

MANHATTAN

C O L L E G E

GRADUATE CATALOG
2009-2011



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The Graduate Catalogue • 2009–2011

Manhattan College
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Please refer to the web site, www.manhattan.edu for
revisions and updated information.

While the announcements presented in the following pages apply as of the date of publication, the College reserves the right to make such changes as circumstances require.

IMPORTANT INFORMATION

This Catalogue contains the general information necessary for those seeking admission into the programs offered by the Graduate Division of Manhattan College. It presents the curricular requirements for the various Master degrees.

Applicants should be aware that the courses listed under each program are not offered every year but are offered in a cycle over a five-year period, the time allotted for the completion of all requirements for the degree.

Because the majority of students matriculating for the degree are attending part-time, it is impossible to indicate the academic session when each course is expected to be offered. However, a separate printed schedule is published approximately two months in advance of every session (fall, spring, summer) detailing which courses are to be offered, the days, times, rooms and professors.

The College reserves the right to withdraw or modify any of the courses, costs or programs listed in this catalogue, to cancel any course or program for which it deems registration insufficient, usually less than ten registrants, to make any other changes which it considers necessary or desirable.

All students must provide evidence of immunization against measles, mumps and rubella (MMR) before attending classes. Such documentation may be provided by a student's physician or former school health official. If a student is unable to produce evidence of the dates of required immunizations, s/he may submit blood test results that indicate immunity to Measles, Mumps and Rubella. Health Services can conduct the blood test, although the student will be responsible for outside laboratory charges for analysis. Free Measles/Mumps/Rubella immunizations are available at our campus Health Services office in Alumni Hall, Suite 104. Students born before 01/01/57 are exempt from the MMR requirement. All students are also required to submit a Meningococcal Meningitis Response Form and indicate whether or not they have had, or intend to receive this vaccine. Although the Meningococcal Meningitis vaccine is not required at this time, students must submit the Response Form in accordance with New York State law. Copies of all required health forms may be downloaded at the Health Services site: http://www.manhattan.edu/stntlife/health/_records.html. Health records may be faxed to (718) 862-7797. Students experiencing difficulty obtaining copies of their immunization records should call Health Services at (718) 862-7217 for assistance.

Non-Discrimination Policy

Manhattan College has had a longstanding policy of non-discrimination. The College repudiates all discriminatory procedures and specifically those based on race, color, religion, national origin, age, sex, disability or any other protected status. The College does not knowingly support or patronize any organization or business which discriminates.

No person shall be denied admission or access to the programs or activities of Manhattan College, nor shall any person be denied employment at the College, solely because of any physical, mental or medical impairment within reasonable accommodations. Inquiries concerning this policy may be referred to Human Resources.

Auxiliary aids and academic adjustments within the guidelines of the ADA/Section 504 are provided without charge by the Specialized Resource Center, Room 300A Miguel, Hall, Voice: 862-7101, TDD: 862-7285.

The Title IX and Age Act Coordinator is located within the Office of Human Resources, Memorial Hall, Room 305, (718) 862-7398. The ADA/Section 504 Coordinator is located within the Specialized Resource Center, Miguel Hall, Room 300A. Voice: 862-7101, TDD: 862-7285.

Notice

Students are ultimately responsible for knowing the policies of the Graduate Division and observing all the regulations that affect their academic status. This catalog is effective September 1, 2009 until August 31, 2011. Ordinarily, students are obligated to fulfill the requirements for a degree as stated in the catalogue effective at the time of their beginning a graduate program.

Dean of Admissions
Manhattan College
Riverdale, New York 10471

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TELEPHONE NUMBERS

The Provost	(718) 862-7304	Weldon Jackson, Ph.D.
Graduate Admissions and Information	(718) 862-7325	William J. Bisset, Jr.
Dean of Education	(718) 862-7374	William Merriman, Ph.D.
Dean of Engineering	(718) 862-7307	Timothy J. Ward, Ph.D.

Chairs and/or Directors of Graduate Programs

Counseling Programs	(718) 862-7497	Corine Fitzpatrick, Ph.D.
Education	(718) 862-7969	Elizabeth M. Kosky, Ed.D
School Building Leadership	(718) 862-7473	Sr. Remigia Kushner, Ph.D.
Chemical Engineering	(718) 862-7185	Ann Marie Flynn, Ph.D.
Civil & Environmental Engineering	(718) 862-7172	Moujalli Hourani, D.Sc.
Electrical & Computer Engineering	(718) 862-7153	Robert Mauro, Ph.D.
Environmental Engineering	(718) 862-7383	Kevin J. Farley, Ph.D.
Mechanical Engineering	(718) 862-7927	Bahman Litkouhi, Ph.D.

Service Offices

Admissions and Information	(718) 862-7325
Office of Student Financial Services	(718) 862-7100
Office of the Registrar	(718) 862-7914
Office of Financial Assistance	(718) 862-7381
International Student Advisor	(718) 862-7213
Bookstore	(718) 862-7249
Director of Residence	(718) 862-7438
Office of Commencement and Special Events	(718) 862-7918

UNDERGRADUATE ACADEMIC CALENDAR

2009 Fall Semester

August	31	Monday	Classes Begin
September	04	Friday	Late Registration & Add/Drop Ends
	07	Monday	Labor Day Holiday
	16	Wednesday	Senate Meeting
October	24	Thursday	Annual La Sallian Convocation
	12	Monday	Columbus Day - Holiday
	13	Tuesday	Monday Schedule of Classes
November	13	Tuesday	Mid-Term Grades Due
	02	Monday	Web Registration Begins for Spring 2010
	18	Wednesday	Senate Meeting
December	20	Friday	Last day to Withdraw from Courses
	25-27	Wed-Fri	Thanksgiving Holiday – no classes
	11	Friday	Last Day of Classes
	14-19	Mon-Sat	Examination Period - Winter
January	08	Friday	Recess begins after last examination Deadline to submit incomplete work to Faculty for Fall 2009

2010 Intersession

January	05	Monday	Classes Begin-January Intersession
	18	Monday	Martin Luther King Jr. Holiday – no classes
	21	Thursday	Last Day of January Intersession

2010 Spring Semester

January	25	Monday	Classes Begin
	29	Friday	Late Registration & Add/Drop Ends
February	17	Wednesday	Senate Meeting
March	08	Monday	Mid-Term Grades Due
	15-19	Mon-Fri	Spring Recess
April	01	Thursday	Registration Begins for Fall 2010
	02-05	Fri-Mon	Easter Holiday – no classes
	07	Wednesday	Founder's Day: The Feast of St. John Baptist de la Salle, Patron of Teachers
May	20	Tuesday	Last day to Withdraw from Courses
	11	Tuesday	Last Day of Classes – Friday schedule
	12	Wednesday	Reading Day
	13-15	Thur-Sat	Final Examination Period
	17-18	Mon-Wed	Final Examination Period
	23	Sunday	The One Hundred and Sixty-Ninth Commencement (Undergraduate)
June	08	Monday	Deadline to submit incomplete work to Faculty for Spring 2010

2010 Fall Semester

August	30	Monday	Classes Begin
September	03	Friday	Late Registration & Add/Drop Ends
	06	Monday	Labor Day Holiday
	25	Thursday	Annual La Sallian Convocation
October	11	Monday	Columbus Day - Holiday
	12	Tuesday	Monday Schedule of Classes
	12	Thursday	Mid-Term Grades Due
November	01	Monday	Web Registration Begins for Spring 2011
	19	Friday	Last day to Withdraw from Courses
	24-26	Wed-Fri	Thanksgiving Holiday – no classes
December	10	Friday	Last Day of Classes
	13-18	Mon-Sat	Examination Period - Winter
			Recess begins after last examination
January	07	Friday	Deadline to submit incomplete work to Faculty for Fall 2010

2011 Intersession

January	04	Tuesday	Classes Begin-January Intersession
	17	Monday	Martin Luther King Jr. Holiday – No classes
	20	Thursday	Last Day of January Intersession

2011 Spring Semester

January	24	Monday	Classes Begin
	28	Friday	Late Registration & Add/Drop Ends
March	08	Tuesday	Mid-Term Grades Due
	14-18	Mon-Fri	Spring Recess
April	01	Friday	Registration Begins for Fall 2009
	07	Thursday	Founder's Day: The Feast of St. John Baptist de la Salle, Patron of Teachers
	18	Monday	Last day to withdraw from classes
May	22-25	Fri-Mon	Easter Holiday – No Classes
	10	Tuesday	Last Day of Classes – Friday schedule
	11		Reading Day
	12-18		Final Examination Period
	22	Sunday	The One Hundred and Seventieth Commencement (Undergraduate)
	June	07	Tuesday

****Subject to changes.*

GENERAL INFORMATION

The Mission of Manhattan College

At its quarterly meeting of October 23, 1990, The Board of Trustees of Manhattan College adopted the following Statement of Mission:

Manhattan College, overlooking Van Cortlandt Park in Riverdale, is an independent Catholic institution of higher learning which embraces qualified men and women of all faiths, races and ethnic backgrounds. Established in 1853, the College is founded upon the Lasallian Catholic tradition of excellence in teaching, respect for individual dignity, and commitment to social justice, inspired by the innovator of modern pedagogy, John Baptist de La Salle.

The mission of Manhattan College is to provide a contemporary, person centered educational experience characterized by high academic standards, reflection on faith, values and ethics, and lifelong career preparation. This is achieved in two ways: by offering students programs which integrate a broad liberal education with concentration in specific disciplines in the arts and sciences or with professional preparation in business, education and engineering; and by nurturing a caring, pluralistic campus community.

The learning experience at Manhattan College is enriched by cooperative programs with other institutions, by postgraduate professional programs, and by capitalizing on its location on the edge of the cultural center and global marketplace that is New York City.

Historical Note

Manhattan College dates its foundation from May 1853 when the school, originally established by the Brothers of the Christian Schools in 1848, moved from Canal Street in lower Manhattan to what was then known as the Manhattanville section of New York City at 131st Street and Broadway. Between 1853 and 1863, the school changed rapidly, adding college level courses in 1859 and first using the name Manhattan College in 1861. A Board of Trustees composed of ten laymen and eight Brothers of

the Christian Schools was assembled in 1862 to petition the Board of Regents and the Legislature of the State of New York to charter a collegiate institution named Manhattan College. The charter to establish Manhattan College was approved by the Legislature and issued by the Board of Regents on April 2, 1863. The first catalog of the newly chartered College stated its goals as follows:

The object of this institution is to afford the youth of our country the means of acquiring the highest grade of education attained in the best American universities or colleges. While the conductors mean that the classical languages shall be thoroughly studied, they have resolved to give a prominence to the higher mathematics and natural sciences not hitherto received in any similar institution in this country; thus combining the advantages of a first class College and Polytechnic Institute.

Thus, Manhattan College was an unusual institution. Its sponsoring Board of Trustees combined both secular independent members and representatives of the religious teaching Institute of the Brothers of the Christian Schools. It also combined excellence in the traditional liberal arts and sciences and excellence in professional and technical education in a single collegiate institution.

