium of industrial and academic institutions is headed by Telecordia.
- New York State Center for Advanced Photonics Engineering Center in Ultrafast Photonics.

CCNY Centers:
- Center for Information Networking and Telecommunications (CINT)
- Institute for Ultrashort Spectroscopy and Lasers (IUSL)
- International Center for Environmental Resources and Development (ICERD)
- Photonics Engineering Center

Research Laboratories:

Other Research Facilities
Research equipment includes: Multi-wavelength Laser Radar (LIDAR) observatory. Mobile Remote Sensing Facility, Modelocked pico and femtosecond Ti: Sapphire lasers and Ti: Sapphire regenerative amplifier systems; Picosecond Q-switched, modelocked Nd: YAGand synchronously pumped tunable dye laser system; Picosecond Q-switched, modelocked Nd: YAGand dye laser/amplifier systems. Femtosecond CPM dye laser/copper vapor laser pumped dye amplifier systems; Fosterite lasers. Nanosecond Q-switched Nd: YAG and tunable optical parametric oscillator systems; large and small frame Argon ion lasers and cw tunable dye laser; semiconductors diode lasers; streak cameras; spectrophotometers and multi-channel optical analyzers; high dynamic range cooled CCD detectors, intensified reticon diode arrays, vidicon detectors, spatial light modulator, and thermal infrared imaging camera; vacuum deposition facilities for metals and polymers; cryogenics refrigerators and cryostats refrigerators and cryostats, high resolution microscopes, wedge bouncer, IC probe stations, and darkroom and mask fabrication facilities; spectrum analyzers, digital pattern generator and error detector, network analyzer; multi gigasample/second digitizing oscilloscopes, 60 GHz communication signal analyzer, 1 GHz and 400 MHz analog oscilloscopes; multimedia communication facilities and ATM switches; Wireless Communications Facilities.

Major computational facilities in the department include a network of 150 Sun workstations. In addition, a network of PC computers is used by graduate students and faculty researchers in the telecommunications and remote sensing areas. These networks are connected to other research facilities located on campus and to the CUNY Computational Center, as well as the National Computational Facilities through the Internet.

COURSE DESCRIPTIONS

F5100: Communication Electronics
Components of end-to-end communications systems. Noise of circuits and systems. Behavior of wide-band and tuned amplifiers; limits on small signal operation. Gain controlled amplifiers. Limiters, frequency multipliers, oscillators, coupling networks, non-linear elements; distortion, amplitude frequency and phase modulators, transmitters and low noise receivers. Prereq: EE 31200. 3 HR./WK.; 3 CR.

F5200: Fiber Optic Communications I
An overview of the fundamental components of an optical fiber link. Degradation, attenuation, and distortion mechanisms in
fibers. LED and laser sources. Detectors and receivers. Analog and digital modulation formats. Performance analysis. 3 HR./WK.; 3 CR.

**F5300: Digital Signal Processing**
Introduction to basic digital signal processing concepts; the finite Fourier transform, cyclic convolution, digital filters, Z-transform. Design of algorithms computing the finite Fourier transform and cyclic convolution, Cooley-Tukey and Winograd algorithms. 3 HR./WK.; 3 CR.

**F5400: Physical Electronics I**
Crystal Structures, reciprocal lattice, phonons, free electron model of metals, periodic potentials and energy bands, Fermi surface and conduction in metals, semiconductor materials. Prereq: EE 33300, EE 33900. 3 HR./WK.; 3 CR.

**F5600: Elements of Control Theory**
Treatment of performance through indices such as integral square error, integral time absolute error, etc. State Variable Design. Continuous and discrete systems. Prereq: EE 37100. 3 HR./WK.; 3 CR.

**F5700: Digital Integrated Circuits**
Design of logic circuits; TTL, MOS, ECL. Design of flip-flops and memories at the transistor level. Design of analog to digital converters. Digital to analog converters. Simple and hold circuits, and timing circuits. Interconnecting logic gates using transmission lines. 3 HR./WK.; 3 CR.

**F5800: Introduction to Lasers**
Review of Maxwell’s equations, geometrical optics, stability of optical cavities, Gaussian beam propagation and Gaussian beams in optical cavities, properties of resonant optical cavities, classical and Einstein model of the interaction of light and matter, laser oscillation and amplification. Gas, semiconductor and solid state lasers. Prereqs: EE 33300. 3 HR./WK.; 3 CR.

**F5900: Microprocessors**

**F6000: Computer Communication Systems**
Queueing theory, Markovian networks, message packet and circuit switching, assignment of link capacities and flows, routing algorithms, stability, flow control and error control, packet radio networks, multiple access schemes and network protocols. Prereq: EE I0100. 3 HR./WK.; 3 CR.

**F6200: Principles of Photonics Engineering**
Principles and CAD tools for the design of photonics systems and devices. Topics from ray tracing, lens design, optical imaging systems design and analysis, interferometry, Fourier optics, fibers, and waveguides, optical detectors, videodiscs, spectroscopy. Prereq: EE 33300. 3 HR./WK.; 3 CR.

**F6300: Wireless Communications**

**F6400: Computer-Aided Digital VLSI Circuits Design**
This course presents a systematic approach to the design of full-custom, very and ultra large scale integration (VLSI and ULSI) circuits, utilizing state-of-the-art electronic design automation (EDA) commercial engineering software – the Cadence Design System. It is to cover three major areas: CMOS Processing Technologies, High Performance Circuit Design techniques and Practices, Advanced EDA CAD Software Applications, coupled with relatively large scale (>one-million transistors) design projects. Prereq: EE44100, EE44400 and EE45700 (or equivalent). 3 HR./WK.; 3 CR.

**F6500: Direct Energy Conversion**
Review of principles underlying modern development for energy conversion. Applications to energy storage, photovoltaic conversion, thermoelectricity, fuel cells, magnetohydrodynamic generation, thermionic generation. Economics of direct energy conversion systems. Prereq: EE 33300, EE 33900. 3 HR./WK.; 3 CR.

**F6600: Communications Protocol Engineering**
Open systems interconnection (OSI) reference model, modeling communication protocols using finite and extended finite state machines, formal languages for protocol specification, real-life protocol specifications, verification of communication protocols, conformance testing methods, synchronization issues in testing, test representation languages. Prereq: F6000 or EE 46000. 3 HR./WK.; 3 CR.

**G3300: Advanced Topics in Mobile Robotics**
This is an advanced course in mobile robotics. Primary topics include control architecture, motion planning, localization and mapping, robot navigation, adaptation and learning and multi-robot systems. Prereq: G5501. 3 HR./WK.; 3 CR.

**G3400: Analysis of Random Systems**
Analysis of dynamic systems with random inputs, including: definitions of discrete and continuous random processes and the Markov property, processes with independent increments, Wiener and Poisson processes, forward and backward Kolmogorov equations, introduction to stochastic differential equations and the Ito calculus, and applications involving stochastic stability and optimal filtering. Prereq: EE I0100. 3 HR./WK.; 3 CR.

**G3800: VLSI Design for Testability Technology I**
This course is to cover concepts such as Economics of IC Test, Methods of Test, Testability and Measurements, Fault Models and Simulation, Test Pattern Generation, LogicTest, Memory Test, the IBM Level Sensitive Scan Design (LSSD) methodology, General Scan Design (GDS) methodology, Partial-and Full Scan designs, the IEEE 1149 boundary scan standards. Along with lectures, homework assignments, and exams, students are required to conduct at least one DFT design project to demonstrate understanding of DFT principles and methods. The main outcome is the basic understanding of DFT concepts and methods. 3 HR./WK.; 3 CR.

**G3900: VLSI Design for Testability Technology II**
This course is geared towards understanding of IC and SoC design methodologies such as IBM’s and TSMC’s ASIC sign-off processes, full- and partial-scan insertions, boundary scan insertion, synthesis of BIST structures, robust delay testing, test resource management, the IEEE 1500 standard for SoC solutions, and other advanced topics such as low-pin count testing and mixed-signal testing. Students are required to perform design projects using CAD software systems such as Cadence Design System and SynTest Technologies’ DEF solutions. The main outcome is the understanding of state-of-the-art technologies demonstrated through commercial CAD software systems, as well as learning and practicing industry solutions. Advanced students will be encouraged to explore new ideas in research projects. 3 HR./WK.; 3 CR.
G5501: Introduction to Robotics
Introduction: historical development of robotic systems, research perspectives;
Robot Manipulators: Homogeneous representation, robot kinematics and dynamics models, path and trajectory planning, robot motion control; Mobile Robots: kinematics model and dynamic model of wheeled mobile robots, motion planning and trajectory generation, navigation and mapping; Robot Sensing: visual and non-visual sensors. Prereq: EE 37100. 3 HR./WK.; 3 CR.

G6000: Communications Protocol Engineering
Open systems interconnection (OSI) reference model, modeling communication protocols using finite and extended finite state machines, formal languages for protocol specification, real-life protocol specifications, verification of communication protocols, conformance testing methods, synchronization issues in testing, test representation languages. Pre/coreq: F6000 or EE 46000. 3 HR./WK.; 3 CR.

G6700: IP Routing
This course focuses on the principles of IP Routing protocols and related quality of service protocols such as Diffserv, RSVP, and MOLS. Standard routing protocols such as RIP, OSPF, and BGP will be discussed in details. Graph theory and optimization methods in path computations will be covered. The course will also discuss traffic engineering methods in IP networks. Finally, TCP/IP protocol analysis and end-to-end path establishment will be covered. Prereq: EE 54600 or EE 46000. 3 HR./WK.; 3 CR.

G7100: Wireless Multimedia Networks
Advances in wireless communications, especially in the area of bandwidth and mobility, made it possible for users to communicate using multi-media. This course emphasizes current and future networking technologies to support multimedia including WPAN, WLAN, WMAN, and WWAN, and convergence of various networks and services. Discussion covers technical issues from Physical layer to Application Layer, as well as a few contemporary issues of interest. Prereq: F6000 and F6300. 3 HR./WK.; 3 CR.

G9400: High Speed Networks

I0000: Seminar
Invited speakers and reports of graduate student research. 1 HR./WK.; 1 CR.

I0100: Probability and Stochastic Processes
Probability space, outcomes and events, random variables, distribution and density functions, limit theorems, functions of random variables, discrete and continuous stochastic processes, mean square estimation and prediction problems. 3 HR./WK.; 3 CR.

I0300: Electrodynamics

I0400: Signal Theory
Signal representations and transforms; Banach and Hilbert signal spaces; Orthogonal decompositions, wavelets; duality; signal theory in distribution spaces; convergence, differentiation and convolution of distributions; Laplace and Fourier transforms of distributions; systems theory in distribution spaces, convolutional systems; operational calculus; spectral properties of signals; generalized sampling theory. 3 HR./WK.; 3 CR.

I0500: Theory of Linear Systems
Review of time and frequency domain analysis of continuous and discrete linear systems. Extension to time varying cases. States and state variables. Matrix formulation and general solutions. State transition matrix, adjoint systems; stability, observability, and controllability. Minimal realization. 3 HR./WK.; 3 CR.

I0800: Physical Electronics II
Classical and quantum theory of harmonic crystals, Phonons and phonon dispersion relations, plasmons, polaritons, polarons, optical processes and excitations, dielectrics and ferroelectrics, diamagnetism, paramagnetism, ferromagnetism, superconductivity. Prereq.: EE 54600. 3 HR./WK.; 3 CR.

I1600: Digital Signal Processing Algorithms
The latest developments in Digital Signal Processing (DSP) algorithms and their implementation on various computers. A survey of basic algebra is given, the tensor product will be a recurring theme. The Cooley-Tukey FFT algorithm and its variants are unified under the banner of tensor product formulation. The Good-Thomas Prime Factor algorithm is also reformulated in this way. Various linear and cyclic convolution algorithms are described; results of the Cook-Toom and the Winograd are emphasized. Newly developed multiplicative FFT algorithms will be introduced. Techniques of writing efficient FORTRAN code. Prereqs: EE 30600 and EE 55300. 3 HR./WK.; 3 CR.

I2200: Image Processing
Image acquisition and representation of monochromatic and color images. Data compression techniques for image transmission including predictive and transform coding. Practical compression techniques, including progressive transmission, JPEG and MPEG. Prereqs: EE F5300 and EE I0100. 3 HR./WK.; 3 CR.

I2300: Digital Computers I
The structure and design of digital computing systems; a subsystem’s approach to the behavior and implementation of computer arithmetic and logic circuitry, storage systems, control circuitry, and input-output. Algorithms and flowcharting; computer codes; utilization of combinational and sequential switching theory in design of computer logic circuits; organization of storage systems. A modular approach to computer construction and ultimate use in higher phases of the hierarchy of machine structures. Prereq: EE 54600. 3 HR./WK.; 3 CR.

I2400: Digital Computers II
Study of complex processors, multiprocessors, time sharing systems, and real time systems. Case histories in system architecture and design; impact of future technologies on computing machinery; concepts and design of ultra-reliable, ultra-available digital computers. Prereq: EE I2300. 3 HR./WK.; 3 CR.