Bordered by the Hudson River and Van Cortlandt Park, the College is able to offer access to the cultural, educational, business and entertainment opportunities of the City as well as a self-contained campus environment.

The College continues to realize the objectives stated in its first catalog by maintaining a full range of programs in the liberal arts, business, and sciences joined with professional programs in engineering and education. The quality of the undergraduate programs has been demonstrated by the College's record as one of the nation's leading undergraduate sources of doctorates in the arts, sciences, engineering and education, and recognized by the establishment of chapters of such prestigious honor societies as Phi Beta Kappa, Sigma Xi and Tau Beta Pi. Similarly, Standard & Poors ranks the Manhattan College School of Business among the leading

undergraduate sources of managerial and financial leadership in the nation.

Although the master degree in course was conferred by Manhattan College as early as 1869, a formally organized unit for graduate study was not set up until the 1920s. In 1939 this Graduate Department of the Extension Division of Manhattan College, as it was then called, received approval of the New York State Education Department to grant the master degree in six areas of concentration: classical languages, education, English, French, history and mathematics. For the next twenty years the curricula in these departments were restricted to members of the Brothers of the Christian Schools. In 1951 the name of the unit was changed to Division for Religious, Program of Graduate Studies, and admitted members of all other religious orders and Catholic clergy.

In 1959 the present title, Graduate Division, was adopted and registered with the University of the State of New York. At the same time the State Education Department gave authorization to open the courses to all qualified students. The division at present has more than three hundred students matriculating for different master degrees.

Subsequently, graduate programs were added in Religious Studies, Environmental Engineering, and Chemical Engineering. In September 1974, Manhattan College received approval from the State Education Department to begin a Master of Science Program in Management. Two new programs in Engineering, Civil and

Electrical, were begun in September 1975 with the necessary approval of the State Education Department. In 1977, a program leading to the master degree in Mechanical Engineering was initiated. Beginning with the 1979 fall semester, the Master of Science in Management program was changed to the Master in Business Administration with seven areas of concentration.

In 1980, the master degree programs in English, History and Religious Studies were terminated. Beginning in the 1982 fall semester, a Master of Science program in Computer Engineering was established, emphasizing the hardware aspects of

computers. In 1989 a Master of Science program in Biotechnology was established. As of 2004, the College no longer offers Master degrees in Business Administration or Biotechnology or accepts students into these programs.

From its beginning, Manhattan College paid particular attention to educating first generation college students, and was an early proponent of access to minority students, establishing special scholarship funds for minority students as early as 1938.

The College became coeducational and accepted its first women undergraduate students in 1973. Prior to that date, the College had established a cooperative program with the neighboring College of Mount Saint Vincent which permitted cross-registration and the merging of academic departments.

With the opening of Horan Hall (formerly East Hill) in 1990, the College is able to maintain a balance between residential and commuting students.

Recognition and Membership

Manhattan College is chartered and empowered to confer academic degrees by the University of the State of New York.

It is accredited by the Middle States Commission on Higher Education, 3624 Market Street, Philadelphia, PA 19104-2680, 215-662-5606, www.msache.org. The college is approved by the American Chemical Society for the professional training of chemists and by the New York State Department of Health for Radiation Therapy Technology. The School of Business is accredited by AACSB International, the Association to Advance Collegiate Schools of Business, the premier accrediting agency for business programs globally.

The undergraduate programs in Chemical, Civil, Environmental, Computer, Electrical, and Mechanical Engineering are accredited at the basic level by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.

The teacher education programs at Manhattan College are accredited by the Teacher Education

Accreditation Council (TEAC). Recognized by the Council for Higher Education Accreditation and by the U.S. Department of Education, TEAC is a nonprofit group dedicated to improving academic degree programs for professional educators. Its primary work is accrediting undergraduate and graduate professional education programs in order to assure the public about the quality of college and university programs.

The College is a member of the Association of American Colleges, the American Council on Education, the Institute of International Education, the National Catholic Educational Association, the Association of Urban Universities, the Association of Governing Boards of Universities and Colleges, the American Association of University Women, the American Society for Engineering Education, Middle Atlantic Association of Colleges of Business Administration, the American Assembly of Collegiate Schools of Business, Association of Continuing Higher Education, the National Association of College and University Summer Sessions, American Association of Colleges for Teacher Education, the College Entrance Examination Board, and the National Commission for Cooperative Education.

Purpose

The Graduate Division of Manhattan College has for its primary purpose the offering of programs leading to academic and professional degrees through a coherent series of courses, discussions, seminars and independent studies or investigations, assisting the student to acquire an introduction into the mastery of knowledge, creative scholarship and basic research in a specific discipline.

The Graduate Division seeks to serve the American and International community by offering programs in professional areas, affording men and women the opportunity of acquiring a broader and deeper acquaintance with one field of knowledge, of learning the methods of productive scholarship, and of advanced study in their professions.

The Graduate Division seeks to provide the academic and professional needs for those who are already engaged in a profession as teachers, engineers, or those who having completed their undergraduate preparation desire to enter immediately into advanced study.

Because many of its students are pursuing a profession, the Graduate Division provides the opportunity of achieving the master degree on a part-time basis. It is possible to pursue full-time graduate study in most programs. The courses are generally conducted in the late afternoons, early evenings and Saturdays during the fall and spring sessions. The schedule will vary with the degree program. In general, Education courses are offered in the late afternoon and Engineering courses in the evenings.

Organization

The Graduate Division operates as an integral unit of the College under the oversight of the Provost of the College and the Deans of the Schools of Education and Engineering. Each graduate program is managed by a chair or a director who reports to the dean of the school in which the program is housed. The Graduate Council is responsible for general policies affecting all graduate programs. The provost and the deans of the schools housing graduate programs constitute the Executive Committee of the Graduate Council. The Graduate Council includes, in addition to the members of the Executive Committee, all chairs or directors responsible for managing graduate programs.

The following degree programs have been approved and are registered with the Bureau of Evaluation, New York State Higher Education Department, under the HEGIS number listed:

Education

Master of Arts, Counseling Program	HEGIS 0826.1
Master of Science, Mental Health Counseling	HEGIS 2104
Professional Diploma in Counseling	HEGIS 0826
Master of Science in Education	
Administration & Supervision	HEGIS 0828
Childhood Education/Special Education	HEGIS 0802
Special Education	HEGIS 0808

Engineering

Master of Science in Chemical Engineering	HEGIS 0906
Master of Science in Civil Engineering	HEGIS 0908
Master of Science in Computer Engineering	HEGIS 0909
Master of Science in Electrical Engineering	HEGIS 0909
Master of Environmental Engineering	HEGIS 0922
Master of Science in Environmental Engineering	HEGIS 0922
Master of Science in Mechanical Engineering	HEGIS 0910

Application and Admission

Application procedures and admission requirements are described for each school in their respective sections of the Catalog.

Transfer Credit

A maximum of six credits for graduate courses completed at another institution prior to matriculation at Manhattan College may be granted if the courses are equivalent to those required at Manhattan College. The courses must have been taken within the five year period prior to acceptance as a matriculated student and have been awarded the grade of B or better. Request for such transfer credit must be made at the time of filing the application for admission. In general, credits that have been used to earn one degree may not be applied to the degree requirements of another degree. The request for transfer credit must be submitted to the Office of Admissions. Courses accepted for transfer credit will be noted on the Manhattan College

academic record. However, the grades will not be counted in the Manhattan College grade point average.

Off-Campus Credit

It is understood that all courses for the degree must be taken at Manhattan College. For compelling reasons and in rare instances, however, a student may secure permission to earn a maximum of six transfer graduate credits at another institution transferable to the Manhattan College record. Written permission to take such work must be obtained by the student in advance from the chair or director and the dean of the school. When such a course is completed, the student must arrange for an official transcript to be mailed directly by the institution where the course was taken to the office of the program director or the dean of the school in which the student is enrolled and must pay the "Off-Campus Courses" fee of \$125 per course before the course is entered on his/her academic record by the office of the Registrar. Only courses

which have earned a B grade or better are transferable. A student who was granted six transfer credits on admission is not eligible for any further transfer of credits during his/her matriculation.

Registration

Students are required to officially register for each session in which they will be in attendance. Before the actual registration, students must submit a registration form approved by their program advisor. Payment must be provided in advance of the time of registration.

Online registration is available through the *Self-Service* system by logging onto the self-service.manhattan.edu site. Students may also register in person or by mail. Dates and instructions for registration will be included with the graduate schedule of courses published online and available in advance by the office of the Registrar or by the program advisor.

Late registration will not be accepted. Enrollment in a course is considered final after the first scheduled class in the Fall and Spring term and after the first two class meetings in the summer session.

Maintenance of Matriculations

Students not in attendance during a semester must register for “Maintenance of Matriculation” in the spring and the fall semesters.

Course Changes

Adds and Drops must be approved by the program advisor and/or program director and processed in the Registrar’s Office before the second scheduled class. Refunds are subject to the policy stated in the catalog.

Grades

The grades used to indicate the quality of the student’s performance in every course are as follows: *A* means excellent, *B* means good, *C* means satisfactory, *D* means poor but passing, *F* means failing. For the purpose of computing grade point averages, the corresponding numerical equivalents for letter grades will be used:

Grade	Quality Points
A	4.0
A-	3.67
B+	3.33
B	3.0
B-	2.67
C+	2.33
C	2.0
C-	1.67
D+	1.33
D	1.0
F	0.0

I Incomplete. Indicates that some requirement of a course has not been satisfied by the end of the term. A student’s request for an Incomplete must be submitted to the instructor before the end of the term or session. The instructor determines whether to grant the request. In all cases the incomplete work must be completed and submitted to the instructor not later than 20 days from the last day of the term’s final examination period. The faculty member must submit the final grade not later than 25 days from the last day of the term’s final examination period. An incomplete will be converted to a grade of F if the work is not completed on schedule. Extensions for the completion of the work or the submission of the final grade will be granted by the dean only in highly unusual circumstances.

W Withdrawal. Indicates withdrawal from a course in which the student is regularly enrolled. The student is required to have the withdrawal notification form signed by the instructor of the course. The deadline for withdrawal from a course will be three weeks before the last day of classes. In “W” courses, neither quality hours or quality points are assigned.

T Thesis. Indicates a Master’s Project or Thesis or Internship/Practicum/Field Experience that is not completed by the end of the semester in which the student has registered for.

Grade Reports

At the end of each semester every eligible student is issued a grade report that lists the courses taken, the grades earned in each course, and the semester and cumulative grade point averages.

Contested Grades

If a student believes that his/her final grade in a course is not consistent with the grading criteria designated by the course instructor, he or she should first discuss the matter with the course instructor. If the student and the instructor cannot resolve the matter in this discussion, the student may discuss the matter with the department chair/program director. Copies of all graded tests, quizzes, and other assignments will be needed.

In the event that the student is not satisfied with the outcome of the discussions with the course instructor and the chair, he or she may make a written request to the chair/program director for a formal consideration of the problem. This request must be submitted within three weeks after the beginning of the semester immediately following the regular Fall or Spring semester. Included in the request will be an outline of the student's specific complaints. The chair/program director shall make a detailed investigation and shall notify the student and course instructor of his or her findings.

The student may appeal the findings of the chair to the dean of the school in which the course was offered. The dean will respond to the student in writing and will preserve the documentation of the process. When the department chair is the course instructor, the student may appeal to the dean of the school in which the course was taught who will investigate the matter and notify the student and the department chair/program director of his or her findings.

Students should be aware that only the course instructor may change a grade.

Grade Changes

All course grades (except "I" grades) are intended to be final and permanent. It is expected that

course instructors will determine and report final grades as accurately and precisely as the nature of the evaluation of student achievement and the grading system will permit. It is considered the instructor's direct and personal responsibility to insure that grades are fair and reported correctly.

Notwithstanding all precautions, faculty members can make errors. When this occurs, the errors should be corrected so that students are not unfairly penalized. If a course instructor decides to request a grade correction, the appropriate forms must be completed and sent to the dean of the school in which the course was taught. Except in the case of contested grades, all requests for correcting grades must be submitted by the last day of the fourth week of the semester of the following Fall or Spring semester. Only the course instructor can submit a grade change request. The dean of the school may disapprove of the request, indicating in writing the reasons why.

Academic Standing

When students receive a second failure in their course of study, they will be eligible for dismissal. When students receive a grade less than B in a second course, it will be necessary to meet with the chair/director of the program to discuss their academic standing. Such students will be considered in good standing as long as they maintain a B average.

Withdrawal from Course

Students who find it necessary to withdraw from courses must file the official withdrawal form with the office of the Registrar. The W grade will not be given if the student withdraws after the published date for withdrawal. The withdrawal is dated when the office of the Registrar has been informed by the student. No refund is given if a student withdraws from a course after the third scheduled class.

Incomplete Course Work

In extraordinary instances, when some requirement of a course has not been completed before the final examination, a student may be assigned

the temporary grade of *I* (Incomplete Course Work), if, in the judgment of the teacher, a passing grade may be attained with the completion of the requirement. The *I* grade will be removed and a permanent grade assigned if the requirement is completed satisfactorily. If the requirement is not completed by the date specified in the academic calendar, (see discussion regarding Incomplete grades above) the *I* grade will be automatically changed to *F*. Students are responsible for making arrangements with the teacher to complete the requirement within the time permitted. For certain projects, Independent Study prerequisites, internships and other non-course work (which carry academic credit), students may have an additional session to complete the required work with the permission of the dean of the school.

Students who fail to complete their Master's Thesis/Project by the end of the semester in which they are registered for will be issued the temporary grade of T. The T grade will be changed to a letter grade when the Thesis/Project/Internship/Practicum/Fieldwork is completed. The T grade is not assigned any quality points and is not computed in the student's grade point average.

Semester Hour of Credit

Many three credit graduate courses meet for two hours of lecture once a week. To comply with the regulation of the Commissioner of Higher Education that there be fifteen hours of instruction for each semester hour or the equivalent, a third credit is granted for the successful completion of a course paper, an independent reading list, or some suitable project assigned by the professor. In addition to the two hours of lecture, the professor will be available during a third hour to assist and direct the student. The student's final grade for the three credits will reflect the response of the student to this third hour requirement.

Records

A report of all course grades is sent to the student at the end of each session by the Registrar of Manhattan College. Official transcripts of record are obtained from the office of the Registrar and bear the seal of Manhattan College. Unofficial transcripts may be obtained online through *Self-Service*. They do not bear the seal of the College, and Manhattan College accepts no responsibility for the accuracy of such transcripts.

Official and unofficial transcripts should be requested from the office of the Registrar, either in person or by mail. The office of the Registrar cannot comply with telephone requests. All obligations to the College must be fulfilled before transcripts will be issued.

Requirements for the Degree

The requirements for a master degree for each of the programs are listed in the departmental sections. All requirements must be completed within the degree time limit.

Students who began graduate studies after January 1, 1989 must present a minimum grade point average of 3.0 within the specified departmental course requirements needed for their degree. If students do not achieve the required grade point average within those specified course requirements, they may take additional courses with the permission of the department chairperson or director of the program to achieve the 3.0 index.

Courses

To be awarded a master degree, a student must successfully complete a minimum of 30 to 49 credits of graduate course work, depending upon the course requirements of the specific program. Most graduate programs are part-time programs and courses are offered in a cycle. It is the responsibility of the student to register for courses in the sequence in which they are offered and to make the necessary progress to complete all the requirements within the five year time period.

Degree Time Limits

All requirements (courses, paper, projects, thesis) must be completed within the maximum of five years from the beginning of the semester of matriculation. The beginning semester of matriculation is the semester within which the candidate is awarded the first credits towards the degree whether they were earned as a non-matriculated or matriculated student. Candidates should plan their five-year program to assure the completion of all requirements within the five year period. Foreign students must be full-time students. They must complete the requirements for the degree within a year and a half.

Termination of Matriculation

The dean of the school, on the recommendation of the chair/director, may terminate the matriculation of any student who fails to make sufficient progress towards the degree or to cancel a student's registration if he/she is registered for courses for which he/she does not have the prerequisites.

Candidates for the degree not in attendance for two calendar years will have their matriculation terminated. To reactivate their matriculation, these candidates must receive permission from the dean of the school. Such candidates, if readmitted, are required to meet all degree requirements within the five-year period from the beginning of the semester of matriculation. If this is not possible, the candidate may have to complete additional courses and current degree requirements.

Conferring of Degrees

Degrees are conferred three times a year - September 1, February 1 and at the annual Commencement Exercises in May. Students who have completed their programs in September or February can receive their degrees in February. Students who complete their programs in May will receive their degrees at the Spring Commencement in May.

Veterans

The Vice President of Student Life, located in Memorial Hall, is responsible for certifying any V.A. benefits. Veterans should bring a copy of their DD 214 to the office with their letter of acceptance into the Graduate Division. The eligibility for the V.A. benefits is for the semester or session for which they are in attendance. To continue to be eligible for these benefits in subsequent semesters after having registered, veterans must report to the Vice President of Student Life to renew the certification of attendance at the beginning of each semester for which they are registered.

The following information is important:

Veterans are paid benefits for actual credit hours in attendance. Nine semester hours is considered full-time for V.A. benefits in graduate school.

Veterans who have not registered for any credit hours but are completing papers, writing a thesis, preparing for comprehensive, or completing a project, are not considered in attendance. Veterans are entitled to benefits for projects and thesis that have credit hours assigned, but only for the semester in which they have registered. Veterans whose project or thesis takes more than one semester are not entitled to benefits beyond the semester in which they have registered for it.

Veterans are reminded that an I grade is not acceptable by the Veterans Administration.

Any change of status withdrawal from a course, nonattendance in a particular semester, failure to register in a subsequent semester must be reported to the Vice President of Student Life.

TUITION AND FEES

The uncertainty of present-day costs makes it necessary for the College to reserve the right to increase tuition and fees whenever necessary. In applying for admission, students and their families should anticipate future annual increases. Such changes will be formally announced in advance.

Payment Responsibilities and Agreement Notice

Enrolled students agree to be in accordance with all policies and procedures related to their financial obligation to the College. The enrolled student assumes liability for any debt incurred during his/her attendance at Manhattan College including late payment penalties and all legal and/or collection costs related to the efforts to collect a past due balance. The terms of payment, withdrawal and adjustment set forth in this catalog are incorporated upon enrollment.

All changes in billing address must be provided immediately in writing even after such time as a student completes his/her program but has loans outstanding to the school. Payment to the College is always the responsibility of the student regardless of the source of funding for tuition. Inquiries regarding accounts receivable and/or cashing can be directed to the Office of Student Financial Services by phone at (718) 862-7100 or e-mail finaid@manhattan.edu.

Account access is available at <http://self-service.manhattan.edu> with a valid student ID number and PIN. Students can view their billing account detail transactions and up-to-date account balances. Other student information services available to view via Web for Students include financial aid awards, class schedules, grades, unofficial transcripts, and personal information such as address, phone number and e-mail address.

Safeguarding Policy

This is an official notice of Manhattan College's policy regarding the safeguarding of customers' information established by the Federal Trade Commission (FTC). Manhattan College is subject to the provisions of the Gramm-Leach

Bliley Act (GLBA, 16 CFR 314) which recognizes the College and other higher education institutions as a financial institution.

Manhattan College adheres to very strict privacy and safeguarding rules, keeping sensitive information safe. Manhattan College is in compliance with specific requirements related to the administrative, technical and physical safeguarding of customer information. Manhattan College also requires its service providers to implement and maintain such safeguards.

Graduate Tuition and Fees 2009–2010

Please refer to the appropriate program section of the catalog. Students enrolled in any 5-year program as an undergraduate student should contact the Office of Student Financial Services to assure the terms and conditions of tuition and aid.

Registration/Payment for Fall and Spring Terms

Students who have satisfied their current account for the term will be eligible for online pre-registration for the upcoming term. Billing invoices with a tuition deadline date will be mailed to these students in early July for the Fall term and by mid-December for the Spring term. Follow-up invoices for outstanding balances will continue monthly thereafter. Payment in full must accompany a request for registration or be provided in advance for those students who have not pre-registered. No student will be permitted to enroll for an academic term until all outstanding accounts with the College have been satisfied. Enrollment for the term is not considered final and complete until the tuition account is satisfied.

Registration/Payment for Intersession/Summer Terms

Without exception, in order to enroll for an intersession or summer term, payment must accompany a request for registration or be provided in advance.

Payment of Tuition and Fees

Acceptable forms of payment are cash, personal check, bank check, money order, credit card, and bank wire. Checks must be payable to Manhattan College. The student's identification number should be included on all payments. Payment can be made in person at the Bursar's Office in Miguel Hall, Room 100 or mailed. The College accepts MasterCard, VISA, Discover and American Express credit cards. Secure, online payments may be processed via the web at <http://self-service.manhattan.edu> by selecting "Parent/Guest Tuition Payment."

Monthly Budget Plan

Manhattan College partners with Tuition Management Systems (TMS) to offer a yearly, comprehensive monthly installment plan (Fall & Spring only) for matriculated students enrolling in at least 6 credit hours per semester. For more information, you can contact TMS at 800-343-0911 or at www.afford.com. You may also contact the Office of Student Financial Services for more information.

Employer Deferment

Students expecting reimbursement from their employer may defer payment of tuition and applicable fees upon approval of our Application for Deferral. Upon approval, a student's account is charged the deferral fee and any portion of tuition/fees not covered by the employer will be payable in advance. The application will require certification of the employer's reimbursement on company letterhead. Please contact the office of Student Financial Services for the current terms and fees and to seek eligibility for a *regular deferral* if there is no employer reimbursement.

Payment Penalties

Students can avoid late fees by paying their tuition and fees by the published deadline. A late penalty of 1% of the outstanding balance of any student account will be assessed at the end of each month until the account is settled. Accounts not paid in full may be referred to a collection agency, which can result in additional collection and/or legal costs.