I3200: Analog Integrated Circuits
Design of analog integrated circuits. Modeling of integrated circuits components. Current mirrors; Differential amplifiers with active loads; Band gap references; operational amplifiers; Feedback; Noise in integrated circuits. Prereq.: EE34200. 3 HR./WK.; 3 CR.

I4600: Analysis and Design of Intelligent Systems
Analysis of intelligent systems, such as those that can solve differential equations in symbolic form, understand human speech, and recognize objects in a scene. Methods of solving problems in artificial intelligence areas will be discussed. Predicate calculus. Rule based deduction system. Expert systems. 3 HR./WK.; 3 CR.

I4700: Introduction to Neural Networks
Overview of Neurocomputing, definition of neural network, motivation to use neural network, simple perceptron, its capability
and limitations, learning laws in perceptron, linear, nonlinear and stochastic units, multilayer networks, concept of hidden units, learning rules, the delta rule, the generalized delta rule, feed-back neural networks, Grossberg, Kohonen and Hopfield models, specific applications in pattern recognition and image processing problems. Coreq: EE I0100. 3 HR./WK.; 3 CR.

I6100: Integrated Circuits: Design and Fabrication I
Introduction to physics of IC processing: epitaxial growth, diffusion, oxidation, ion implantation, evaporation, and sputtering. Bipolar IC processing function, oxide and air isolation, analog IC design, OP amps and other circuits. MOS processing: metal and poly gate and self aligned structure, CMOS. Digital IC design. Analysis of ECL, T2L, I2L and MOS logic design. 3 HR./WK.; 3 CR.

I6200: Integrated Circuits: Design and Fabrication II
Circuit layout for silicon Ics. Thin film and VLSI design film circuits. Analog and digital system applications. Measurement and testing, assembly, yield, failure and reliability. Prereq.: EE I6100. 3 HR./WK.; 3 CR.

I7000: Local Area Networks
LAN topology (bus, ring, star, tree, etc.). Transmission media. IEEE 802 protocol standards. Accessing schemes, ALOHA, carrier, sense multiple access (CSMA/CD), token passing, polling, reservations schemes, etc. Circuit switching LAN’s, blocking probabilities, Erlang’s formula and private branch exchange (PBX). Interconnection of LAN’s, TCP/IP protocol. Prereq: EE I7300. 3 HR./WK.; 3 CR.

I7100: Statistical Communication Theory
Review of probability and stochastic processes, limit theorems, correlation function, power spectral density, vector channels, optimum decision regions, optimum receivers, probability of error; determination of bounds on error rates. Prereq: EE I0100. 3 HR./WK.; 3 CR.

I7200: Spread Spectrum
Review of digital communication; comparison of digital modulation techniques such as PSK, DPSK, GFSK, MSK, and combined phase-amplitude data systems; autocorrelation and spectral characteristics of a spread spectrum signal. Response of a direct sequence spread spectrum signal to unwanted signals and to random noise. Pseudorandom codes, Gold codes, characteristics of codes used for spread spectrum; frequency-hopping. The phase locked loop; bit synchronization, Costas receiver; tracking using the Delay locked loop and the Tuaida ther loop; acquisition techniques; applications of spread spectrum to TDMA, navigation, RPV; state-of-the-art in spread spectrum hardware. Prereq: EE I0100. 3 HR./WK.; 3 CR.

I7300: Digital Communication 1
Source coding. Characterization of communication signals and systems, optimum receivers for additive white Gaussian noise channel, carrier and symbol synchronization, channel capacity and coding, block and convolutional channel codes. Prereq: EE I0100. 3 HR./WK.; 3 CR.

I7400: Digital Data Communications II
Signal design for band-limited channels, communication through band-limited linear filter channels, adaptive equalization, multichannel and multiscarrier systems, spread spectrum signals for digital communications, digital communications through fading multipath channels, multiluser communications. Prereq: EE17300. 3 HR./WK.; 3 CR.

I8200: Electro-Optics
Beam propagation in anisotropic media, Faraday rotation, birefringence, beam propagation in periodic media, Bragg scattering and Brag filters, acousto-optic effect and devices, electro-optic effect and devices, photorefractive materials and other nonlinear effects, integrated optics. Prereq.: EE F6200. 3 HR./WK.; 3 CR.

I8300: Fiber Optic Communications II
Basic building blocks of an all optical network with particular emphasis on optical amplifiers including both Semiconductor Optical Amplifiers (SOAs) and Erbium-Doped Fiber Amplifiers (EDFAs). System architecture for: I) the point-to-point link, II) the single station-to-multistation multipoint network, and III) the any-to-any connected network. Wavelength-Division Multi-Access (WDMA) and Time-division Multi-access networks (TMWA). Prereq: EE F5200. 3 HR./WK.; 3 CR.

I8500: Optical Signal Processing

I9600: Report
In depth analysis by means of a written report using a number of technical papers, reports or articles on a specific topic. Topics to be chosen by the student after consultation with a professor. An oral presentation of the written report may be required at the departmental seminar. Prereq: completion of 15 credits toward the master’s degree in EE. 0 CR.

I9700: Master’s Project
Analytical or experimental project, preferably of student’s own choice. Under direction of a faculty advisor, student submits written proposal, performs the required task, and submits a written final report. Prereq: departmental master’s advisor’s approval. 3 CR. CREDIT WILL BE GRANTED FOR EITHER I9700 OR I9900, NOT BOTH.

I9800: Graduate Laboratory
Experimental project. Topic must be approved by a faculty member as well as the departmental master’s advisor. 3 CR.

I9900: Research for the Master’s Thesis
Prereq: departmental master’s advisor’s approval. 6 CR. CREDIT WILL BE GRANTED FOR EITHER I9700 OR I9900, NOT BOTH.

J0000: Advanced Seminar
Advanced developments in electrical engineering. Students and instructor report on topics of interest. Prereq: departmental Ph.D. advisor’s approval. CREDIT VARIES.

J2700: Multidimensional Signal Processing
Multidimensional signals and systems. DFT, FIR, IIR filters design. Stability. Prereq: EE F5300 and ENGR I1200. 3 HR./WK.; 3 CR.

J9900: Research for Doctoral Dissertation
VARIABLE CREDIT (12 CR. MAXIMUM).

R0100: Special Topics in Advanced Electrical Engineering.
Prereq: Third-level standing in the doctoral program.

FACULTY

Samir Ahmed, Herbert Kayser Professor
B.A., Cambridge Univ., M.A.; Ph.D., Univ. College (UK)
Mohamed A. Ali, Professor
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B.E., The City College, M.E.; Ph.D., CUNY
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Center for Information Networking and Telecommunication (CINT)

Professor Tarek Saadawi, Director • Institute Office: Steinman 529 • Tel: 212-650-7263

GENERAL INFORMATION

The CINT Center represents the culmination of approximately fifteen years of research cooperation of faculty members from the Departments of Computer Science and Electrical Engineering in the fields of high speed, multimedia, multiservice, integrated wired and mobile wireless networks. Necessary experimentation is performed in a well-equipped Networking Systems Laboratory.

The Center’s present research work on telecommunications and information distribution is largely supported by the U.S. Army Research Laboratory (ARL) by way of the “ARL Collaborative Technology Alliance on Communications and Networks.” A part of this CINT research aims to overcome the severe bandwidth and energy constraints of the mobile wireless environment of battlefield command and control, while providing secure, jam-resistant communications in noisy, hostile surroundings.

Previous sponsors included various U.S. Army organizations (ARL, Communications-Electronics Command, Army Research Office), the National Science Foundation, and the New York State and the New York City Departments of Transportation. Industry is represented by Telcordia, Panasonic, AT&T, and Lockheed-Sanders.

The group’s faculty members play a major part in teaching the undergraduate and graduate networking courses offered by the Electrical Engineering and Computer Science departments at The City College.

OTHER CURRENT RESEARCH AREAS

CINT areas of research cover many aspects of mobile communications and information distribution. CINT faculty have recently made a number of contributions in the area of AD-HOC mobile Networking. These networks provide the capability to establish communications between various heterogeneous mobile users without the need to involve the wire/wireless infrastructure network. Routing algorithms as well as new transport protocols and MAC layer protocols are being developed for AD-HOC mobile networks.

This research has a great impact on military networking as well as on commercial applications. Further research concerns:

• Qos Support for Real-Time Services such as video, voice, and data
• Probabilistic Reasoning Mobile Agent System for Network Testing
• Mobile IP Systems
• MPEG-4 and MPEG-2 Video over ATM synchronization
• Adaptive Multimedia Synchronization for Teleconferencing
• Empirical Qos Study of Hybrid Terrestrial-Satellite ATM Network
• Core-Manager Based Multi-Cast Routing (CMMR)
• Mobility Support for CMMR
• Multimedia Conferencing System with Multi-Casting
• Optimal Buffer Allocation in ATM Switches
• Use of Genetic Algorithms in Mobile Agent Generation for Network Security
• Conformance Testing and Verification of Communication Protocols
• Artificial Intelligence inTelecommunications
• Neural Network Applications in ATM Resource Allocations
• Optical Communications
• Wireless Communications
• Policy-Driven Networks
• Network Infrastructures for Bio-Medical Applications
• User-Centered Mechanisms for Distributed Collaborations

FACILITIES OF THE NETWORKING SYSTEMS LABORATORY

The networking Systems Laboratory has the following facilities:

• Heterogeneous Network Testbed: ATM Switches, Wireless LAN, Router, PCNet
• Simulation Software: OPNET, NS-2, COMNET, MODSIM
• ATM Test Equipment: ATM Generator and Analyzer
• IP Telephony Gateway
• 20 + Ultra Workstations (with Enterprise Server), PC Network

PLANS FOR THE FUTURE OF CINT

The Center plans to pursue three additional major areas of activity in the near future:

1. A program of cross-disciplinary research which stresses the theoretical, analytical and experimental aspects of telecommunications and information networking, consisting of high-speed multimedia networking, next generation internet protocols, mobile communications, photonics engineering, optical communications and information distribution. Key areas of research include quality of service requirements, mobility and wireless networking, opt-
ical communications and optical switching, video and image communications, and internet protocols. In addition, considerable attention is to be paid to the economics pricing/business aspects of telecommunications and information services. Research with respect to network security will play a considerable part.

2. An expanded program of education for City College Master’s and doctoral students will involve the development of new advanced courses in networking and information distribution.

3. A program of industry/university/government cooperation which will stress the importance of knowledge and technology transfer between these entities. This implies the exploration of similarities between military command and control systems and such civilian applications as traffic control, emergency management, and the security of financial institutions.
The City College offers the following master’s degrees in Mechanical Engineering:

**M.E. (M.E.) Professional Master’s Degree**

**M.S. (Engineering)**

### DEGREE REQUIREMENTS

**Professional Master’s Degree**

**Engineering Core Courses** 9

*Mechanical Engineering:*
- G0200: Applied Fluid Mechanics
- G4000: Applied Stress Analysis

*Engineering:*
- I1100: Introduction to Engineering Analysis

**Technical Electives** 15-21

*Five to seven courses from the following list:*

*Mechanical Engineering:*
- G0300: Computer Aided Manufacturing
- G0500: Mechanical Vibrations
- G0600: Thermal Systems Design
- G2300: Heating, Ventilating and Air Conditioning
- G4100: Mechatronics: Principles and Practice
- G4200: Continuum Mechanics
- G4300: Non-Newtonian Fluid Mechanics
- G4400: Nano/Micromechanics
- G4500: Mechanics and Physics of Material Behavior
- G4600: Computational Fluid Dynamics
- I3100: Steam and Gas Turbines
- I3600: Conduction Heat Transfer
- I3700: Convection Heat Transfer
- I6200: Advanced Concepts in Mechanical Vibrations
- I6500: Computer Aided Design
- I6700: Composite Materials
- I6900: Experimental Methods in Fluid Mechanics

*Engineering:*
- I1700: Finite Element Methods in Engineering

*Any graduate course in the School of Engineering with the approval of the departmental advisor.*

*One course from list below may be taken in place of a technical elective:*

*Engineering Management Courses*
- F3800: Management Concepts for Engineers (3 cr.)
- F9300: Economics and Investment Analysis of Engineering Projects (3 cr.)
- G7600: Engineering Law (3 cr.)
- G8500: Project Management (3 cr.)
- I8000: Decision and Planning Techniques for Engineers (3 cr.)

*Report/Project/Thesis:*

*Mechanical Engineering:*
- I9700: Report (0 cr.)
- I9800: Project (3 cr.)
- I9900: Research for the Master’s Thesis (3 cr.)
- G0400: Industry Oriented Design Project (6 cr.)

**Total Credits** 30

*Note: With departmental approval, students may register for two 50000-level undergraduate courses towards the Master’s degree. However, these courses will not be included in their G.P.A.*

### The M.S. Degree

The M.S. degree is awarded to students who do not have a bachelor’s degree in engineering.

### LABORATORIES

In addition to the undergraduate laboratories, the Department has established specialized laboratories to carry out research in advanced materials and fracture mechanics, environmental and fluid sciences, aerosciences, bioengineering and heat transfer.

**Experimental Fluid Mechanics and Aerodynamics Laboratory**

Turbulent flows encountered in engineering applications is the focus of research carried out in this laboratory. In particular the behavior of small scales of turbulence is studied by carrying out measurements with high spatial and temporal resolution. The facilities and equipment in this lab include a 4 ft. x 4 ft. x 25 ft. low speed wind tunnel; a large scale compressible flow shock tube of 12 in. diameter, 74 ft. length and 3,000 psi maximum pressure; a YAG laser and other accessories for Rayleigh scattering; an Argon laser for laser Doppler anemometry; 2 CCD cameras sensitive in the ultraviolet range; fast data acquisition systems; and a particle image velocimetry.

**Microscale Heat Transfer Laboratory**

The microscale Heat Transfer Laboratory (MHTL) engages in measurement, analysis and theoretical modeling of the heat transfer properties of thermal management materials. Currently the MHTL focuses on the near-field radiation heat transfer properties of ceramic carbides, and microscale thermal transport mechanisms in advanced porous
ceramics. Equipment utilized in MHTL for radiation analysis includes a modular mid-infrared spectrometer, and Si, MCT and InSb detectors for spectral analysis of the entire mid-IR spectral range.

Biomechanics Laboratory
The Biomechanics Laboratory is engaged in research investigating bone mechanics, bone implant interaction and mechanisms of sport or accidental injuries. Current areas of research include modeling of traumatic brain injury (TBI), blunt head impacts, mainly due to vehicular collisions, contact sports or falls; investigating cervical spine injuries and instabilities due to contact sport and automobile accidents; biodynamic modeling and simulations to access human and machine interaction, and development of computational models for the prediction of long-term bone adaptation and design of bone implants.

Solid Mechanics/Materials Research Laboratory
This laboratory is devoted to research involving solid mechanics and materials processing, testing and evaluation, with emphasis on the study of fracture and damage mechanics, composite materials, high and low temperature behaviors, and micro- and nanomechanics for micro- and nanostructural design. Various modern testing and processing techniques, such as micro-mechanical in situ testing, static, fatigue, vibration and impact testing at high, low and room temperatures, non-destructive evaluation and digital image processing are used. Currently, it has a scanning electron microscope equipped with a high-temperature tensile stage, a servo-hydraulic universal testing machine with an environmental chamber, a computer controlled drop weight impact tester with an environmental chamber, a gas gun for high-speed ballistic impact, a computer-controlled vibration shaker system with a precision temperature/humidity chamber, an immersion and a spray ultrasonicprüfungs system, an optical bench with holographic/interferometric setups.

Ferroelectric and Active Materials Research Laboratory
The major goal of this laboratory is to conduct experimental and analytical research on active materials such as ferroelectric materials, shape memory alloys, and their composites. It also provides students opportunities to have hands-on and research experiences on active materials and structures. Currently the lab is equipped with an electro-mechanical coupling testing machine, a high voltage amplifier, a displacement sensor machine, a vacuum bagging system and a custom built autoclave for polymer-matrix composites processing, a refrigerated circulating digital liquid bath, and a piezo-d33 tester.

Computational Fluid Dynamics Center at the NSF-CREST Center for Mesoscopic Modeling and Simulation
A 48-processor SUN system based on 750 MHz ultraspark3 chips with a peak performance of about 1.5 GB per processor, 24 GB of RAM, 864 GB of disk space and a Dolphin SCI interconnect; an 81-node Microway Beowulf cluster, which is composed of 40-nodes AMD Athlon processors and 41-nodes AMD Opteron 64-bit processors; high performance and general purpose desktop workstations.

Computer Aided Design and Engineering (CAD/CAE) Facilities
The Department of Mechanical Engineering recently established a state-of-the-art Computer Aided Design Laboratory which is used for engineering analysis and design. It consists of twenty-six Dell Dimension 8200 series computers, a Dell PowerEdge 2500 server, two HP Color LaserJet 4600dn printers, an HP LaserJet 5100tn printer, and a wide-screen monitor. The Department also has a Multimedia Distance Learning Facility which includes twenty-five Pentium 4 PCs, document camera, LCD projector and whiteboard. In addition, the Department maintains twenty-eight SUN sparc/ultra workstations and sixteen Pentium PCs in its other three computer laboratories. These systems are equipped with mechanism design, mathematics, finite element, boundary element and computer-aided manufacturing software including PRO-ENGINEER, Solid Works, LS-DYNA, ABAQUS, MathCAD, MATLAB, Mathematica, FLUENT, NASTRAN-4D, and MasterCAM.

COURSE DESCRIPTIONS

G0000: Selected Topics in Mechanical Engineering
Advanced topics selected for their timeliness and current interest. VARIABLE CR.

G0200: Applied Fluid Mechanics

G0300: Computer Aided Manufacturing

G0400: Industry Oriented Design Project

G0500: Mechanical Vibrations

G0600: Thermal Systems Design

G2300: Heating, Ventilating and Air Conditioning

G4000: Applied Stress Analysis

G4100: Mechatronics: Principles and Practice

G4200: Continuum Mechanics

G4300: Non-Newtonian Fluid Mechanics

G4400: Nano/Micromechanics

G4500: Mechanics and Physics of Material Behavior

G4600: Computational Fluid Dynamics

I0000: Seminars
Recent developments in mechanical engineering and related fields; economic and social effects. The students report on assigned subjects. Prereq: departmental approval. VARIABLE CR.

I3100: Steam and Gas Turbines
Classification of modern turbomachines. Concepts in applied thermo-fluid mechanics. Similarity in design; wind tunnels and cascade of aerofoils; loss mechanisms; radiation equilibrium theory; performance prediction; erosion and high temperature problems; instrumentation. Prereqs: ME 33100, ME 35600. 3 HR./WK.; 3 CR.

I3600: Conduction Heat Transfer
Formulation of the basic governing equations in rectangular, cylindrical and spherical coordinates. Consideration of linear and nonlinear problems. Topics include: conduc-
tion with energy generation, transpiration cooling, conduction in non-stationary systems, phase transformation, and ablation. Exact analytic solutions. Application of the integral method. Prereqs: Math 39200 and ME 43300, or ChE 34200. 3 HR./WK.; 3 CR.

I3700: Convection Heat Transfer

15800: Trajectories and Orbits
Kepler’s laws. The central force field. Ballistic trajectories. Minimum energy orbital transfer. Earth orbits and orbital parameters. Hohmann transfer. Two body and many body problems. Consideration of translunar trajectories and deep space problems. Prereq: ME 24700 or equivalent. 3 HR./WK.; 3 CR.

I6200: Advanced Concepts in Mechanical Vibrations
Natural modes of vibrations in continuous systems. Approximate methods, including Rayleigh-Ritz, Galerkin’s Method, and Holtzer’s Method. Transform methods for solution of continuous systems, the method of characteristics. Random excitations. Prereq: ME 16000. 3 HR./WK.; 3 CR.

I6500: Computer Aided Design
Computer aided engineering design methodology: components of hardware, software and the use of commercial CAD systems in mechanical engineering design. Basic concepts of CAD and engineering analysis. Pro-Engineering Analysis Code; Splines and Coon’s surfaces; geometric and wire frame modeling techniques. Simulation and modeling of an engineering problem; engineering assumptions. Introduction to finite element methods; mesh generation; simulation of loadings, and boundary conditions. Postprocessing and evaluation of results. Applications of these concepts to specific engineering design projects. Prereqs: ME 14500, ME 33000, ME 47200 (or equivalent) Math 39200. 3 HR./WK.; 3 CR.

I6700: Composite Materials

16800: Nonlinear Dynamics and Chaos
This course is built around a concrete mechanical system, for example, the pendulum. Definition of dynamical systems, phase space flows and invariant subspaces. Local and global bifurcation theory: Saddle-node, transcritical, pitchfork, and Hopf bifurcations, stability of homoclinic orbits, central manifolds and normal forms. Chaos: fractal geometry and dimension, Lyapunov exponents, routes to chaos (period doubling, quasi-periodicity, intermittency), spatio-temporal chaos. Prereq: Math 39100 or equivalent. 3 HR./WK.; 3 CR.

I6900: Experimental Methods in Fluid Mechanics

J0200: Computation and Modeling of Turbulent Flows
Discusses and introduces state-of-the-art engineering calculation methods for turbulent flows with or without heat transfer, and presents a general introduction to the physics of turbulence necessary for mathematical description and modeling of physical phenomena in turbulent flow. Prereqs: Math 39200, ME 35600. 3 HR./WK.; 3 CR.

J9700: Report
In-depth analysis of a specific topic by means of a written report using a number of technical papers, reports or articles as references. Topic to be chosen by student in consultation with a professor. Prereq: completion of 12 credits toward the master’s degree in Mechanical Engineering. 0 CR.

J9800: Project
Theoretical or experimental project under the supervision of a faculty advisor. Student submits a written proposal, performs the required work, and submits a written final report. Prereq: written departmental approval. 3 CR.

I9900: Research for the Master’s Thesis
VARIABLE CR.

J9900: Research for the Doctoral Dissertation
VARIABLE CR.

Other Engineering Courses
Other appropriate Engineering courses are listed in the engineering introductory section of this Bulletin and include the following:

I0800: Foundation of Fluid Mechanics I
I0900: Foundation of Fluid Mechanics II
I1100: Engineering Analysis
I1400: Applied Partial Differential Equations
I1500: Introduction to Numerical Methods
I1700: Finite Element Methods in Engineering
I2400: Turbulent Flows
I3200: Statistical Thermodynamics
I5200: Behavior of Inelastic Bodies and Structures
I6400: Wave Propagation in Solids and Fluids
I9100: Mass Transfer
J5000: Theory of Elasticity

FACULTY

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Honghui Yu, Assistant Professor

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Eugene A. Avallone
Antonio Baldo
Myron Levitsky
Gerard G. Lowen
Anton L. Steinhauser
Henry T. Updegrove, Jr.
Appendices
Appendix A
GOVERNANCE

The Governance of The City College is the concern of all its members. All its constituencies—students, faculty, and administration—contribute to the maintenance and development of the College; each of the constituencies has its particular area of concern.

Because each constituency has the right to govern itself in areas that are its exclusive concern and responsibility, the Governance Charter sets forth the powers and organization of the various bodies within the College, and guarantees their autonomy on matters exclusively within their jurisdiction. But because the constituencies are interrelated, and because all must participate in the well being of the College as a whole, the Governance Charter also provides for communication between constituencies and advisory roles and joint participation on matters of mutual or general concern.

The following governance bodies carry out these duties.

The Undergraduate Student Senate and the Graduate Student Council, elected annually from and by their appropriate constituencies, represent the interests of the students. It is from among these bodies that student representation on college-wide bodies is drawn for consultative purposes.

The Faculty of each school (organized into a representative, elected council when there are more than 100 faculty members) approve courses, curricula, degree requirements, and criteria for student progress and retention. The College of Liberal Arts and Science has a general Faculty Council, plus one each for its divisions—Education, Humanities and the Arts, Science and Social Science. Each of the College’s professional schools—the CUNY Medical School, Engineering, and Architecture—also has its own Faculty.

The Faculty Senate draws its elected representatives from the constituent academic units of the College and deals with such college-wide matters as academic freedom, educational policy, the role of administrators, and the allocation of the College’s resources. Senators are elected by the faculty for three-year terms. In addition to the faculty, the following are members ex officio, without vote: the President, all deans and vice presidents, and representatives of the student senates.

The Policy Advisory Council serves as a consultative body to the President on all major policy matters affecting the College and its members. It draws its members from all groups at the College, including the part-time instructional staff and the non-teaching staff.

ALUMNI ASSOCIATION OF THE COLLEGE

The first graduating class of 1853 of the New York Free Academy (as The City College of New York was originally known) organized the Alumni Association to form a community of friends with a shared experience and common goals. In 1913, the Association was incorporated, and is governed by a Board of Directors. At the Annual Meeting held in the Spring, dues paying members elect the officers of the corporation who guide its affairs. Officers who are elected annually include the President, three Vice Presidents, Secretary, Treasurer and Historian. In addition, thirty-six Directors from the membership at-large are selected for staggered three-year terms. Two to three Directors from each of the special interest groups (affiliate groups and constituent societies), including their respective Presidents, are elected annually for one-year terms. Completing the Board of Directors are Honorary Directors selected by the President of the Corporation, and Life Directors, who are former Presidents. The Board of Directors meets a minimum of five times a year.

The purpose and objectives of the Alumni Association are to advance the interests and welfare of the College, foster a spirit of fraternity/sorority and goodwill among graduate, service alumni and to offer financial, technical and networking support for today’s students.

Representing special concerns, interests and educational specialties, the Association serves as the umbrella or parent to eleven affiliate groups and two constituent societies including Alumni Varsity, Architecture Alumni, Art Alumni, Asian Alumni, Black Alumni, Center for Worker Education Alumni, Communications Alumni, Education Alumni, Latino Alumni, Nursing Alumni, Science Alumni and the Business and Economics Alumni Society and Engineering School Alumni. The groups are each governed by a voluntary Board of Directors with officers and conduct activities to benefit alumni and today’s students.