Indebtedness to the College may automatically terminate current enrollment and indefinitely suspend future enrollment. Students may also be barred from receiving grade reports, parking decals, transcripts, and participating in commencement until all accounts have been paid.

Refund and Liability Policy

Adds, Drops and Withdrawals from a course(s) or a semester's enrollment must be processed by the program director and the office of the Registrar. No adds or drops of courses will be permitted after the second scheduled meeting of a course. After the second scheduled meeting, a student will receive a grade of W if he/she is not in attendance and has not authorized action otherwise through the program director and the Registrar. In this case, a student is liable for the tuition in accordance with the schedule below.

A student who drops or withdraws from a course(s) must inform the program director and the office of the Registrar and fill out the appropriate paperwork. Teachers are not authorized to issue drop or withdrawal slips. The date used for refund/liability purposes will be the date that the paperwork was completed, not the last date of attendance. Drops or withdrawals received by mail will be effective as of the official postmarked date.

Refund of Tuition/Liability of Tuition (not registration fee or other fees) will be made in accordance with the following schedule:

Drop from a course before the first scheduled class

Fall and Spring semester	
100% refund	0 liability
Summer sessions	
100% refund	0 liability

Drop from a course before the second scheduled class

Fall and Spring semester	
90% refund	10% liability
Summer sessions	
80% refund	20% liability

Withdrawal from a course before the third scheduled class (Drops not permitted)

Fall and Spring semester	
80% refund	20% liability

Summer sessions	
50% refund.....	50% liability

Withdrawal from after the third scheduled class (Drops not permitted)

Fall and Spring semester	
No refund	100% liability
Summer sessions	
No refund	100% liability

Withdrawal/Leave of Absence

Voluntary and involuntary withdrawals or leaves of absence will be subject to the refund/liability schedule as listed in the catalog. Since the College incurs the cost of a student's enrollment, specific circumstances that pertain to the withdrawal or leave of absence will not be considered for review except in cases of terminal illness or death of an immediate family member.

Failure to attend classes and/or notification to the instructor does not constitute an official withdrawal. Furthermore, failure to make or complete payment does not constitute official withdrawal.

Return of Title IV Funds

Manhattan College is required by federal and state regulations to make known the federal formula for the return of federal funds. The federal formula requires a return of Title IV aid if the student received federal assistance in the form of a Federal Pell Grant, Federal SEOG Grant, Federal Stafford or PLUS loans or Federal Perkins loan and withdrew on or before completing 60% of the semester. [Only the Federal Stafford loan is applicable to graduate students; other forms of assistance apply to undergraduate students only.] The percentage of Title IV aid to be returned is equal to the number of calendar days remaining in the semester divided by the number of calendar days in the semester. Scheduled breaks of more than four consecutive days are excluded.

Refunds of Credit Balances

Refunds of credit balances are subject to the review of the Bursar and will be issued when the credit amount actually exists on the student's account and a request is made in person or in writing. Credit balances resulting from excess payments will be refunded to the student unless otherwise authorized by the student. If a refund is not requested, future enrollment is assumed and the credit balance will remain on the student account to help offset future charges. Credit balances resulting from scholarships and financial aid, including federal and state programs and alternate loan programs are subject to specific guidelines and approval of a financial aid counselor or Director of Financial Aid and the Bursar.

Processing of Refund Checks

Processing of refund checks will take 10 to 15 business days. Checks will be mailed to the current home address on our system unless otherwise authorized in writing by the student. Students may request to pick up refund checks in person provided they are able to present a valid photo ID.

Financial Assistance

The office of Student Financial Services will assist in obtaining the maximum financial aid available to those who qualify. Since the majority of students enrolled in the graduate programs at Manhattan College are attending part-time, financial assistance is limited.

To be eligible for financial assistance, a student must be matriculated and attending at least 1/2 time (6 credits per semester). To be considered for financial aid, students must comply with the timely submission of the following:

Free Application for Federal Student Assistance (FAFSA) — our FAFSA code is 002758. The FAFSA form can be obtained from the office of Student Financial Services or by filing directly on the web at www.fafsa.gov. The FAFSA form should be filed as early as possible after January 1st for the academic year for which the student wishes to be considered for aid.

To assist the College in determining eligibility, a **Graduate Financial Aid Form** is also required. At times, the student may also be required to submit copies of tax returns and other proofs as determined by the director.

The Federal Student Aid Program performs a needs analysis service which computes the student/family contribution toward educational costs. Manhattan College then determines financial need based on the total cost of attendance at the College. The cost of attendance includes tuition and fees, a room and board allowance, books, transportation and other miscellaneous costs. The office of Student Financial Services deducts the family contribution as determined by the FAFSA from the Total Cost of Attendance to arrive at an amount of family need. A Financial Aid Award Letter will be sent to advise students of eligible aid types. Typical financial awards might include:

Subsidized Federal Stafford Student Loan: a matriculated graduate student may borrow up to \$8,500 per year depending on need as determined by the FAFSA. Interest and repayment begin six months after graduation or after six months of failure to enroll at least part-time.

Unsubsidized Federal Stafford Student Loan: a matriculated graduate student may borrow up to \$12,000 per year depending on need as determined by the FAFSA. Under this program, borrowers are responsible for interest that accrues while attending school.

Note: Maximum eligibility for these federal loans is \$20,500 per academic year. However, the loan amount may be limited to cover only the cost of attendance as determined by the guidelines above. First-time borrowers at Manhattan College must submit a Master Promissory Note (MPN) and complete a Loan Entrance Interview Form.

New York State Tuition Assistance Program (TAP): available to New York State residents enrolled in an approved graduate program on a full-time basis (12 credits per semester). The maximum TAP award for graduate students is \$562 per semester.

Students are urged to begin the process of filing applications at least six months prior to the start of the semester for which aid is needed. Students are advised to visit the Office of Student Financial Services to discuss the impact of financial aid based on any changes in enrollment or family circumstances.

Information concerning fellowships, scholarships, and assistantships is available from the office of the dean or chairs/directors of programs.

Further information on financial aid can be obtained from the office of Student Financial Services, Miguel Hall Room 100.

Endowed and Special Category Scholarships

Eder Associates Scholarship

Founded by Eder Associates, the scholarship provides tuition assistance to a financially needy graduate student with an outstanding academic record who is seeking a master's degree in the Graduate Environmental Engineering Program.

The HydroQual, Inc., Scholarship

Founded in 1991 by HydroQual, Inc., to provide tuition assistance to students accepted for matriculation in the Graduate Environmental Engineering Program.

The Hazen and Sawyer Scholarship

In honor of C. Richard Walter '50. Founded in 1990 by Hazen and Sawyer, P.C. upon the occasion of C. Richard Walter's retirement as president and chair of Hazen and Sawyer. This scholarship will provide tuition assistance to graduate students accepted for matriculation in the Graduate Environmental Engineering Program.

Awards

The Fitzpatrick Family Medal

The Fitzpatrick Family Medal is awarded to a student from the Graduate School of Education who exemplifies the Lasallian tradition of academic excellence and service to others.

The Frank Derbenwick Award

This award is given in recognition of superior performance in the Chemical Engineering Graduate Program in memory of Chemical Engineering Professor Frank Derbenwick.

The James Strecansky '62/Air Products Award

This award is given to a graduate student for outstanding service to the Chemical Engineering Department.

The Robert Harris '61 Memorial Award

This award is presented to an outstanding foreign national enrolled in the Chemical Engineering Graduate Program.

SERVICES

The College Bookstore is located on the first floor of the Leo Engineering Building. Textbooks and auxiliary materials may be obtained there.

Health Services is located on the first floor of Alumni Hall. A full-time Nurse Practitioner and part-time college Physicians are available to address student health concerns.

An Accidents and Sickness Insurance Plan is available to students of Manhattan College. Students from foreign countries are especially urged to participate in this plan. Information is available at the office of the Vice President of Finance, 3rd floor of Memorial Hall.

Available to students is a Director of Career Services and Cooperative Education who will assist students seeking employment. The office is on the fifth floor of Miguel Hall.

Manhattan College has a Counseling Center located on the fifth floor of Miguel Hall. Registered Manhattan College students may avail themselves of the services offered by the Center academic and psychological counseling, consultation and referral.

Parking permits may be obtained from the Director of Security whose office is on the first floor of Jasper Hall.

The Campus Ministry has an office on the second floor of Miguel Hall. All Manhattan College students may receive religious counseling through the Campus Ministry.

The International Student Advisor is available for all nonacademic advice and has an office on the second floor of Miguel Hall, Room 207A.

Library

The Mary Alice and Tom O'Malley Library provides support for the instructional and research needs of the students, faculty and staff of the college, and contains approximately 200,000 volumes, and access to over 26,000 journals in various formats. The resources of the library are available through JASPERcat, a cooperative online catalog, which also includes catalogs of

other area libraries. The Manhattan College Library homepage provides access to a number of useful academic and informational databases, which include many full-text journals, books and reference materials covering a wide range of subjects. Off-site access to the catalogs and special databases is available to all registered students.

Students and faculty of Manhattan College can use the library resources of New York City and Westchester County by utilizing the interlibrary loan and on-site use arrangements of METRO, a regional library service network.

The 80,000 square foot O'Malley Library includes more than 100 computer workstations and provision for network connectivity throughout the building as well as media services and teleconferencing. Student study space in a variety of settings has increased dramatically including the availability of fifteen (15) group study rooms. An Internet Cafe9 is situated outside the main library entrance and is available to students 24/7. Reference librarians are available to provide information assistance on a scheduled basis and by appointment. The librarians also teach library- research classes to graduate and undergraduate students.

During designated times of the school year, all or parts of the library will be open 24 hours a day. A schedule of hours is posted at www.manhattan.edu/library. A college I.D. card is required for entrance. A schedule of hours is posted at www.manhattan.edu/library. For more information about library hours and services, please call (718) 862-7166.

Computer Facilities

A wide variety of computing resources are available to Manhattan College students, faculty, and staff via JasperNet, the college's campus-wide network. JasperNet deploys wired and wireless computing and information services to campus laboratories, classrooms, and offices, as well as to student residence halls. Twelve microcomputer laboratories are located on the Manhattan College campus in the Research and Learning Center, DeLaSalle Hall, Miguel Hall and O'Malley Library. These laboratories serve all schools of the College. They support approximately 350 Pentium IV based microcomputers running under Microsoft Windows XP and Red Hat LINUX.

All campus locations are connected via a multi-gigabit backbone network. JasperNet provides many network based applications and services including online courses and web based storage as well as E-mail, Internet and World Wide Web access via TCP/IP, and laser printing in the laboratories. A wide range of software is available including math and statistical packages (Maple, MathCad, MatLab, SPSS, Excel), compilers (C++, Visual Basic, Visual J++), databases (Access, SQL), word processors (MS Word), presentation graphics (PowerPoint), multimedia authoring (Macromedia Director), as well as department-specific applications (E.g. I-DEAS, AutoCad, FLUENT). JasperNet provides full ethernet connectivity to students in all of the College's residence halls. Students living in these networked buildings can connect their own networkable desktop or notebook computer directly to JasperNet. General support is provided via the project's Web pages: www.manhattan.edu/resnet/.