In recognition of the growing geographical diversity of alumni, the chartering of Alumni Chapters began after World War II. Twenty-five dues paying members living in a city outside the New York metropolitan area can secure a charter from the Alumni Association as an official chapter. There are currently twelve active chapters across the country including Washington Chapter, Florida Chapters (Palm Beach and South Florida), North and South California Chapters, Northern Nevada Chapter, New Jersey Chapter and Cincinnati Chapter.
Appendix B

APPENDIX B.1

Rules and Regulations for the Maintenance of Public Order Pursuant to Article 129-A of the Education Law

The tradition of the University as a sanctuary of academic freedom and center of informed discussions is an honored one, to be guarded vigilantly. The basic significance of that sanctuary lies in the protection of intellectual freedom: the rights of professors to teach, of scholars to engage in the advancement of knowledge, of students to learn and express their views, free from external pressures or interference. These freedoms can flourish only in an atmosphere of mutual respect, civility, and trust among teachers and students, only when members of the University community are willing to accept self-restraint and reciprocity as the condition upon which they share in its intellectual autonomy.

Academic freedom and the sanctuary of the University campus extend to all who share these aims and responsibilities. They cannot be invoked by those who would subordinate intellectual freedom to political ends, or who violate the norms of conduct established to protect that freedom. Against such offenders the University has the right, and indeed the obligation, to defend itself. We accordingly announce the following rules and regulations to be in effect at each of our colleges which are to be administered in accordance with the requirements of due process as provided in the Bylaws of the Board of Trustees.

With respect to enforcement of these rules and regulations we note that the Bylaws of the Board provide that:

“THE PRESIDENT. The president, with respect to his education unit, shall:

1. Have the affirmative responsibility of conserving and enhancing the educational standards of the college and schools under his jurisdiction;

2. Be the advisor and the executive agent of the Board and of his respective College Committee and as such shall have the immediate supervision with full discretionary power in carrying into effect the Bylaws, resolutions, and policies of the Board, the lawful resolutions of the several faculties;

3. Exercise general superintendence over the concerns, officers, employees, and students of his educational unit”

A. Rules

1. A member of the academic community shall not intentionally obstruct and/or forcibly prevent others from the exercise of their rights. Nor shall he intervene with the institution’s educational processes or facilities, or the rights of those who wish to avail themselves of any of the institution’s instructional, personal, administrative, recreational, and community services.

2. Individuals are liable for failure to comply with lawful directions issued by representatives of the University/College when they are acting in their official capacities.

3. Unauthorized occupancy of University/College facilities or blocking access to or from such areas is prohibited. Permission from appropriate college authorities must be obtained for removal, relocation, and use of University/College equipment and/or supplies.

4. Theft from, or damage to University/College premises of property, or theft of or damage to property of any person on University/College premises is prohibited.

5. Each member of the academic community or an invited guest has the right to advocate his position without having to fear abuse, physical, verbal, or otherwise, from others supporting conflicting points of view. Members of the academic community and other persons on the college grounds shall not use language or take actions reasonably likely to provoke or encourage physical violence by demonstrators, those demonstrated against, or spectators.

6. Action may be taken against any and all persons who have no legitimate reason for their presence on any campus within the University/College, or whose presence on any such campus obstructs and/or forcibly prevents others from the exercise of the rights or interferes with the institution’s educational processes or facilities, or the rights of those who wish to avail themselves of any of the institution’s instructional, personal, administrative, recreational, and community services.

7. Disorderly or indecent conduct on University/College-owned or controlled property is prohibited.

8. No individual shall have in his or her possession a rifle, shotgun, or firearm or knowingly have in his possession any other dangerous instruments or material that can be used to inflict bodily harm on an individual or damage upon a building or the grounds of the University/College without the written authorization of such educational institution. Nor shall any individual have in his possession any other instrument or material which can be
used and is intended to inflict bodily harm on any individual or damage upon a building or the grounds of the University/College.

9. Any action or situation which recklessly or intentionally endangers mental or physical health or involves the forced consumption of liquor or drugs for the purpose of initiation into or affiliation with any organization is prohibited.

10. The unlawful manufacture, distribution, dispensation, possession, or use of illegal drugs or other controlled substances by University students or employees on University/College premises, or as part of any University/College activities is prohibited. Employees of the University must also notify the College Personnel Director of any criminal drug statute conviction for a violation occurring in the workplace not later than (5) days after such conviction.

11. The unlawful possession, use, or distribution of alcohol by students or employees on University/College premises or as part of any University/College activities is prohibited.

B. Penalties

1. Any student engaging in any manner in conduct prohibited under substantive Rules 1-11 shall be subject to the following range of sanctions as hereafter defined in the attached Appendix: admonition, warning, censure, disciplinary probation, restitution, suspension, expulsions, ejection, and/or arrest by the civil authorities.

2. Any tenured or non-tenured faculty member, or other member of the instructional staff, or member of the classified staff engaging in any manner in conduct prohibited under substantive Rules 1-11 shall be subject to the following range of penalties: warning, censure, restitution, fine not exceeding those permitted by law or by the Bylaws of The City University of New York or suspension with/without pay pending a hearing before an appropriate college authority, dismissal after a hearing, ejection, and/or arrest by the civil authorities, and, for engaging in any manner in conduct prohibited under substantive rule 10, may, in the alternative, be required to participate satisfactorily in an appropriately licensed drug treatment or rehabilitation program. A tenured or non-tenured faculty member, or other member of the instructional staff, or member of the classified staff charged with engaging in any manner in conduct prohibited under substantive Rules 1-11 shall be entitled to be treated in accordance with applicable provisions of the Education Law, or the Civil Service Law, or the applicable collective bargaining agreement, or the Bylaws or written policies of The City University of New York.

3. Any visitor, licensee, or invitee, engaging in any manner in conduct prohibited under substantive Rules 1-11 shall have its permission to operate on campus rescinded.

4. Any organization which authorized the conduct prohibited under substantive rules 1-11 shall have its permission to operate on campus rescinded.

Penalties 1-4 shall be in addition to any other penalty provided by law or The City University Trustees.

Sanctions Defined:

A. Admonition.

An oral statement to the offender that he/she has violated university rules.

B. Warning.

Notice to the offender, orally or in writing, that continuation or repetition of the wrongful conduct, within a period of time stated in the warning, may cause far more severe disciplinary action.

C. Censure.

Written reprimand for violation of specified regulation, including the possibility of more severe disciplinary sanction in the event of conviction for the violation of any University regulation within a period stated in the letter of reprimand.

D. Disciplinary Probation.

Exclusion from participation in privileges or extracurricular University activities as set forth in the notice of disciplinary probation for a specified period of time.

E. Restitution.

Reimbursement for damage to or misappropriation of property.

Reimbursement may take the form of appropriate service repair or otherwise compensate for damages.

F. Suspension.

Exclusion from classes and other privileges or activities as set forth in the notice of suspension for a definite period of time.

G. Expulsion.

Termination of student status for an indefinite period. The conditions of readmission, if any is permitted, shall be stated in the order of expulsion.

H. Complaint to Civil Authorities.

APPENDIX B.2

ARTICLE XV - STUDENTS*

Section 15.0. PREAMBLE.

Academic institutions exist for the transmission of knowledge, the pursuit of truth, the development of students, and the general well-being of society. Student participation, responsibility, academic freedom, and due process are essential to the operation of the academic enterprise. As members of the academic community, students should be encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth.

Freedom to learn and to explore major social, political, and economic issues are necessary adjuncts to student academic freedom, as is freedom from discrimination based on racial, ethnic, religious, sex, political, and economic differentiations.

Freedom to learn and freedom to teach are inseparable facets of academic freedom. The concomitant of this freedom is responsibility. If members of the academic community are to develop positively in their freedom; if these rights are to be secure, then students should exercise their freedom with responsibility.

Section 15.1. CONDUCT

STANDARD DEFINED.

Each student enrolled or in attendance in any college, school or unit under the control of the board and every student organization, association, publication, club or chapter shall obey the laws of the city, state and nation, and
the bylaws and resolutions of the board, and the policies, regulations, and orders of the college.

The faculty and the student body at each college shall share equally the responsibility and the power to establish, subject to the approval of the board, more detailed rules of conduct and regulations in conformity with the general requirement of this article.

This regulatory power is limited to the right of students to the freedoms of speech, press, assembly and petition as applied to others in the academic community and to citizens generally.

Section 15.2. STUDENT ORGANIZATIONS

A. Any group of students may form an organization, association, club or chapter by filing with the duly elected student government organization of the college or school at which they are enrolled or in attendance and with an officer to be designated by the faculty of the college or school at which they are enrolled or in attendance (1) the name and the purposes of the organization, association, club or chapter, (2) the names and the addresses of its president and secretary or other officers corresponding in function to president and secretary.

However, no group, organization or student publication with a program against the religion, race, ethnic origin or identification or sex of a particular group or which makes systematic attacks against the religion, race, ethnic origin or sex of a particular group shall receive support from any fees collected by the college or be permitted to organize or continue at any college or school. No organizations, military or semi-military in character, not connected with established college or school courses, shall be permitted without the authorization of the faculty and the duly elected student government and the board.

B. Extra-curricular activities at each college or school shall be regulated by the duly elected student government organization to insure the effective conduct of such college or school as an institution of higher learning and for the prevention of activities which are hereafter proscribed or which violate the standards of conduct of the character set forth in bylaw 15.1.

Such powers shall include:
1. The power to charter or otherwise authorize teams (excluding intercollegiate athletics), publications, organizations, associations, clubs or chapters, and, when appropriate in the exercise of such regulatory power, the power to refuse, suspend or revoke any charter or other authorization for cause after hearing on notice.
2. The power to delegate responsibility for the effective implementation of its regulatory functions hereunder to any officer or committee which it may appoint. Any aggrieved student or group whose charter or other authorization has been refused, suspended or revoked may appeal such adverse action by such officer or committee of student government to the duly elected student government. On appeal an aggrieved student or group shall be entitled to a hearing following the due process procedures as set forth in section 15.3. Following such hearing the duly elected student government shall have the authority to set aside, decrease or confirm the adverse action.

C. Any person or organization affiliated with the college may file charges with an office of the dean of students alleging that a student publication has systematically attacked the religion, race, ethnic origin, or sex of a particular group, or has otherwise contravened the laws of the city, state or nation, or any bylaw or resolution of the board, or any policy, regulation or order of the college, within a reasonable period of time after such occurrence.

If the dean of students determines, after making such inquiries as he/she may deem appropriate, that the charges are substantial, he/she shall attempt to resolve the dispute, failing which he/she shall promptly submit the charges to the faculty-student disciplinary committee for disposition in accordance with the due process procedures of section 15.3. thereof.

If the committee sustains the charges or any part thereof against the student publication, the committee shall be empowered to (1) reprimand the publication, or (2) recommend to the appropriate funding bodies the withdrawal of budget funds. The funding body shall have the authority to implement fully, modify or overrule the recommendations.

D. Each college shall establish a student elections review committee in consultation with the various student governments. The student elections review committee shall approve the election procedures and certify the results of elections for student governments, and student body referenda.

E. Student government elections shall be scheduled and conducted, and newly elected student governments shall take office, in accordance with policies of the board, and implementing regulations.

Section 15.3. STUDENT DISCIPLINARY PROCEDURES.

Complaint Procedures:

A. Any charge, accusation, or allegation which is to be presented against a student, and, which if proved, may subject a student to disciplinary action, must be submitted in writing in complete detail to the office of the dean of students promptly by the individual, organization or department making the charge.

B. The chief student affairs officer of the college or his or her designee will conduct a preliminary investigation in order to determine whether disciplinary charges should be preferred. The chief student affairs officer or his or her designee will advise the student of the charge(s) against him or her, consult with other parties who may be involved or who have information regarding the incident, and review other relevant evidence. Following this preliminary investigation, which shall be concluded within thirty (30) calendar days of the filing of the complaint, the chief student affairs officer or designee shall take one of the following actions:

1. Dismiss the matter if there is no basis for the allegation(s) or the allegation(s) does not warrant disciplinary action. The individuals involved shall be notified that the complaint has been dismissed;
2. Refer the matter to conciliation. If a matter is referred to conciliation the accused student shall receive a copy of the notice required pursuant to section 15.3.e. of this bylaw; or prefer formal disciplinary charges.

3. Prefer formal disciplinary charges.

Conciliation Conference:

C. The conciliation conference shall be conducted by the counselor in the office of the dean of students or a qualified staff or faculty member designated by the chief student affairs officer. The following procedures shall be in effect at this conference:

1. An effort will be made to resolve the matter by mutual agreement.
2. If an agreement is reached, the counselor shall report his/her recommendation to the chief student affairs officer for approval and, if approved, the complainant shall be notified.
3. If no agreement is reached, or if the student fails to appear, the counselor shall refer the matter back to the chief student affairs officer who will prefer disciplinary charges.
4. The counselor is precluded from testifying in a college hearing regarding information received during the conciliation conference.