A dedicated Web Server for the College – <http://www.manhattan.edu> – is maintained by the Computer Center and supports over fifteen thousand hypertext pages of information including online catalogs, handbooks, and policies. Some faculty members maintain web pages for their courses on the server supported by a separate file server to facilitate the posting of online courseware. The Computer Center also provides on-line support, documentation, and other services via their web site: www.manhattan.edu/compcent/.

Computing laboratories are equipped for digital overhead projection and many are used as hands-on classrooms. Portable microcomputers with projection capabilities are used by instructors for demonstrations purposes in other classrooms throughout the campus which are linked to JasperNet.

Computer Laboratory Hours:

Research & Learning Center

Monday - Friday	9:00a.m.-10:30 p.m.
Weekends	10:00 a.m.-5:30 p.m.

De La Salle CIS Lab

Monday - Friday	8:00 a.m.-10:00 p.m.
Weekends	10:00 a.m. - 6:00 p.m.

Security

The Security Department is charged with the responsibility of enforcing all College security regulations, including the supervision of all campus parking facilities. There are 36 officers who conduct foot and vehicle patrols on the campus areas 24 hours a day. Being a component of the Student Life Division, the Security Department actively supports the stated mission of the College and accepts its responsibility to employ security measures to ensure that our students enjoy their time at Manhattan College in safety and well being.

Current Education Law 6450 crime reporting and statistics are as follows:

2008

OFFENSE	<i>On Campus</i>	<i>Residence Halls</i>	<i>Public Property</i>
Aggravated Assault	0	0	0
Arson	0	0	0
Burglary	14	4	0
Murder/Non Negligent Manslaughter	0	0	0
Negligent Manslaughter	0	0	0
Motor Vehicle Theft	0	0	2
Robbery	1	0	0
Sex Offenses (Forcible)	0	0	0
Sex Offenses (Non-Forcible)	0	0	0
Hate Crimes	0	0	0
Arrests			
Drug Violations	2	0	0
Liquor Law Violations	0	0	1
Weapon Possession	0	0	0
Disciplinary Actions/Referrals			
Drug Abuse Violations	59	54	0
Liquor Law Violations	127	104	0
Weapon Possession	0	0	0

2007

OFFENSE	<i>On Campus</i>	<i>Residence Halls</i>	<i>Public Property</i>
Aggravated Assault	0	0	3
Arson	0	0	0
Burglary	29	24	0
Murder/Non Negligent Manslaughter	0	0	0
Negligent Manslaughter	0	0	0
Motor Vehicle Theft	0	0	0
Robbery	0	0	1
Sex Offenses (Forcible)	0	0	0
Sex Offenses (Non-Forcible)	0	0	0
Hate Crimes	0	0	0
Arrests			
Drug Violations	7	7	0
Liquor Law Violations	0	0	0
Weapon Possession	0	0	0
Disciplinary Actions/Referrals			
Drug Abuse Violations	38	35	0
Liquor Law Violations	189	187	0
Weapon Possession	0	0	0

2006

OFFENSE	<i>On Campus</i>	<i>Residence Halls</i>	<i>Public Property</i>
Aggravated Assault	0	0	0
Arson	0	0	0
Burglary	6	5	0
Murder/Non Negligent Manslaughter	0	0	0
Negligent Manslaughter	0	0	0
Motor Vehicle Theft	0	0	2
Robbery	0	0	1
Sex Offenses (Forcible)	1	1	0
Sex Offenses (Non-Forcible)	0	0	0
Hate Crimes	0	0	0
Arrests			
Drug Violations	2	0	0
Liquor Law Violations	0	0	4
Weapon Possession	0	0	0
Disciplinary Actions/Referrals			
Drug Abuse Violations	47	47	0
Liquor Law Violations	117	88	1
Weapon Possession	0	0	0

* *On Campus total includes Residence Hall incidents.*

SCHOOL OF EDUCATION GRADUATE PROGRAMS

School of Education Graduate Calendar 2009 - 2010

2009 Fall Semester

August	31	Monday	Graduate Counseling & Special Ed Classes begin
September	08	Tuesday	Leadership Classes begin
	16	Wednesday	Late Registration and Add/Drop Ends
October	09	Friday	Intent to Graduate May '10 due
			Application to Graduate Feb. '10 due
	12	Monday	Columbus Day (Classes will be held)
November	02	Monday	Registration begins for Spring 2010
	03	Tuesday	Election Day (Classes will be held)
	11	Wednesday	Veteran's Day (Classes will be held)
	13	Friday	Last day to withdraw from classes
	23-29	Thu-Sun	Thanksgiving Holiday (No Classes)
December	17	Thursday	Last day of Graduate Classes
January	01	Friday	Deadline to submit incomplete work to faculty for Fall 2009

2010 Spring Semester

January	19	Tuesday	Classes Begin
	26	Tuesday	Late Registration & Add/Drop Ends
April	01	Thursday	Registration for Fall 2010
May	03	Monday	Registration for Summer 2010
	06	Thursday	Last day of Graduate classes
	19	Wednesday	Graduate Commencement
June	02	Wednesday	Deadline to submit incomplete work to faculty for Spring 2010
	29	Tuesday	Intent to Graduate September '10 due

Summer 2010 A & B

May	17	Monday	Summer Session A begins
June	25	Friday	Summer Session A ends
	28	Monday	Summer Session B begins for Counseling and Special Ed
July	05	Monday	Summer Session B begins for School Leadership
	30	Friday	Summer Session B ends for School Leadership
August	05	Thursday	Summer Session B ends for Counseling and Special Ed

Subject to changes.

PLEASE NOTE: Students are responsible for knowing and observing the following due dates. The date of graduation may be delayed if the due dates are not met. Forms are available from the Program Directors, the Graduate Education office, and online.

To Graduate in:	Submit Intent by:	Submit Application/Major Paper Internship/ Practicum Documentation by:
February '10	Oct. 10, 2009	Nov. 15, 2009
May '10	Oct. 10, 2009	Feb. 15, 2010
September '10	June 10, 2010	July 15, 2010

School of Education Graduate Calendar 2010 - 2011

2010 Fall Semester

August	30	Monday	Graduate Counseling & Special Ed Classes begin
September	07	Tuesday	Leadership Classes begin
	16	Wednesday	Late Registration and Add/Drop Ends
October	08	Friday	Intent to Graduate May '11 due Application to Graduate Feb. '11 due
	11	Monday	Columbus Day (Classes will be held)
November	01	Monday	Registration begins for Spring 2009
	02	Tuesday	Election Day (Classes will be held)
	11	Thursday	Veteran's Day (Classes will be held)
	12	Friday	Last day to withdraw from classes
	25-28	Thu-Sun	Thanksgiving Holiday (No Classes)
December	09	Thursday	Last day of Graduate Classes
December	31	Friday	Deadline to submit incomplete work to faculty for Fall 2010

2011 Spring Semester

January	18	Tuesday	Classes Begin
	25	Tuesday	Late Registration & Add/Drop Ends
April	01	Friday	Registration for Fall 2011
May	02	Monday	Registration for Summer 2011
	05	Thursday	Last day of Graduate classes
	18	Wednesday	Graduate Commencement
June	01	Wednesday	Deadline to submit incomplete work to faculty for Spring 2011
	28	Tuesday	Intent to Graduate September '10 due

Summer 2011 A & B

May	16	Monday	Summer Session A begins
June	24	Friday	Summer Session A ends
	27	Monday	Summer Session B begins for Counseling and Special Ed
July	05	Tuesday	Summer Session B begins for School Leadership
	29	Friday	Summer Session B ends for School Leadership
August	04	Thursday	Summer Session B ends for Counseling and Special Ed

Subject to changes.

PLEASE NOTE: Students are responsible for knowing and observing the following due dates. The date of graduation may be delayed if the due dates are not met. Forms are available from the Program Directors, the Graduate Education office, and online.

To Graduate in:	Submit Intent by:	Submit Application/Major Paper Internship/Practicum Documentation by:
February '11	Oct. 10, 2010	Nov. 15, 2010
May '11	Oct. 10, 2010	Feb. 15, 2011
September '11	June 10, 2011	July 15, 2011

Tuition and Fees (2009 – 2010)

Tuition and other fees are payable by mail or in person at the Bursar's office, Miguel Hall, at or before the time of registration. Check or money order should be made payable to Manhattan College. The College also accepts MasterCard, VISA, Discover and American Express.

Regular Fees*

Application for all students (non-refundable)	\$60.00
Registration per term (non-refundable)	\$75.00
Graduate Tuition per credit	\$620.00
Graduation fee (required of all students who will be graduated)	\$300.00
Telecommunications Fee (per term) (For students enrolled in 5 or more credits)	\$105.00

Special Fees*

Reactivation of Matriculation	\$50.00
Returned check fee	\$75.00
Off-campus courses	\$125.00
Deferral Fee	\$100.00
Each transcript of record from Registrar	\$5.00
Finance charge (per month on overdue balance)	1%

**Subject to change*

EDUCATION PROGRAMS

Mission

The School of Education is committed to the mission of Manhattan College to provide a contemporary, person-centered education that embodies the LaSallian traditions of scholarship, excellence in teaching, respect for individual dignity, and commitment to social justice. The additional goal of the School is to prepare self-directed, reflective, scholarly professionals dedicated to the highest standards for themselves and those they serve. Professionals are prepared in the fields of Counseling, School Leadership and Childhood/Special Education (Grades 1-6).

Application Procedures

Application forms for admission to all programs in the School of Education may be obtained from the Graduate Education Office, from the School of Education web site (<http://www.manhattan.edu/academics/graduate/index.shtml>), or from the Office of Admissions. The completed form accompanied by the application fee (non-refundable) must be submitted to the Office of Admissions. Applicants for admission are responsible for having official transcripts of all undergraduate and graduate courses mailed directly to the Office of Admissions, paying the application fee, submitting letters of recommendation, and if required, standardized test scores.

Official transcripts (not student copies) of all undergraduate records must be sent to the Office of Admissions by the institutions issuing them. Applicants who file an application before the baccalaureate degree has been conferred may be accepted pending the successful completion of their undergraduate work. A final transcript must be received in the Office of Admissions before they register for graduate courses.

Graduates of Manhattan College should write to the Office of the Registrar requesting that an official transcript be sent to the Office of Admissions.

An application is not complete until all the necessary materials and application fee have been received by the Office of Admissions. Incomplete applications cannot be processed. Students who

file an application and whose official transcripts arrive after the deadline date cannot be assured that their application will be processed in time for the semester for which they are applying.

The filing should be completed before April 1st for summer session application; July 10th for fall session applicants, and December 7th for spring session applicants.

The Program Director for the program for which a person is applying reviews the application and supportive documents and forwards a recommendation to the Dean of Education. This recommendation is sent to Office of Admissions for processing. The Office of Admissions then informs the applicant of the decision. Those who have been accepted will receive the instructions for registration at the beginning of the session for which they have been accepted.

The documents submitted in support of application cannot be returned to the applicant and can not be duplicated for any purpose. All documents received are part of the records of the College.

Admission

Applicants for admission into any graduate program in the School of Education must hold a baccalaureate degree from an accredited college or institution acceptable to Manhattan College. In addition, they must meet the specific requirements as stated in the introduction to the respective programs. Normally, an undergraduate grade point average of 3.00 on a 4.00 scale is required, although other factors can be considered in the decision for admission.

Admission into graduate education programs will be granted as a matriculated student, one seeking to fulfill the requirements of a degree. A student may be granted permission to take an approved graduate course on a non-matriculated basis or, in special cases, as an auditor. A non-matriculated student is one earning graduate credit for a specific course but not necessarily working for a degree. For example the student may be interested in earning a Graduate Certificate or continuing education units or completing credits for other professional reasons. For both non-matriculated

and auditing students, tuition and fees are the same as for matriculated students.

A student who lacks undergraduate prerequisites for a specific program may be asked to complete satisfactorily certain undergraduate courses as a non-matriculated student. Students requesting to take graduate courses as a non-matriculated student must have the necessary prerequisites for those courses. Students may not register for more than 12 credits as a non-matriculated student without the permission of the Dean of the School of Education.

Students who take graduate courses at Manhattan College on a non-matriculated basis and apply thereafter for admission to a graduate program as a matriculated student will be informed at the time of acceptance which courses may be applied to that degree program.

Students who have earned a master's degree or who are pursuing a master's degree in one education program from Manhattan College and desire to seek admission into another program must file a new application with the Office of Admissions.

All documents of applicants who have been accepted and who for extenuating circumstances cannot register for courses during the session for which they were admitted will be kept on file for two years. The documents will be destroyed if the applicant does not register for courses within that period.

Visiting Students

Students who are matriculated in a graduate program at another institution and who wish to take a course (or courses) at Manhattan College may do so as non-matriculated students for individual courses for which they have prerequisites. For non-matriculated students, tuition and fees are the same as for matriculated students.

Applicants from Foreign Countries

The College accepts students from foreign countries for its full-time graduate programs in the School of Education. In general, the College cannot accept students into its part-time graduate

programs. The student who is accepted and receives a student visa must be enrolled in each term of the academic year for 9. Such students must complete the program within 18 months.

Applicants from foreign countries should submit their admission application, official transcripts, and the admission fee four months before the beginning of the session they wish to enter. In addition, they must submit a notarized statement that they have sufficient funds to finance their education and their maintenance. Many of the sources of financial assistance are limited to the residents of the United States.

All students applying from foreign countries must take the TOEFL (Test of English as a Foreign Language) and have the test results sent to the Office of Admissions. A minimum TOEFL score of 213 (550 for paper exam) will satisfy Manhattan College admission requirements and criteria for issuance of the I-20 form.

A student from another country who is informed of acceptance must deposit \$300 which will be credited toward tuition. This fee is non-refundable if the student does not register but will be credited to his/her account for two years. When the \$300 is received, the student will be sent an I-20 form which must be presented to the United States authority to arrange for an F1 student visa.

Objectives

The Graduate School of Education is committed to the preparation of Human Service professionals through courses leading to the master degree in one of three programs. The Counseling Program (M.A.) is directed toward work in counseling and psychology with a view to preparing the candidate for the role of counselor in schools, in colleges, in agencies. The Teacher Education Program (M.S. in Ed.) is directed toward the professional preparation of teachers of disabled individuals, including but not limited to the mentally retarded, the emotionally disturbed, the physically disabled, the neurologically impaired, the multiply disabled and those with specific learning disabilities in grades 1-6. The dual program prepares teachers to work with children in grades 1-6 in the general as well as Special Ed-

ucation settings. The School Leadership Program (M.S. in Ed.) is directed toward the professional preparation of school building leaders, administrators and supervisors, assistant principals, department chairs, coordinators, unit heads, and the like. Post Masters (Professional Diplomas) are offered in each of the programs. A certificate program in Teaching and Learning with Technology is also offered.

General Admission Requirements

In addition to the special requirements that may be listed for various programs, candidates must:

- Earn a baccalaureate degree from an accredited college or institution acceptable to Manhattan College and normally meet or exceed an undergraduate grade point average of 3.0 on a 4.0 scale. Other factors will be considered for admission, such as years of professional experience, a high average in major field, scores on required standardized tests, or academic development beyond the baccalaureate degree. Candidates who have not taken the prerequisite coursework may be required to take graduate courses that are not part of the degree program.
- Meet any additional requirements for a specific program.
- Submit the following: application form, transcript, one page handwritten Narrative Statement of Interest in the specific program, resume and letter of reference, preferably from a professional colleague or professor.
- Schedule an interview with the director of the specific program.
- Applicants interested in a graduate assistantship should request information about graduate assistantship by contacting the Education office.
- Applications for admission will be reviewed by the Program Director and the Dean of the School of Education.

Matriculation Status

Admission will be granted as a matriculated student, one seeking to fulfill the requirements for a master degree or professional diploma or as a

non-matriculated student, one earning graduate credit for specific courses but not for the degree. Normally participants are not allowed to continue in a non-matriculated status beyond 12 credits.

Seniors in the undergraduate Education program at Manhattan College who have completed their undergraduate requirements may, with the written consent of the director of their programs and the Dean of Education, be admitted to appropriate graduate level courses.

Transfer Credit

The Graduate Education Programs at Manhattan College are designed with a developmental emphasis. Assessment is ongoing and performance based. Therefore, a matriculated student is expected to earn all the credits for the program at the College. Transfer of credits will only be considered for compelling reasons. In such cases, students should submit an Off Campus Course Approval Form to their Program Director who will forward it with a recommendation to the Dean. Participants must obtain written approval prior to enrolling in the course.

Degree Requirements

To obtain a master degree from the School of Education students must:

- File the Intent to Graduate form with the Program Director by the due date during the semester before graduation.
- File the Application to Graduate form with the Registrar in the final semester of course work.
- Give evidence of having met program standards through periodic performance reviews.
- Undertake and complete a research based project/paper under the direction of a faculty member. The topic must be related to the participant's program of study and approved by a faculty advisor as part of EDUG 713 Methods of Education and Psychological Research. The major paper must be completed in EDUG 888 (for Special Ed and School Leadership) or EDUG 851 for Counseling, submitted, and a final draft ten-

tatively approved before registering for the practicum/internship or seminar or the following courses: EDUG, 732, or 858, 862, 863. Final approval including sign-off by a faculty advisor is required in order to graduate. Candidates must carefully follow the format of the American Psychological Association, and must submit completed papers according to the timeline for graduation: January 15 for May, June 15 for September, and October 15 for February. The approved major paper must be placed on file in the Graduate Education office.

- Earn the required number of credits for the program, successfully complete each course and demonstrate mastery of the professional knowledge, dispositions and skills for the specific degree and/or certification with a cumulative index of 3.0 or better.
- Undertake a practicum/internship if required. These experiences, including the seminars and reports related to them, are designed to integrate the theory, research and practice developed throughout the program.
- Pay and clear all outstanding financial accounts including library and graduation fees owed the College.

New York State Certification

School Counseling, Special Education, School Building Leadership, Administration and Supervision Certifications

The Graduate Education Programs have been approved by the New York State Department of Education to offer course work leading to Certification as a Special Education or dual Childhood/Special Education Teacher, School Building Leader, or School Counselor.

To be eligible for certification, the candidate must:

- 1) Complete all course work with a cumulative index of 3.0.
- 2) Complete the New York State approved program in the certification area.
- 3) Successfully complete, if required, student teaching, practicum or internships as evidenced by observations from the field and college supervisors.
- 4) Successfully complete the appropriate sections of the New York State Teachers Examination, LAST, ATS-W & CST where applicable.
- 5) Complete the application for certification form (which may be obtained from the Dean's Office or online) and payment of required fees.
- 6) Be recommended by the Dean of the School of Education, the state certifying officer. Candidates possessing provisional New York State certification in Childhood Special Education or School Building Leadership may merit permanent/professional certification upon completing the degree program provided they have satisfied the New York State requirements regarding length of service. Students in Special Education must pass the appropriate New York State Education Department tests, LAST, ATS-W, ATS-P and CST if required.
- 7) Complete the training in Child Abuse Recognition and Reporting and SAVE legislation required for new and renewed certification. Such training is provided in all degree programs through specified courses. Candidates for certification must take the necessary course at the college or from a state approved provider to fulfill this New York State mandated requirement for certification.

Changes in certification requirements issued by New York State Education Department will take precedence over and replace those presented in this catalogue.

Those seeking New York State certification are responsible for knowing and meeting all State requirements for their specific programs.

COUNSELING

Corine Fitzpatrick, Ph.D.; NBCC; Licensed Psychologist, NY State; Licensed MHC, NY State Program Director

<http://home.manhattan.edu/~corine.fitzpatrick/>

Master of Arts in School or Master of Science in Mental Health Counseling

Professional Diploma in Counseling and Personnel Services

<http://www.manhattan.edu/educate/graduate/counseling.html>

Masters Program in School Counseling

The program is concerned with fostering the intellectual, social, spiritual, vocational, personal, and professional development of individuals throughout the life span. It is grounded in research and is also shaped by the needs of schools, community agencies, and colleges that require the services of professional counselors. While a theoretical thread is evident in the core coursework, an experiential thread also begins in the first semester. At the end of their preparation, it is expected that counselors-in-training will emerge with certain knowledge, skills and dispositions. They will be able to: assess, facilitate, and guide individual development; enhance the experiences that further human development and ameliorate those that hinder optimum development; work with individuals from diverse ethnic, cultural, and socioeconomic backgrounds; and engage in inquiry with respect to emerging professional thought and practice. Most importantly, counselors-in-training will enhance their ability to be empathic, caring human service providers.

Program participants are responsible for giving evidence of having acquired the required competencies and met standards through periodic performance reviews, completion of course and program requirements and for maintaining a B or better average in course work.

Admission

Applicants for admission into the master degree program in School Counseling must have earned a baccalaureate degree and a suitable preparation in the behavioral sciences. Consideration will be given for teaching experience and for other applicable experience. Students who possess a bachelor degree but do not have relevant background may be required to take prerequisite courses for admission. A Narrative Statement of Interest in the counseling program is required. An interview with the Director is recommended prior to admission.

Masters Program in Mental Health Counseling

The mental health counseling program is a 60 credit master's degree program that prepares students to work in mental health settings such as: mental health centers, hospitals, and residential treatment centers. The Master of Science in Mental Health Counseling is a rigorous program designed to meet the requirements for an independent mental health care license in New York and other states. The primary objective of this program is to train masters level practitioners in assessment and intervention in the mental health care settings. Together with a post degree experience requirement (3000 hours internship) and successful completion of a licensure exam, graduates will be able to provide direct clinical and counseling services to patients in a wide range of medical, research, mental health and independent practice settings.