Notice of Hearing and Charges:

D. Notice of the charge(s) and of the time and place of the hearing shall be personally delivered or sent by the chief student affairs officer of the college to the student at the address appearing on the records of the college, by registered or certified mail and by regular mail. The hearing shall be scheduled within a reasonable time following the filing of the charges or the conciliation conference. Notice of at least five business days shall be given to the student in advance of the hearing unless the student consents to an earlier hearing.

E. The notice shall contain the following:

1. A complete and itemized statement of the charge(s) being brought against the student including the rule, bylaw or regulation he/she is charged with violating, and the possible penalties for such violation.
2. A statement that the student has the following rights:
   - to present his/her side of the story;
   - to present witnesses and evidence on his/her behalf;
   - to cross-examine witnesses presenting evidence against the student;
   - to remain silent without assumption of guilt; and
   - to be represented by legal counsel or an advisor at the student’s expense.

A warning that anything the student says may be used against him/her at a non-college hearing.

Faculty-Student Disciplinary Committee Procedures:

F. The following procedures shall apply at the hearing before the faculty-student disciplinary committee:

1. The chairperson shall preside at the hearing. The chairperson shall inform the student of the charges, the hearing procedures and his or her rights.
2. After informing the student of the charges, the hearing procedures, and his or her rights, the chairperson shall ask the student charged to plead guilty or not guilty. If the student pleads guilty, the student shall be given an opportunity to explain his/her actions before the committee. If the student pleads not guilty, the college shall present its case. At the conclusion of the college’s case, the student may move to dismiss the charges. If the motion is denied by the committee the student shall be given an opportunity to present his or her defense. Prior to accepting testimony at the hearing, the chairperson shall rule on any motions questioning the impartiality of any committee member or the adequacy of the notice of the charge(s). Subsequent thereto, the chairperson may only rule on the sufficiency of the evidence and may exclude irrelevant, immaterial or unduly repetitive evidence. However, if either party wishes to question the impartiality of a committee member on the basis of evidence which was not previously available at the inception of the hearing, the chairperson may rule on such a motion. The chairperson shall exclude all persons who are to appear as witnesses, except the accused student.
4. The college shall make a record of each fact-finding hearing by some means such as a stenographic transcript, a tape recording or the equivalent. A disciplined student is entitled upon request to a copy of such a transcript, tape or the equivalent without cost.
5. The student is entitled to a closed hearing but has the right to request an open public hearing. However, the chairperson has the right to hold a closed hearing when an open public hearing would adversely affect and be disruptive of the committee’s normal operations.
6. The college bears the burden of proving the charge(s) by a preponderance of the evidence.
7. The role of the faculty-student disciplinary committee is to listen to the testimony, ask questions of the witnesses, review the testimony and evidence presented at the hearing and the papers filed by the parties and render a determination as to guilt or innocence. In the event the student is found guilty, the committee shall then determine the penalty to be imposed.
8. At the end of the fact-finding phase of the hearing, the student may introduce additional records, such as character references. The college may introduce a copy of the student’s previous disciplinary record, where applicable, provided the student was shown a copy of the record prior to the commencement of the hearing. The disciplinary record shall be submitted to the committee in a sealed envelope and shall not be opened until after the committee has made its findings of fact. In the event the student has been determined to be guilty of the charge or charges the records and documents introduced by the student and the college shall be opened and used by the committee for dispositional purposes, i.e., to determine an appropriate penalty if the charges are sustained.
9. The committee shall deliberate in closed session. The committee’s decision shall be based solely on the testimony and evidence presented at the hearing and the papers filed by the parties.

10. The student shall be sent a copy of the faculty-student disciplinary committee’s decision within five days of the conclusion of the hearing. The decision shall be final subject to the student’s right of appeal.

11. Where a student is represented by legal counsel, the president of the college may request that a lawyer from the general counsel’s office appear at the hearing to present the college’s case.

Section 15.4. APPEALS.

A. An appeal from the decision of the faculty-student disciplinary committee may be made to the president who may confirm or decrease the penalty but not increase it. His/her decision shall be final except in the case of dismissals or suspension for more than one term. An appeal from a decision of dismissal or suspension for more than one term may be made to the appropriate committee of the board. Any appeal under this section shall be made in writing within fifteen days after the delivery of the decision appealed from. This requirement may be waived in a particular case for good cause by the president or board committees as the case may be. If the president is a party to the dispute, his/her functions with respect to an appeal shall be discharged by an official of the university to be appointed by the chancellor.

Section 15.5. COMMITTEE STRUCTURE.

A. Each faculty-student disciplinary committee shall consist of two faculty members and two student members and a chairperson. A quorum shall consist of the chair and any two members. Hearings shall be scheduled at a convenient time and efforts shall be made to insure full students and faculty representation.

B. The president shall select in consultation with the head of the appropriate campus governance body or where the president is the head of the governance body, its executive committee, three (3) members of the instructional staff of that college to receive training and to serve in rotation as chair of the disciplinary committee. If none of the chairpersons appointed from the campus can serve, the president, at his/her discretion, may request that a chairperson be selected by lottery from the entire group of chairpersons appointed by other colleges. The chairperson shall preside at all meetings of the faculty-student disciplinary meetings and decide and make all rulings for the committee. He/she shall not be a voting member of the committee but shall vote in the event of a tie.

C. The faculty members shall be selected by lot from a panel of six elected annually by the appropriate faculty body from among the persons having faculty rank or faculty status. The student members shall be selected by lot from a panel of six elected annually in an election in which all students registered at the college shall be eligible to vote. In the event that the student or faculty panel or both are not elected, or if more panel members are needed, the president shall have the duty to select the panel or panels which have not been elected. No individuals on the panel shall serve on the panel for more than two consecutive years.

D. In the event that the chairperson cannot continue, the president shall appoint another chairperson. In the event that a student or faculty seat becomes vacant and it is necessary to fill the seat to continue the hearing, the seat shall be filled from the faculty or student panel by lottery.

E. Persons who are to be participants in the hearings as witnesses or have been involved in preferring the charges or who may participate in the appeals procedures or any other having a direct interest in the outcome of the hearing shall be disqualified form serving on the committee.

Section 15.6. SUSPENSION OR DISMISSAL.

The board reserves full power to dismiss or suspend a student, or suspend a student organization for conduct which impedes, obstructs, or interferes with the orderly and continuous administration and operation of any college, school, or unit of the university in the use of its facilities or in the achievement of its purposes as an educational institution.

The chancellor or chancellor’s designee, a president or any dean may in an emergency or extraordinary circumstances, temporarily suspend a student, or temporarily suspend the privileges of a student organization or group for cause, pending an early hearing as provided in bylaw section 15.3. to take place within not more than seven (7) school days. Prior to the commencement of a temporary suspension of a student, the college shall give such student an informal oral explanation of the evidence supporting the charges and the student may present informally his/her explanation or theory of the matter. When a student’s presence poses a continuing danger to person or property or an ongoing threat of disrupting the academic process, notice and opportunity for denial and explanation may follow suspension, but shall be given as soon as feasible thereafter.

Section 15.7. THE UNIVERSITY STUDENT SENATE.

There shall be a university student senate responsible, subject to the board, for formulation of university-wide student policy relating to the academic status, role, rights and freedoms of the students. The authority and duties of the university student senate shall not extend to areas of interest which fall exclusively within the domain of the student governments of the constituent units of the university. Consistent with the authority of the board of trustees in accordance with the education law and the bylaws of the board of trustees, the university student senate shall make its own bylaws providing for the election of its own officers, the establishment of its own rules and procedures, for its internal administration and for such other matters as is necessary for its existence. The university student senate shall have the full rights and responsibilities accorded student orga-
Academic Dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, and expulsion, as provided herein.

Definitions and Examples of Academic Dishonesty
Cheating is the unauthorized use or attempted use of material, information, notes, study aids, devices or communication during academic exercise.

The following are some examples of cheating, but by no means is it an exhaustive list:
- Copying from another student during an examination or allowing another to copy your work.
- Unauthorized collaboration on a take home assignment or examination.
- Using notes during a closed book examination.
- Taking an examination for another student, or asking or allowing another student to take an examination for you.
- Changing a graded exam and returning it for more credit.
- Submitting substantial portions of the same paper to more than one course without consulting with each instructor.
- Preparing answers or writing notes in a blue book (exam booklet) before an examination.
- Allowing others to research and write assigned papers or do assigned projects, including use of commercial term paper services.
- Giving assistance to acts of academic misconduct/dishonesty.
- Fabricating data (all or in part).
- Submitting someone else’s work as your own.
- Unauthorized use during an examination of any electronic devices such as cell phones, palm pilots, computers or other technologies to retrieve or send information.
- Plagiarism is the act of presenting another person’s ideas, research or writings as your own. The following are some examples of plagiarism, but by no means is it an exhaustive list:
  - Copying another person’s actual words without the use of quotation marks and footnotes attributing the words to their source.
  - Presenting another person’s ideas or theories in your own words without acknowledging the source.
  - Using information that is not common knowledge without acknowledging the source.
  - Failing to acknowledge collaborators on homework and laboratory assignments.
  - Internet Plagiarism includes submitting downloaded term papers or parts of term papers, paraphrasing or copying information from the internet without citing the source, and “cutting and pasting” from various sources without proper attribution.
- Obtaining Unfair Advantage is any activity that intentionally or unintentionally gives the student an unfair advantage in his/her academic work over another student.
  - The following are some samples of obtaining an unfair advantage but by no means is it an exhaustive list:
    - Stealing, reproducing, circulating, or otherwise gaining advance access to examination materials.
    - Depriving other students of access to library materials by stealing, destroying, defacing, or concealing them.
    - Retaining, using or circulating examination materials which clearly indicate that they should be returned at the end of the exam.
    - Intentionally obstructing or interfering with another students’ work.

Falsification of Records and Official Documents
The following are some examples of falsification, but by no means is it an exhaustive list:
- Forging signatures of authorization.
- Falsifying information on an official academic record.
- Falsifying information on an official document such as a grade report, letter of permission, drop/add form, ID card, or other college documents.

FACULTY SENATE OF THE CITY COLLEGE PROCEDURES TO ADDRESS VIOLATIONS OF THE CUNY POLICY ON ACADEMIC INTEGRITY

WHEREAS the College must develop a range of procedures to implement the University’s Academic Integrity Policy, and
WHEREAS the College’s Office of Academic Standards and the Faculty Senate’s Education Policy Committee have collaborated to develop faculty procedures to address violations of the CUNY Policy on Academic Integrity, therefore
BE IT RESOLVED THAT the Faculty Senate endorses the procedures specified below.

Faculty Procedures to Address Violations of the CUNY Policy on Academic Integrity

A. Informal Resolution Procedure
When a faculty member suspects there has been a violation of academic policy, he/she should meet with the students to discuss the matter.

If the student does not deny the charge and agrees to an informal penalty, the instructor may impose an academic sanction.

It is strongly recommended that the faculty member file a faculty report form with the office of the Academic Integrity Official (AIO) in NAC 5/216 within 15 business days of the incident. The office of the AIO will provide the student with a copy and maintain a record of the incident.
B. Formal Resolution Procedure
When a faculty member suspects there has been a violation of academic policy, he/she should meet with the student to discuss the matter.

If the student denies the charge, and the faculty member seeks an academic and/or disciplinary sanction, the faculty member must file a faculty report form within fifteen days to the AIO in NAC 5/216. The office of the AIO will provide the student with a copy.

While the case is under review by the AIO, the faculty member shall not assign a permanent grade, whether for the particular assignment(s) in question or for the course as a whole.

For the purpose of reporting grades to the Registrar, the faculty member shall use the grade of PEN until the case is resolved by the AIO.

The AIO will promptly inform the faculty member and the student when the case is resolved.

C. The Academic Integrity Office
In cases requiring a formal resolution, the AIO will review all original and relevant documentation submitted by the faculty member and will contact the student regarding the charges and request a written appeal from the student. The AIO will make every attempt to resolve the case prior to further referral. If there is no mutually acceptable resolution, the responsibility of the review will be forwarded to the Academic Integrity Committee or, if disciplinary sanctions are sought, to the Faculty Student Disciplinary Committee.

RESOLUTION PASSED:
DECEMBER 16, 2004

APPENDIX B.4

Computer User Responsibilities

The computer resources* of the City University of New York must be used in a manner that is consistent with the University’s educational purposes and environment. All users of computer resources are expected to act in a spirit of mutual respect and cooperation, and to adhere to the regulations for their use set forth in this document.

As a user of CUNY computer resources: You must have a valid authorized account to use computer resources that require one and may use only those computer resources that are specifically authorized. You may use your account only in accordance with its authorized purposes and may not use an unauthorized account for any purposes.

You are responsible for the safeguarding of your computer account. For a mainframe computer account, you should change your password frequently and should not disclose it to anyone. You should take all necessary precautions in protecting the account, no matter what type of computer resources you are using. You may not circumvent system protection facilities.