Admission

Applicants for admission into the master degree program in Mental Health Counseling must have earned a baccalaureate degree. Consideration will be given for applicable experiences. Students who possess a bachelor degree but do not have relevant background may be required to take a prerequisite course for admission. A Narrative Statement of Interest in the Mental Health Counseling program is required. An interview with the Director is recommended prior to admission.

Program Planning

The approved degree program for School consists of 36 credits of course work. The Mental Health Program consists of 60 credits. These programs require a major paper and a practicum/internship. Periodic consultation with an advisor is required to assure proper sequence and progress in developing competencies as a counselor. The programs prepare students for counseling in schools and in other agencies.

Degree Program School Counselor

(36 Credits)

Required Courses

(30 credits) from EDUG 713, 721, 722, 724, 725, 727, 732, 780, 807 and 851. Students must earn 6 credits in elective courses. Students should consult with the Program Director for courses most suitable for their purpose. Suggested courses include: EDUG 704, 705, 708, 709, 710, 715, 723, 726, 729, 731, 778, 853, and 859. Students must complete a research project.

Degree Program Mental Health Counseling

(60 Credits)

Students preparing for counseling in non-school settings must earn 57 credits of core courses and two electives. Students should consult with the Program Director for 3 credits of courses most suitable for their goals.

Required courses

Elective (1)

EDUG 713 Methods of Educational and Psychological Research

EDUG 715 Marriage and Family counseling

EDUG 721 Introduction to Counseling Practices and Theories

EDUG 722 Counseling the Individual

EDUG 723 Life Span Development

EDUG 724 Psychology of Career Counseling

EDUG 725 Practicum in Groups

EDUG 726 Introduction to Mental Health Counseling

EDUG 732 Practicum in Counseling

EDUG 780 Psychology and Education of the Emotionally Disturbed

EDUG 807 Measurement and Appraisal for Counselors

EDUG 850 Advanced Group Counseling

EDUG 851 Mentored Research

EDUG 852 Internship in Counseling I

EDUG 859 Approaches to Multicultural Counseling

EDUG 866 Leadership, Supervision, and Consultation in Counseling

EDUG 867 Professional Orientation to Counseling: Standards, Law, Ethics and Evaluation

EDUG 891 Foundations in Evaluation, Assessment and Diagnosis

EDUG 894 Internship in Counseling II

New York State Certification/Licensure

School. Upon the completion of the Master of Arts degree (School Counseling), SAVE and Child Abuse Recognition and Reporting requirements, the student will fulfill the requirements for Provisional certification as a school counselor. The student must file an Application for Certificate with the office of the Dean of Education in order to be recommended for certification. Application should be submitted prior to graduation.

Mental Health. Manhattan College's program meets the State of New York requirements and graduates are license eligible with 3,000 post degree supervised hours and the passage of a state exam. Also, graduates may take the National Counselor Examination (NCE) to receive the national board certification: Nationally Certified Counselor (NCC).

Professional Diploma School Counselor

(24 credits)

Admission

Students must have a master's degree from an approved educational institution and possess provisional certification in counseling or its equivalent. A Narrative Statement of Interest in the counseling program, recommendation and interview are required prior to admission.

Program

The Professional Diploma consists of 24 credits of course work. It emphasizes broader preparation in counseling and related services for advanced responsibilities, including intervention, and in the conduct, supervision, and evaluation of counseling practice. Upon completion of 24 credits, students may apply for New York State permanent certification if they have worked as a school counselor for 2 years. Required courses are EDUG 723, EDUG 850, EDUG 859, 866, 867, and EDUG 852. Students must earn 6 credits in other appropriate courses after consultation with the Program Director. Suggested courses are EDUG 704, 705, 708, 709, 712, 714, 715, 717, 719, 726, 729, 731, 778, 781, 835, 853, 864, 738, 780, 891 and 894.

Bilingual Certificate

(15 credits)

The certificate program consists of 15 credits of coursework to prepare counselors to specifically work with bilingual/multicultural students.

Required Courses

EDUG 802, 810, 816, 817, 818

EDUCATIONAL TECHNOLOGY PROGRAM

Certificate Program (15 Credits)

Teaching and Learning with Technology

Corine Fitzpatrick, Ph.D.
Program Director

<http://home.manhattan.edu/~corine.fitzpatrick>

Required Courses (9 credits)

EDUG 737, 875, 879

Electives–Administration

From EDUG 745, 749, 757, 845, 849, 877

Electives–Special Education

EDUG 761, 783, 805, 808, 768, 812, 877

Electives–Counseling

From EDUG 718, 877

Admissions

- Baccalaureate Degree from accredited institution
- G.P.A. average of 3.0 in applicant's major
- Two letters of recommendation or support
- Narrative Statement discussing the connection between technology and teaching

Program

The Certificate Program is designed to help educators, prospective educators as well as professionals from other fields integrate technology into professional practice. It concurrently focuses on curriculum and the practice of teaching and learning. Unlike programs designed to train computer specialists, the emphasis is not on technology, but rather on the seamless infusion of technology into the learning and teaching environment. The Certificate Program is interdepartmental with options for School Administrators, Special Educators and Counselors.

SPECIAL EDUCATION GRADUATE PROGRAMS

Special Education

Elizabeth M. Kosky, Ed.D.
Program Director

Master of Science in Education

Admission

Applicants for admission into the master degree program in Special Education must have earned a baccalaureate degree and must have suitable preparation in the behavioral sciences. Consideration will be given for teaching experience and other applicable experience. Students who possess a bachelor degree but do not hold provisional/initial teaching certification must pass the LAST prior to matriculation. They must also meet the New York State Education requirements in English, Math, Science, Foreign Language and Social Studies. Students will be required to fulfill these requirements and pass the ATS-W and CST (if certified after February 2004) as a prerequisite for recommendation for certification.

A Narrative Statement of Interest in the Special Education Program, resume and interview with the Director of Special Education is recommended prior to admission.

Program

The degree program for candidates with childhood level certification consists of 37 credits of course work, which includes the practicum, EDUG 862, a major paper and Special Education program portfolio.

The program provides a broad base of knowledge and experience to enable students to teach mentally retarded, learning disabled, emotionally disturbed, physically disabled, neurologically impaired, and multiply disabled individuals in special education or inclusive settings. The individual courses are designed to develop certain knowledge, dispositions, and skills required to meet NYS standards for special education teachers (Grades 1-6). Students are expected to

consult with the Program Director regarding courses and progress.

Course participants are responsible for giving evidence of having acquired the required competencies and met standards through periodic performance reviews, portfolio, completion of course and program requirements and for maintaining a B or better average in course work.

New York State Certification

At the time of publication of this catalog, the Master of Science degree (Special Education) fulfills all the academic requirements for certification as a special education teacher. Upon completion of the Master of Science in Education degree, SAVE and Child Abuse Recognition and Reporting requirement the student will fulfill the academic requirements for provisional/initial teacher certification. Students who do not possess provisional certification are required by the New York State Education Department to pass the LAST and ATS-W tests. When students have completed the degree requirements and passed the required CST exams, they will be recommended for a provisional/initial certification, or permanent certification if they have met the NYS regulations for appropriate length of time for teaching experience and mentoring. The student must file an Application for Certificate form with the N.Y.S. Department of Education (online) and contact the Office of the Dean of Education in order to be recommended for certification. This application should be filed upon graduation.

Job Opportunities for Teacher Education Graduates

According to the National Center for Education Statistics' Predicting the Need for Newly Hired Teachers in the U.S. to 2008-2009, nationwide some 2.4 million teachers will be needed in the next 11 years because of teacher turnover, retirement, and rising student enrollment.

Degree Programs

(Completed after February 2004)

M.S. Ed – Special education – Grades 1-6 (37 credits)

(Option for Middle School Courses)

Prerequisites

Applicant must hold provisional or initial certification as a childhood general education or special education teacher (Grades 1-6).

Required Core Courses

EDUG 713, 733/704, 778, 781, 787, 789, 862, 888

Required Math, and Science Content Courses (6 credits)

From EDUG 785 AND 768, 775, 812, 899

Required Social Studies and Language Arts Content Courses (6 credits)

From EDUG 750, 753, 754, 766 AND 805, 808

Electives (6 credits)

From EDUG 761, 783, 868, 869, 873, 874, etc.
Others with approval of Program Director

OR

Middle School Courses

EDUG 873 and 874

M.S. Ed Dual Childhood/Special Education Grades 1-6 (49 credits)

Option for Middle School Courses

Prerequisites

Provisional or initial certification in Childhood general education (Grades 1-6) or special education (Grades 1-6)

Individuals who are not certified must:

- Present passing scores on the LAST for matriculation.
- Meet N.Y.S. Education requirements for undergraduate core which includes courses in History, Social Sciences, Humanities, Artistic expression, Foreign Language, Science, Math, Information retrieval, Communications, written analysis and expression.
- Completed Undergraduate major (30 credits) in the Arts or Sciences.

Candidates with deficiencies will be required to take specific courses to meet these requirements for certification.

Required Core Courses (34 credits)

EDUG 713, 723, 733/704, 778, 781, 787, 789, 856, 863, 888, 896, 897

Required Literary Courses (6 credits)

From EDUG 898 and 753 or 754 or 766

Required Math, and Science Content Courses (6 credits)

From EDUG 785, 775 and 899, 768, 812

Required Social Studies and Language Arts Content Courses (3 credits)

EDUG 805, 808

Middle School Courses

EDUG 873 and 874

Five Year Program

Elizabeth M. Kosky, Ed.D.
Program Director

Bachelor of Science and Master of Science in Education

Dual Certification Childhood Education/Special Education

This program is designed for the undergraduate student seeking certification for grades 1-6.

Students who complete the first semester of sophomore year with a cumulative index of 3.00 or better and grades of B or better in all education courses may apply for admission into the five year BS/MS Ed program which leads to certification in Childhood Education/Special Education (Grades 1-6). Upon satisfactory completion of specific program requirements, and successful completion of LAST, ATS-W, and CST (Multi-subject and Students with Disabilities), students will be recommended for initial certification in each area.

Degree Program

(151/152 credits)

Students complete the required sequence of undergraduate courses during freshman, sophomore, junior and senior year. In the fourth year they are enrolled in four graduate courses. In the fifth year, students complete 22 graduate credits. Five year participants student teach in a Special Education setting full days during the Fall or Spring semester of the fifth year.

Professional Diploma

(18 Credits)

Admission

Students must have a masters degree from an approved educational institution and possess provisional/initial certification in Special Education, Reading, Elementary Education, Speech and Language or its equivalent. A Narrative Statement of Interest in the Consultant Teacher or

Autism Spectrum Disorder, resume and interview with the Director of Special Education are recommended prior to admission.

Certification

There is no New York State certification program available through Manhattan College for the holder of the Professional Diploma in Special Education.

Consultant Teacher

(18 Credits)

Program

The Professional Diploma in Consultant Teacher consists of 18 credits of course work. It is designed to train Special Education Teachers for the consultant teacher role. There is no specific certification for this position in New York State.

Required Courses (6 Credits)

EDUG 781, 805, 806, 808, 820, 822.