You may not knowingly use any system to produce system failure or degraded performance.

You may not engage in unauthorized duplication, alteration or destruction of data, programs or software. You may not transmit or disclose data, programs or software belonging to others and may not duplicate copyrighted material.

You may not engage in abusive or improper use of computer hardware. This includes, but is not limited to, tampering with equipment, unauthorized attempts at repairing equipment and unauthorized removal of equipment components.

You may not use computer resources for private purposes, including, but not limited to, the use of computer resources for profit making or illegal purposes.

You may not use computer resources to engage in abuse of computer personnel or other users. Such abuse includes the sending of abusive, anonymous, or unsolicited messages within CUNY or beyond via network facilities.

The use of college computer resources may be subject to college regulations, and you are expected to be familiar with those regulations.

These regulations and college regulations are subject to revision. You are expected to be familiar with any revisions in regulations.

The University reserves the right to monitor, under appropriate conditions, all data contained in the system to protect the integrity of the system and to insure compliance with regulations.

Any user who is found to be in violation of these rules shall be subject to the following:

Suspension and/or termination of computer privileges;
Disciplinary action by appropriate college and/or University officials;
Referral to law enforcement authorities for criminal prosecution;
Other legal action, including action to recover civil damages and penalties.

* “Computer Resources” is an inclusive term referring to any and all computing/information technology: hardware, software and access. Hardware includes, but is not limited to, terminals, personal computers, workstations, printers, mice, monitors, and cabling, peripheral devices. Software includes, but is not limited to, mainframe shared software, networked software, and stand-alone software residing on personal computers. Access includes, but is not limited to, accounts on timesharing systems as well as access to stand-alone personal computing systems and other relevant technology.

APPENDIX B.5

Workplace Violence Policy and Procedures

The City University of New York has a long-standing commitment to promoting a safe and secure academic and work environment that promotes the achievement of its mission of teaching, research, scholarship and service. All members of the University community—students, faculty and staff—are expected to maintain a working and learning environment free from violence, threats of harassment, violence, intimidation or coercion. While these behaviors are not prevalent at the University, no organization is immune.

The purpose of this policy is to address the issue of potential workplace violence in our community, prevent workplace violence from occurring to the fullest extent possible, and set forth procedures to be followed when such violence has occurred.
Policy
The City University of New York prohibits workplace violence. Violence, threats of violence, intimidation, harassment, coercion, or other threatening behavior towards people or property will not be tolerated. Complaints involving workplace violence will not be ignored and will be given the serious attention they deserve. Individuals who violate this policy may be removed from University property and are subject to disciplinary and/or personnel action up to and including termination, consistent with University policies, rules and collective bargaining agreements, and/or referral to law enforcement authorities for criminal prosecution. Complaints of sexual harassment are covered under the University’s Policy Against Sexual Harassment.

The University, at the request of an employee or student, or at its own discretion, may prohibit members of the public, including family members, from seeing an employee or student on University property unless necessary to transact University-related business. This policy particularly applies in cases where the employee or student suspects that an act of violence will result from an encounter with said individual(s).

Scope
All faculty, staff, students, vendors, contractors, consultants, and others who do business with the University, whether in a University facility or off-campus location where University business is conducted, are covered by this policy. This policy also applies to other persons not affiliated with the University, such as former employees, former students, and visitors. When students have complaints about other students, they should contact the Office of Student Affairs at their campus.

Definitions
Workplace violence is any behavior that is violent, threatens violence, coerces, harasses or intimidates others, interferes with an individual’s legal rights of movement or expression, or disrupts the workplace, the academic environment, or the University’s ability to provide services to the public. Examples of workplace violence include, but are not limited to:
1. Disruptive behavior intended to disturb, interfere with or prevent normal work activities (such as yelling, using profanity, verbally abusing others, or waving arms and fists).
2. Intentional physical contact for the purpose of causing harm (such as slapping, stabbing, punching, striking, shoving, or other physical attack).
3. Menacing or threatening behavior (such as throwing objects, pounding on a desk or door, damaging property, stalking, or otherwise acting aggressively; or making oral or written statements specifically intended to frighten, coerce, or threaten) where a reasonable person would interpret such behavior as constituting evidence of intent to cause harm to individuals or property.
4. Possessing firearms, imitation firearms, knives or other dangerous weapons, instruments or materials. No one within the University community, shall have in their possession a firearm or other dangerous weapon, instrument or material that can be used to inflict bodily harm on an individual or damage to University property without specific written authorization from the Chancellor or the college President regardless of whether the individual possesses a valid permit to carry the firearm or weapon.

Reporting of Incidents
1. General Reporting Responsibilities
Incidents of workplace violence, threats of workplace violence, or observation of workplace violence are no to be ignored by any member of the University community. Workplace violence should promptly be reported to the appropriate University official (see below). Additionally, faculty, staff, and students are encouraged to report behavior that they reasonably believe poses a potential for workplace violence as defined above. It is important that all members of the University community take this responsibility seriously to effectively maintain a safe working and learning environment.

2. Imminent or Actual Violence
Any person experiencing or witnessing imminent danger or actual violence involving weapons or personal injury should call the Campus Public Safety Office immediately, or call 911.

3. Acts of Violence Not Involving Weapons or Injuries to Persons
Any person who is the subject of a suspected violation of this policy involving violence without weapons or personal injury, or is a witness to such suspected violation, should report the incident to his/her supervisor, or in lieu thereof, to their respective Campus Public Safety Office. Students should report such incidents to the Office of Student Affairs at their campus or in lieu thereof, their campus Public Safety Office. The Campus Public Safety Office will work with the Office of Human Resources and the supervisor or the Office of Student Affairs on an appropriate response.

4. Commission of a Crime
All individuals who believe a crime has been committed against them have the right, and are encouraged, to report the incident to the appropriate law enforcement agency.

5. False Reports
Members of the University community who make false and malicious complaints of workplace violence, as opposed to complaints which, even if erroneous, are made in good faith, will be subject to disciplinary action and/or referral to civil authorities as appropriate.

6. Incident Reports
The University will report incidents of workplace violence consistent with the College Policies for Incident Reporting Under the Campus Security Policy and Statistical Act (Clery Act).

Confidentiality
The University shall maintain the confidentiality of investigations of workplace violence to the extent possible. The University will act on the basis of anonymous complaints where it has a reasonable basis to believe that there has been a violation of this policy and that the safety and well being of members of the University community would be served by such action.
Retaliatory Action

Retaliatory action will be subject to policy. Those found responsible for violence are a violation of this policy. Those found responsible for workplace violence will be subject to discipline up to and including termination.

Appendix B.6

Notice of Access to Campus Crime Statistics, the Campus Security Report, and Information on Registered Sex Offenders

The College Advisory Committee on Campus Safety will provide upon request all campus crime statistics as reported to the U.S. Department of Education, as well as the annual campus security report. The campus security report includes: (1) the campus crime statistics for the most recent calendar year and the two proceeding calendar years; (2) campus policies regarding procedures and facilities to report criminal actions or other emergencies on campus; (3) policies concerning the security of and access to campus facilities; (4) policies on campus law enforcement; (5) a description of campus programs to inform students and employees to be responsible for their own security and the security of others; (6) campus crime prevention programs; (7) policy concerning the monitoring through the police of criminal activity at off-campus locations of students organizations officially recognized by the college; (8) policies on illegal drugs, alcohol, and underage drinking; (9) where information provided by the State on registered sex offenders may be obtained (also see below); and (10) policies on campus sexual assault programs aimed at the prevention of sex offenders and procedures to be followed when a sex offense occurs. This information is maintained pursuant to the federal Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act.

The campus crime statistics and the annual campus security report are available at the reference desk of the library and the college website at www.ccny.cuny.edu/public_safety/crime_stats.html. If you wish to be mailed copies of the campus crime statistics and the annual campus security report, you should contact Paul F. Occhiogrosso, Esq., Dean of Faculty & Staff Relations and Counsel to the President; Records Access Officer at (212) 650-8276 and copies will be mailed to you within 10 days. The U.S. Department of Education’s website address for campus crime statistics is www.ed.gov/security/InstDetail.asp (then input City College of New York of The City University of New York).

In accordance with the federal Campus Sex Crimes Prevention Act, registered sex offenders now are required to register the name and address of any college at which he/she is a student or employee. The New York State Division of Criminal Justice maintains a registry of convicted sex offenders and informs the college’s chief security (public safety) officer of the presence on campus of a registered sex offender as a student or employee. You may contact the college’s chief security officer Edward D. Diaz CPP-Director of Public Safety and Security, located in the NAC building, in the 4th floor, room 201, or you may contact him at (212) 650-6911 to obtain information about Level 2 or Level 3 registered sex offenders on campus. To obtain information about Level 3 offenders, you may contact the Division’s registry website at www.criminaljustice.state.ny.us/nsor/sor_about.htm and then click on “Search for Level 3 Sex Offenders” or access the directory at the college’s public safety department or police precinct. To obtain information about Level 2 offenders, you need to contact the public safety department, local police precinct in which the offender resides or attends college, or the Division’s sex offender registry at 800-262-3257.

Appendix B.7

Article XVI – Student Activity Fees and Auxiliary Enterprises

Section 16.1. STUDENT ACTIVITY FEE

The student activity fee is the total of the fees for student government and other student activities. Student activity fees, including student government fees collected by a college of the university shall be deposited in a college central depository and, except where earmarked by the board, allocated by a college association budget committee subject to review by the college association as required in these bylaws.

Section 16.2. STUDENT ACTIVITY FEES USE – EXPENDITURE CATEGORIES

Student activity fee funds shall be allocated and expended only for the following purposes:

- Extracurricular educational programs;
- Cultural and social activities;
- Recreational and athletics programs;
- Student government;
- Publications and other media;
- Assistance to registered student organizations;
- Community service programs;
- Enhancement of the college and university environment;
- Transportation, administration and insurance related to the implementation of these activities;
- Student services to supplement or add to those provided by the university;
- Stipends to student leaders.

Section 16.3 STUDENT GOVERNMENT FEE

The student government fee is that portion of the student activity fee levied by resolution of the board, which has been established for the support of the student government activities. The existing student government fees now in effect shall continue until changed. Student government fees shall be allocated by the duly elected student government, or each student government where more than one duly elected student govern-
Section 16.4. STUDENT GOVERNMENT ACTIVITY DEFINED
A student government activity is any activity operated by and for the students enrolled at any unit for the university provided, (1) such activity is for the direct benefit of the students enrolled at the college, (2) that participation in the activity and the benefits thereof is available to all students enrolled in the unit or student government thereof, and (3) that the activity does not contravene the laws of the city, state or nation, or the published rules, regulations, and orders of the university or the duly established college authorities.

Section 16.5. COLLEGE ASSOCIATION
A. The college association shall have responsibility for the supervision and review of college student activity fee supported budgets. All budgets of college student activity fees, except where earmarked by the board to be allocated by another body, should be developed by a college association budget committee and recommended to the college association for review by the college association prior to expenditure. The college association shall review all college student activity fee allocations and expenditure for conformance with the expenditure categories defined in Section 16.2 of this article and the college association shall disapprove any allocation or expenditure it finds does not so conform, or is inappropriate, improper, or inequitable.

B. A college association shall be considered approved for purposes of this article if it consists of thirteen (13) members, its governing documents are approved by the college president and the following requirements are met:
1. The governing board of the college association is composed of:
   - The college president or his/her designee as chair.
   - Three administrative members appointed by the college president.
   - Three faculty members appointed by the college president from a panel whose size is twice the number of seats to be filled and the panel is elected by the appropriate college faculty governance body.
   - Six student members comprised of the student government president(s) and other elected students with the student seats allocated on a basis which will provide representation to each government, where more than one exists, as nearly as practicable in proportion to the student activity fees provided by the students from the respective constituencies.
2. The college association structure provides a budget committee composed of members of the governing board, at least a majority of whom are students selected in accordance with section 16.5.(b) (1)(iv) of these bylaws. The budget committee shall be empowered to receive and review student activity fee budget requests and to develop a budget subject to the review of the college association. The college association may choose to not approve the budget or portions of the budget if in their opinion such items are inappropriate, improper, or inequitable. The budget shall be returned to the budget committee with the specific concerns of the college association noted for further deliberation by the budget committee and subsequent resubmittal to the college association. If the budget is not approved within thirty (30) days those portions of the budget voted upon and approved by the college association board will be allocated. The remainder shall be held until the college association and the budget committee agree.
3. The governing documents of the college association have been reviewed by the board’s general counsel and approved by the board.

Section 16.6. MANAGEMENT AND DISBURSEMENT OF FUNDS
The college and all student activity fee allocating bodies shall employ generally accepted accounting and investment procedures in the management of all funds. All funds for the support of student activities are to be disbursed only in accordance with approved budgets and be based on written documentation. A requisition for disbursements of funds must contain two signatures; one, the signature of a person with responsibility for the program; the other the signature of an approved representative of the allocating body.

Section 16.7. REVENUES
All revenues generated by student activities funded through student activity fees shall be placed in a college central depository subject to the control of the allocating body. The application of such revenues to the account of the income generating organization shall require the specific authorization of the allocating body.

Section 16.8. FISCAL ACCOUNTABILITY HANDBOOK
The chancellor or his/her designee shall promulgate regulations in a fiscal accountability handbook, to regulate all aspects of the collection, deposit, financial disclosure, accounting procedures, financial payments, documentation, contracts, travel vouchers, investments and surpluses of student activity fees and all other procedural and documentary aspects necessary, as determined by the chancellor or his/her designee to protect the integrity and accountability of all student activity fee funds.

Section 16.9. COLLEGE PURPOSES FUND
A. A college purposes fund may be established at each college and shall be allocated by the college president. This fund may have up to twenty-five(25) percent of the unearmarked portion of the student activity fee earmarked to it by resolution of the board, upon the presentation to the
board of a list of activities that may be properly funded by student activity fees that are deemed essential by the college president.

B. Expenditures from the college purposes fund shall be subject to full disclosure under section 16.13. of these bylaws.

C. Referenda of the student body with respect to the use and amount of the college purposes fund shall be permitted under the procedures and requirements of section 16.12. of these bylaws.

Section 16.10. AUXILIARY ENTERPRISE BOARD

A. The auxiliary enterprise board shall have responsibility for the oversight, supervision, and review over college auxiliary enterprises. All budgets of auxiliary enterprise funds and all contracts for auxiliary enterprises shall be developed by the auxiliary enterprise budget and contract committee and reviewed by the auxiliary enterprise board prior to expenditure or execution.

B. The auxiliary enterprise board shall be considered approved for the purposes of this article if it consists of at least eleven (11) members, its governing documents are approved by the college president and the following requirements are met:

1. The governing board is composed of the college president or his/her designee as chair, plus an equal number of students and the combined total of faculty and administrative members.
2. The administrative members are appointed by the college president.
3. The faculty members are appointed by the college president from a panel whose size is twice the number of seats to be filled and the panel is elected by the appropriate college faculty governance body.
4. The student members are the student government president(s) and other elected students and the student seats are allocated on a basis which will provide representation to each government, where more than one exists, as nearly as practicable, in proportion to the student enroll-

ment by headcount from the respective constituencies.
5. The auxiliary enterprise board structure provides for a budget and contract committee composed of a combined total of faculty and administrative members that is one more than the number of student members. The budget and contract committee shall be empowered to develop all contract and budget allocation proposals subject to the review and approval of the auxiliary enterprise board.
6. The governing documents of the auxiliary enterprise board have been reviewed by the board’s general counsel and approved by the board.

Section 16.11. THE REVIEW AUTHORITY OF COLLEGE PRESIDENTS OVER STUDENT ACTIVITY FEE ALLOCATING BODIES AND AUXILIARY ENTERPRISE BOARDS

A. The president of the college shall have the authority to disapprove any student activity fee, including student government fee, or auxiliary enterprise allocation or expenditure, which in his or her opinion contravenes the laws of the city, state, or nation or any bylaw or policy of the university or any policy, regulation, or order of the college. If the college president chooses to disapprove an allocation or expenditure, he or she shall consult with the general counsel and vice chancellor for legal affairs and thereafter communicate his or her decision to the allocating body or auxiliary enterprise board.

B. The president of the college shall have the authority to suspend and send back for further review any student activity fee, including student government fee, allocation or expenditure which in his/her opinion is not within the expenditure categories defined in section 16.2. of this article. The college association shall, within ten (10) days of receiving a proposed allocation or expenditure for further review, study it and make a recommendation to the president with respect to it. The college president shall thereafter consider the recommendation, shall consult with the general counsel and vice chancellor for legal affairs, and thereafter communicate his/her final decision to the allocating body as to whether the allocation or expenditure is disapproved.

C. The chancellor or his/her designee shall have the same review authority with respect to university student activity fees that the college president has with respect to college student activity fees.

D. All disapprovals exercised under this section shall be filed with the general counsel and vice chancellor for legal affairs.

E. Recipients of extramural student activity fees shall represent an annual report to the chancellor for the appropriate board committee detailing the activities, benefits and finances of the extramural body as they pertain to the colleges where students are paying an extramural fee.

Section 16.12. REFERENDA

A referendum proposing changes in the student activity fee shall be initiated by a petition of at least ten (10) percent of the appropriate student body and voted upon in conjunction with student government elections.

A. Where a referendum seeks to earmark student activity fees for a specific purpose or organization by changing the total student activity fee, the results of the referendum shall be sent to the college association for implementation.

B. Where a referendum seeks to earmark student activity fees for a specific purpose or organization by changing the total student activity fee, the results of such a referendum shall be sent to the board by the president of the college together with his/her recommendation.

C. At the initiation of a petition of at least ten(10) percent of the appropriate student body, the college president may schedule a student referendum at a convenient time other than in conjunction with student government elections.

D. Where the referendum seeks to affect the use or amount of student activity fees in the college purposes fund, the results of the referendum shall be sent to the board by the col-
the reason that he or she is unable.

Section 16.13. DISCLOSURE
A. The college president shall be responsible for the full disclosure to each of the student governments of the college of all financial information with respect to student activity fees.
B. The student governments shall be responsible for the full disclosure to their constituents of all financial information with respect to student government fees.
C. The student activity fee allocating bodies shall be responsible for the full disclosure of all financial information to its membership, to the college and to the student governments with respect to all of its activities.
D. The auxiliary enterprise board shall be responsible for the full disclosure of all financial information to its membership, to the college and to the student governments with respect to auxiliary enterprises.
E. For purposes of the foregoing paragraphs, full disclosure shall mean the presentation each semester of written financial statements which shall include, but need not be limited to, the source of all fee income by constituency, income from other sources creditable to student activity fee accounts, disbursements, transfers, past reserves, surplus accounts, contingency and stabilization funds. Certified independent audits performed by a public auditing firm shall be conducted at least once each year.

Section 16.14. STIPENDS
The payment of stipends to student leaders is permitted only within those time limits and amounts authorized by the board.

Appendix B.8
New York State Education Law, Article 5: S 224-a. Students unable because of religious beliefs to Register or attend classes on certain days.

1. No person shall be expelled from or be refused admission as a student to an institution of higher education for the reason that he or she is unable, because of his or her religious beliefs, to register or attend classes or to participate in any examination, study or work requirements on a particular day or days.
2. Any student in an institution of higher education who is unable, because of his or her religious beliefs, to attend classes on a particular day or days shall, because of such absence on the particular day or days, be excused from any examination or study or work requirements.
3. It shall be the responsibility of the faculty and of the administrative officials of each institution of higher education to make available to each student who is absent from school, because of his or her religious beliefs, an equivalent opportunity to register for classes or make up any examination, study or work requirements which he or she may have missed because of such absence on any particular day or days. No fees of any kind shall be charged by the institution for making available to the said student such equivalent opportunity.
4. If registration, classes, examinations, study or work requirements are held on Friday after four o’clock post meridian or on Saturday, similar or makeup classes, examinations, study or work requirements or opportunity to register shall be made available on other days, where it is possible and practicable to do so. No special fees shall be charged to the student for these classes, examinations, study or work requirements or registration held on other days.
5. In effectuating the provisions of this section, it shall be the duty of the faculty and of the administrative officials of each institution of higher education to exercise the fullest measure of good faith. No adverse or prejudicial effects shall result to any student because of his or her availing himself or herself of the provisions of this section.
6. Any student, who is aggrieved by the alleged failure of any faculty or administrative officials to comply in good faith with the provisions of this section, shall be entitled to maintain an action or proceeding in the supreme court of the county in which such institution of higher education is located for the enforcement of his or her rights under this section.
6-a. It shall be the responsibility of the administrative officials of each institution of higher education to give written notice to students of their rights under this section, informing them that each student who is absent from school, because of his or her religious beliefs, must be given an equivalent opportunity to register for classes or make up any examination, study or work requirements which he or she may have missed because of such absence on any particular day or days. No fees of any kind shall be charged by the institution for making available to such student such equivalent opportunity.

Appendix B.9
Notification Under FERPA of Student Rights Concerning Education Records and Directory Information
The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. The FERPA rights of students are:
- The right to inspect and review your education records.
- Students should submit to the registrar, dean, head of the academic department, or other appropriate official, written requests that identify the record(s) they wish to inspect. If the records are not maintained by the college official to whom the request was submitted, that official shall advise the student...
of the correct official to whom the request should be addressed. All requests shall be granted or denied in writing within 45 days of receipt. If the request is granted, you will be notified of the time and place where the records may be inspected. If the request is denied or not responded to within the 45 days, you may appeal to the college’s FERPA appeals officer. Additional information regarding the appeal procedures will be provided to you if a request is denied.

The right to request the amendment of the student’s education records that the student believes are inaccurate or misleading.

You may ask the college to amend a record that you believe is inaccurate or misleading. You should write to the college official responsible for the record, clearly identify the part of the record you want changed, and specify why it is inaccurate or misleading.

If the college decides not to amend the record as requested by you, the college will notify you of the decision and advise you of your right to appeal to the college’s FERPA appeals officer regarding the request for amendment. Additional information regarding the hearing procedures will be provided to you when notified of your right to a hearing.

The right to consent to disclosure of personally identifiable information contained in your education records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent is disclosure to college officials with legitimate educational interests. A college official is a person employed by the university in an administrative, supervisory, academic or research, or support staff position; a person or company with whom the university has contracted; a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another college official in performing his or her tasks.

A college official has a legitimate educational interest if access is reasonably necessary in order to perform his or her instructional, research, administrative or other duties and responsibilities.

Upon request, the college discloses education records without consent to officials of another college or school in which the student seeks or intends to enroll.

You may appeal the alleged denial of FERPA rights to the:

General Counsel and Vice Chancellor for Legal Affairs
The City University of New York
535 East 80th Street
New York, NY 10021

The right to file a complaint with the U.S. Department of Education concerning alleged failures by the college to comply with the requirements of FERPA. The name and address of the Office that administers FERPA are:

Family Policy Compliance Office
U.S. Department of Education
600 Independence Avenue, SW
Washington, D.C. 20202-4605

The college will make the following “directory information” concerning current and former students available to those parties having a legitimate interest in the information: name, attendance dates (periods of enrollment), address, telephone number, date and place of birth, photograph, e-mail address, full or part-time status, enrollment status (undergraduate, graduate, etc.), level of education (credits) completed, major field of study, degree enrolled for, participation in officially recognized activities and sports, height and weight of athletic team members, previous school attended, and degrees, honors and awards received. By filing a form with the Registrar’s Office, you may request that any or all of this directory information not be released without your prior written consent. This form is available in the Registrar’s Office and may be filed, withdrawn, or modified at any time.

Appendix B.10

No. 8. A. AMENDMENT TO THE POLICY ON WITHHOLDING STUDENT RECORDS

RESOLVED, That the existing Board of Trustees policy with respect to the withholding of student records as last amended on February 22, 1993, Cal. No. 7.c., be amended as follows:

Students who are delinquent and/or in default in any of their financial accounts with the college, the university or an appropriate state or federal agency for which the university acts as either a disbursing or certifying agent, and students who have not completed exit interviews as required by the Federal Perkins Loan Program, the federal Family Education Loan Programs, the William D. Ford Federal Direct Loan Program, and the Nursing Student Loan Program, are not to be permitted to complete registration, or issued a copy of their grades, a transcript of academic record, certificate, or degree, nor are they to receive funds under the federal campus-based student assistance programs or the federal Pell Grant Program unless the designated officer, in exceptional hardship cases and consistent with federal and state regulations, waives in writing the application of this regulation.

Appendix B.11

Freedom of Information Law Notice

Requests to inspect public records at the college should be made to the Registrar Customer Manager, Lucian Pinckney (160 Convent Avenue, Administration Building, Room 102 (212) 650-7850). Public records are available for inspection and copying by appointment only at a location to be designated. You have the right to appeal a denial of a request for access to records to the CUNY General Counsel and Vice Chancellor for Legal Affairs. Copies of the CUNY procedures for Public Access to Public Records Pursuant to Article 6 of the Public Officers Law and the appeal form are available at the reference desk of the library and the college website.

Appendix B.12

Special Provisions for Students in the Military

The following policies apply to students who leave CUNY to fulfill military obligations.

I. Students called up to the reserves or drafted before the end of the semester.
Grades. In order to obtain a grade, a student must attend 13 weeks (five weeks for summer session).

Refunds. A student called up to the reserves or drafted who does not attend for sufficient time to qualify for a grade is entitled to a 100% refund of tuition and all other fees except application fees.

II. Students who volunteer (enlist) for the military.

Grades. Same provision as for students called up to the reserves. In order to obtain a grade, a student must attend 13 weeks (five weeks for summer session).

Refunds. The amount of the refund depends upon whether the withdrawal is before the 5th week of classes. Withdrawal before the beginning of the 5th calendar week (3rd calendar week for summer session): 100% refund of tuition and all other fees except application fees. Withdrawal thereafter: 50% refund.

III. Other Provisions for Military Service:

Resident Tuition Rates. These lower rates are applicable to all members of the armed services, their spouses and their dependent children, on full-time active duty and stationed in the State of New York.

Re-enrollment of Veterans. Veterans who are returning students are given preferred treatment in the following ways:

Veterans who are former students with unsatisfactory scholastic records, may be readmitted with a probation program.

Veterans, upon their return, may register even after normal registration periods, without late fees.

Granting of college credit for military service and armed forces instructional courses.

Veterans returning too late to register may audit classes without charge. Late Admissions. Veterans with no previous college experience are permitted to file applications up to the date of registration, and are allowed to begin classes pending completion of their application and provision of supporting documents.

Readmission Fee. Upon return from military service, a student will not be charged a Readmission Fee to register at the same college.

Veterans Tuition Deferrals. Veterans are entitled to defer the payment of tuition pending receipt of veterans' benefits.

New York National Guard Tuition Waivers. Active members of the New York National Guard, who are legal residents of New York State and who do not have a baccalaureate degree, are eligible for a tuition waiver for undergraduate study.

APPENDIX B.13

Notification of Student Immunization Requirements

Students who do not submit proof of measles, mumps and rubella (MMR) immunization or who fail to return the meningococcal meningitis response form within a statutory grace period shall be prohibited from attending the institution. For additional information, you should contact the Wellness and Counseling Center located in the Science Building (MR), Room 15, at the following number (212) 650-8222.

Public Health Law 2165 requires that post-secondary students be immunized against measles, mumps, and rubella (MMR).

All registered full-time students and part-time students born on or after January 1, 1957 who are enrolled for at least six, but fewer than twelve semester hours (or the equivalent) per semester in an approved degree program or registered certificate program must submit proof of MMR immunization. Students may be exempt from the required MMR immunizations for religious or medical reasons. To qualify for a religious exception, students must submit a signed statement, or in the event the student is a minor (under 18), a signed statement from their parent or guardian, that they hold sincere and genuine religious beliefs that prohibit immunization. To qualify for medical exception, students must submit a written statement from a licensed physician or nurse practitioner indicating that such immunization may be detrimental to their health.

Public Health Law 2167 requires that post-secondary institutions provide written information about meningococcal meningitis to its students and that students complete, sign, and return a meningococcal meningitis response form. Public Health Law 2167 does not require that students be immunized against meningitis.

Public Health Law 2167 requires colleges to distribute written information about meningococcal meningitis disease and vaccination and students to complete, sign and return to the college, a meningococcal meningitis response form that: (a) confirms that the college has provided the information about meningococcal meningitis; and (b) indicates that either: (1) the student has received immunization against meningococcal meningitis within the 10 years preceding the date of the response form; or (2) the student has decided against receiving the vaccination. This law applies to students, who are enrolled in at least six semester hours (or the equivalent) per semester. No student may be exempt from receiving information or returning the response form.

APPENDIX B.14

Policy for City College Pages on the World Wide Web

WWW PAGES Published by Faculty, Staff and Students

Faculty, staff, and students may create WWW pages for use in their various academic and administrative duties and activities and may install them on City College web servers. The contents of individuals’ WWW pages published on the City College web servers must comply with the General Rules on Information Content stated in this policy.

Individuals’ WWW pages are not College publications and the contents of these pages do not necessarily represent the views of the College.

Individual departments and administrative units may define additional conditions for the creation and installation of WWW pages by faculty, staff, and students under their supervision. Any such additional conditions must
be consistent with this overall policy but may include more detailed guidelines and, where necessary and appropriate, additional restrictions.

Recognized student organizations may create WWW pages and may install them on a City College web server. After verification by a designated member of the Office of the Dean of Students that the student organization is active and officially recognized by the College, a link may be created from an official City College home page to the student organization’s home page.

Student organization WWW pages are not College publications and their contents do not necessarily represent the views of the College.

The contents of student organization WWW pages must comply with the General Rules on Information Content stated in this policy.

**Terms and Conditions of Use**

Any person who uses the WWW facilities at City College consents to all of the provisions of this policy and agrees to comply with all of its terms and conditions and with all applicable local, state, and federal laws and regulations.

Any user of the WWW whose actions involving the WWW violate this, or any other College policy or regulation, may be subject to limitations or elimination of WWW privileges as well as other disciplinary actions.

**APPENDIX B.15**

**Policy Against Sexual Harassment**

**Policy Statement**

It is the policy of The City University of New York to promote a cooperative work and academic environment in which there exists mutual respect for all University students, faculty, and staff. Harassment of employees or students based upon sex is inconsistent with this objective and contrary to the University policy of equal employment and academic opportunity without regard to age, sex, sexual orientation, alienage or citizenship, religion, race, color, national or ethnic origin, handicap, and veteran or marital status. Sexual harassment is illegal under Federal, State, and City laws, and will not be tolerated within the University.

The University, through its colleges, will disseminate this policy and take other steps to educate the University community about sexual harassment. The University will establish procedures to ensure that investigations of allegations of sexual harassment are conducted in a manner that is prompt, fair, thorough, and as confidential as possible under the circumstances, and that appropriate corrective and/or disciplinary action is taken as warranted by the circumstances when sexual harassment is determined to have occurred. Members of the University community who believe themselves to be aggrieved under this policy are strongly encouraged to report the allegations of sexual harassment as promptly as possible. Delay in making a complaint of sexual harassment may make it more difficult for the college to investigate the allegations.

**A. Prohibited Conduct**

It is a violation of University policy for any member of the University community to engage in sexual harassment or to retaliate against any member of the University community for raising an allegation of sexual harassment, for filing a complaint alleging sexual harassment, or for participating in any proceeding to determine if sexual harassment has occurred.

**B. Definition of Sexual Harassment**

For purposes of this policy, sexual harassment is defined as unwelcome sexual advances, requests for sexual favors, and other oral or written communications or physical conduct of a sexual nature when:

- submission to such conduct is made either explicitly or implicitly a term or condition of an individual’s employment or academic standing;
- submission to or rejection of such conduct by an individual is used as a basis for employment or academic decisions affecting such individual; or
- such conduct has the purpose or effect of unreasonably interfering with an individual’s work or academic performance or creating an intimidating, hostile or abusive work or academic environment.

Sexual harassment can occur between individuals of different sexes or of the same sex. Although sexual harassment most often exploits a relationship between individuals of unequal power (such as between faculty/staff member and student, supervisor and employee, or tenured and untenured faculty members), it may also occur between individuals of equal power (such as between fellow students or co-workers), or in some circumstances even where it appears that the harasser has less power than the individual harassed (for example, a student sexually harassing a faculty member). A lack of intent to harass may be relevant to, but will not be determinative of, whether sexual harassment has occurred.

**C. Examples of Sexual Harassment**

Sexual harassment may take different forms. Using a person’s response to a request for sexual favors as a basis for an academic or employment decision is one form of sexual harassment.

Examples of this type of sexual harassment (known as quid pro quo harassment) include, but are not limited to, the following:

- requesting or demanding sexual favors in exchange for employment or academic opportunities (such as hiring, promotions, grades, or recommendations);
- submitting unfair or inaccurate job or academic evaluations or grades, or denying training, promotion, or access to any other employment or academic opportunity, because sexual advances have been rejected.

Other types of unwelcome conduct of a sexual nature can also constitute sexual harassment, if sufficiently severe or pervasive that the target does find, and a reasonable person would find, that an intimidating, hostile or abusive work or academic environment has been created.

Examples of this kind of sexual harassment (known as hostile environment harassment) include, but are not limited to, the following:

- sexual comments, teasing, or jokes;
- sexual slurs, demeaning epithets, derogatory statements, or other verbal abuse.
Section 494C(j) of the Higher Education Act of 1965, as amended, provides that a student, faculty member, or other person who believes he or she has been aggrieved by an institution of higher education has the right to file a written complaint.

In New York State, a complaint may be filed by any person with reason to believe that an institution has acted contrary to its published standards or that conditions at the institution appear to jeopardize the quality of the institution’s instructional programs or the general welfare of its students. Any person who believes he or she has been aggrieved by an institution on or after May 4, 1994, may file a written complaint with the State Education Department within three years of the alleged incident.

How to File a Complaint

1. The person should first try to resolve the complaint directly with the institution by following the internal complaint procedures provided by the institution. An institution of higher education is required to publish its internal complaint procedure in a primary information document such as the catalog or student handbook. (The Department suggests that the complainant keep copies of all correspondence with the institution.)

2. If a person is unable to resolve the complaint with the institution or believes that the institution has not properly addressed the concerns, he or she may send a letter or telephone the Postsecondary Complaint Registry to request a complaint form. Please telephone (212) 951-6493 or write to:

New York State Education Department
Postsecondary Complaint Registry
One Park Avenue, 6th Floor
New York, NY 10016

3. The Postsecondary Complaint Registry Form should be completed, signed, and sent to the above address. The completed form should indicate the resolution being sought and any efforts that have been made to resolve the complaint through the institution’s internal complaint processes. Copies of all relevant documents should be included.

4. After receiving the completed form, the Department will notify the complainant of its receipt and make any necessary request for further information. When appropriate, the Department will also advise the institution that a complaint has been made and, when appropriate, the nature of the complaint. The complainant will also be notified of the name of the evaluator assigned to address the specific complaint. The evaluator may contact the complainant for additional information.

5. The Department will make every effort to address and resolve complaints within ninety days from receipt of the complaint form.

Complaint Resolution

Some complaints may fall within the jurisdiction of an agency or organization other than the State Education Department. These complaints will be referred to the entity with appropriate jurisdiction. When a complaint concerns a matter that falls solely within the jurisdiction of the institution of higher education, the complainant will be notified and the Department will refer the complaint to the institution in question and request that the matter receive a review and response.

Upon conclusion of the Department’s complaint review or upon a disposition of the complaint by referral to another agency or organization, or to the institution of higher education, the Department will issue a written notice to the complainant describing the resolution of the complaint. The complainant may contact the Department evaluator directly for follow-up information or for additional assistance.
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<td>Susan O’Malley, ex officio</td>
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Appendix E
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Acting Dean, School of Engineering
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B.S.

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Ardie D. Walser
Associate Dean for Undergraduate Studies, School of Engineering
B.E., M.E., Ph.D.
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Jeffery Clapp
Director, Instructional Media

Robert Coleman
Director, Intercollegiate Athletics

Joyce Coppin
Acting Director, College Now

Patricia Cruz
Director, Aaron Davis Hall

Sophia Demetriou
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Paula Wiest
Manager, Telecommunications

Brigitte Zapata
Bursar
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Herman H. Cline, Associate Professor

Judy Connorton, Associate Professor
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Laurel Franklin, Associate Professor
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William Gibbons, Assistant Professor

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A.A., Borough of Manhattan Community College; B.A., Queens College; M.L.S., Pratt Inst.; M.S., The City College

Pamela R. Gillespie, Professor, Assistant Dean and Chief Librarian
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Claudia Lascar, Assistant Professor

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Grace-Ellen McCrann, Instructor

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Amy Wolfe, Instructor
B.A., Univ. of Wisconsin-Madison, M.L.S.

PROFESSORS EMERITI

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Robert Kuhner
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Elizabeth Rajec
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<td>Childhood Education</td>
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<td>English Education “7-12”</td>
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<td>Entry Level Leader</td>
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*MLA pending registration by the New York State Department of Education
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By Train
IRT #1 local to 137th Street and Broadway, walk up 138th Street three blocks to Convent Avenue.

IND “A” or “D” express or “B” or “C” local to 145th Street and St. Nicholas Avenue, walk west one block to 145th Street and Convent Avenue, then south to 138th Street.

IRT #4 or #5 express or #6 local to 125th Street and Lexington Avenue, change there for the M-100 or M-101 bus to Amsterdam Avenue and 138th Street, walk east one block to Convent Avenue.

Metro North to 125th Street and Park Avenue, change there for the M-100 or M-101 bus to Amsterdam Avenue and 138th Street, walk east one block to Convent Avenue.

Note: City College operates shuttle buses between the campus and the 137th Street (Broadway) and 145th Street (St. Nicholas) subway stations.

By Car
From the West Side: Westside Highway traveling north, exit at 125th Street, right to Amsterdam Avenue, left to 133rd Street, right one block to Convent Avenue. Traveling south from the George Washington Bridge, exit at 125th Street, first left onto 132nd Street, one block to Broadway, left to 133rd Street, right two blocks to Convent Avenue.

From the East Side: Triborough Bridge to Harlem River Drive, exit at 135th Street to end, turn right on St. Nicholas Avenue, then left onto 141st Street, make left on Convent Avenue to campus.

By Bus
M-18 to 138th Street and Convent Avenue.

M-4 or M-5 to Broadway and 137th Street, walk up 138th Street three blocks to Convent Avenue.

M-100 or M-101 to Amsterdam Avenue and 138th, walk east one block to Convent Avenue.

Parking on Campus
Parking on campus is extremely limited. Parking permits are sold on an annual basis. Please check the website www.ccny.cuny.edu/public_safety/parking.html for complete details.