Suggested Electives (12 credits)

From EDUG 704, 723, 730, 731, 733, 753, 754, 760, 761, 766, 773, 775, 768, 783, 785, 805, 808, 812, 899.

Autism Spectrum Disorder

(18 Credits)

Program

The Professional Diploma in Autism Spectrum consists of 18 credits of course work which includes an internship teaching students with these disorders.

Required Courses

EDUG 880, 881, 882, 883, 884 and 885

Bilingual Certificate

(15 credits)

The certificate program consists of 15 credits of coursework to prepare educators to specifically work with bilingual/multicultural students.

Required Courses

EDUG 802, 810, 813, 814, 815.

SCHOOL BUILDING LEADERSHIP PROGRAM

Sister Remigia Kushner, Ph.D.
Program Director

The school leadership program at Manhattan College is based on New York State's Essential Knowledge and Skills for School Building Leaders (SBL), School District Leaders (SDL), and School District Business Leaders (SDBL) and the content areas proposed by the Commissioner's Regulations.

Admission:

In addition to the general admission requirements for a Graduate Program in Education, applicants for admission to the School Leadership Program must possess an initial or provisional or permanent or professional certificate and three years experience in classroom teaching service or pupil personnel service, or give appropriate and acceptable evidence of potential for instructional leadership based on prior experiences, and have a recommendation from an appropriate source. Prior experiences, including experiences as a teacher, administrator, or pupil personnel services provider may include, but need not be limited to: recommendations of current supervisor(s), colleagues(s), parents and students; evidence of leadership, results of leadership efforts undertaken in the position held. A handwritten Statement of interest in the program should indicate these results. An interview with the Program Director is recommended prior to admission.

Should New York State mandate a change in these requirements, New York State regulations will take precedence over this catalog.

Note: Candidates for NYS certification are responsible for knowing and meeting NYS requirements related to the specific certification they seek. Any changes in NYS requirements take precedence over those in this catalog.

Degree Program:

The Master of Science in Education in School Building Leadership consists of 33 credits of course work (11 three-credit courses). If Research (EDUG 713) must be taken, it is included in the 33 credits. If research is waived, another course is substituted and a major paper is completed in EDUG 888, a one-credit course in Mentored Research.

Participants should consult with the Program Director for courses and competencies appropriate to the specific administrative role or certification desired. Those who have applied for and received a waiver for EDUG 713 are expected to write a major paper whose topic and design are approved by the Program Director, and to register for EDUG 888, Independent Study in Research (this course does not count toward the degree).

Program of Studies: Master of Science in Education, School Building Leadership

(33 credits)

Ordinarily, participants register for no more than 6 credits (2 three-credit courses) in the Fall or Spring semesters and no more than 9 credits (3 three-credit courses) for the May to August summer sessions.

Leadership Strand: (1 course required)

EDUG 735, 760, 835, 837, 838

Management Strand: (2 courses required)

EDUG 740, 743, 744, 839, 841, 842, 846, 847, 870, 890

Curriculum Strand: (1 course required)

EDUG 745, 746, 757, 845, 868, 869, 875, 877

Supervision Strand: (2 courses required)

EDUG 737, 738, 747, 838, 848

Issues/Technology Strand: (2 courses required)

EDUG 736, 739, 741, 749, 799, 809, 836, 844, 849, 876, or appropriate others from Graduate Education offerings.

A co-requirement of the above six courses is 100 hours of course related leadership activities.

Required for the Master of Science in Education in School Building Leadership:

EDUG 713, or substitute if waived, 748, and 889.

Participants must meet New York State requirements for a two hour workshop in Child Abuse Recognition and Reporting, and in School Violence Prevention and Intervention legislation from an approved provider or through graduate course work.

The Leadership Experience (Internship)

A prerequisite for the Leadership Experience is acceptance by a school or district for an administrative internship experience and sponsorship by a certified administrator. The internship consists of sustained administrative experience in diverse settings planned collaboratively with university and school or district personnel in substantive, appropriate and approved administrative and supervisory tasks. Requirements include, but need not be limited to, an internship portfolio, an internship project, video tape, logs, journals, and others as required.

Ordinarily, the Leadership Experience is a 15 week full-time program or a 30 week part-time program.

Professional Diploma

(24 Credits)

Admission:

Those seeking admission to the Professional Diploma Program in School Building Leadership at Manhattan College must meet all the entrance requirements for the Master Degree Program in Leadership and, in addition, possess an appropriate master degree.

Should New York State mandate a change in these requirements, New York State regulations will take precedence over this catalog.

Program of Studies: Professional Diploma in School Building Leadership

(24 credits)

Ordinarily, participants register for no more than 6 credits (2 three-credit courses) in the Fall or Spring semesters and no more than 9 credits (3 three-credit courses) for the May to August summer sessions.

Leadership Strand: (1 course required)

EDUG 735, 760, 835, 837, 838

Management Strand: (2 courses required)

EDUG 740, 743, 744, 839, 841, 842, 846, 847, 870, 890

Curriculum Strand: (1 course required)

EDUG 745, 757, 845, 875

Supervision Strand: (2 courses required)

EDUG 737, 738, 747, 838, 848

A co-requirement of these six courses is 100 hours of course related leadership activities.

Required:

EDUG 748, 889

Those seeking the Professional Diploma in School Building Leadership must meet the same requirements for the internship as those listed for the Master Degree.

Participants must meet New York State requirements for a two hour workshop, Child Abuse Recognition and Reporting, and in School Violence Prevention and Intervention legislation from an approved provider or through graduate course work.

Course Descriptions (EDUG)

600. Orientation to School Building Leadership.

This course is required for all those admitted to the School Building Leadership (SBL) program and should be taken within the first six credits. This orientation includes Course Related Leadership Activities (CRLA), the goals of the Leadership Program, the integration of technology into teaching and learning, the Leadership Experience (the Internship), and the required documentation for the program completion. *Three credits*

700. Lasallian Educational Practice and Philosophy.

An examination of the life and educational contributions of John Baptist de La Salle. The course will examine "The Catholic School" and specifically "The Lasallian School." Pedagogy, curriculum, spirituality, social action and the training of new teachers will be discussed. *Three credits*

704. Introduction to Group Dynamics & Human Relations.

Experiential study of factors that provide a climate of freedom for personal expression; exploration of feelings; interpersonal communication through group analysis of current community problems; emphasis on the atmosphere conducive to interaction among group members; dynamics for innovative and constructive behavior; theory and practice in treatment and elimination of conflict, especially in intergroup-intercultural problems. *Three credits*

705. Orientation to Alcohol and Substance Abuse Counseling.

An introduction to alcohol and chemical dependency counseling with an emphasis on major aspects of the field such as the disease concept, the importance of self-help groups in the recovery process, ethical principles that impact on alcohol and substance abuse counseling, Federal and State confidentiality laws, and client HIV status as it pertains to confidentiality. *Three credits*

706. Alcohol and Substance Abuse: Evaluation, Treatment Planning and Case Management.

An in-depth study of the essential components of alcohol and drug assessments, their importance in the treatment planning process, the development and implementation of behaviorally-oriented treatment plans and the coordination of services for clients through case management activities. The va-

riety of treatment opportunities for clients based on their individual needs will be studied. *Prerequisite: 705 or permission of Program Director. Three credits*

708. Physical and Psychopharmacological Aspects of Alcohol and Substance Abuse.

An examination of how alcohol and other substances affect physical health, including the brain and the individual's cognitive functioning. Specific emphasis will be placed on the pharmacological effects of alcohol and other substances of abuse. Specific illness commonly found among this population such as AIDS, tuberculosis and other communicable diseases will be discussed. *Three credits*

709. Alcohol and Substance Abuse Counseling Family Issues and Treatment Approaches.

A comprehensive review of the literature pertaining to the effects of alcoholism and other substance abuse on the family system. Individual and group treatment approaches employed within the family system, including co-dependency groups, Al-Anon, Alateen, and other services for children of alcoholics and substance abusers will be discussed. *Prerequisites: 721, 725, or permission of the Program Director. Three credits*

710. Current Issues in Alcohol and Substance Abuse Counseling.

An examination of how certain influences affect our understanding and treatment of alcohol and substance abuse. These include gender, sexual orientation, racial and ethnic minorities, issues of sexual abuse and violence and the HIV client. Other issues that will be reviewed pertain to the special needs of children of alcoholics and substance abusers and their treatment. Particular focus will be placed on relapse and specific relapse prevention approaches used in the field. *Three credits*

711. Multiple Disorders: Alcohol, Substance Abuse and Psychopathology.

A comprehensive examination of psychiatric disorders and the nomenclature of DSM-IV. Issues pertaining to the ways that various mental disorders complicate the evaluation and treatment of alcohol and substance abuse will be studied. Specific treatment interventions with certain groups of dually-diagnosed individuals will be provided. Specific attention will be paid to the treatment of polysubstance abusers. *Three credits*

712. Counseling the Single Parent Family.

Examination of the needs of children and parents in single parent families; distinctions made among single parent families' problems brought about by divorce, separation, death, annulment and out-of-wedlock children. *Three credits*

713. Methods of Educational and Psychological Research.

Critical evaluation of educational and psychological research. Design and implementation of a research project utilizing the scientific method and statistical inference. Examination of techniques and format of research writing. Students complete three sections of the required major paper. Topic must be related to the student's specific program and approved by the course professor. If all five sections of the major paper are not completed in 713, Special Ed and School Leadership participants will enroll in the one credit course, EDUG 888 until course requirements are completed. EDUG 888 does not count toward graduation. *Three credits*

714. Psychology of Career Counseling.

Techniques of counseling different populations in a variety of settings. The course will address the role of work, job seeking techniques, the use of assessments, value clarification methods, and design of programs. *Three credits*

715. Marriage and Family Counseling.

Examination and application of the theory, practice and utilization of marriage and family counseling techniques. *Three credits*

717. Stress Reduction Techniques.

Study of the causes and characteristics of stress. Examination of different approaches and techniques for stress management that can be employed by the counselor. *Three credits*

718. Computer Applications for Guidance Counselors.

Examination of software for programming, record keeping, testing, reference, referral, and networking for internal and external communication. Opportunity for hands-on experience with software and hardware in the Computer Lab. *Three credits*

721. Introduction to Counseling Practices and Theories.

Introduction to the field of counseling including exposure to historical foundation of counseling, professional organizations, theories and research findings; procedures used in educational, vocational, personal and alcohol and other drug counseling; case study illustrations. Students will be introduced to timely topics such as multicultural and developmental perspectives. *Three credits*

722. Counseling the Individual.

Techniques of counseling, case conceptualization and consultation including class and outside experience with primary emphasis on development; assessment and intervention techniques using case studies, discussion and practice counseling; analysis of techniques using a variety of problems including drug and alcohol abuse. *Prerequisites: EDUG 721, 780 or permission of the Program Director. Three credits*

723. Life Span Development: Child, Adolescent and Adult.

Comprehensive review of major theories of human development from pre-natal period through senescence. Critical tasks and aspects of growth for each period will be explored. Particular emphasis will be placed on cognitive and psychosocial development and how children, adolescents, and adults are affected differentially by various learning and emotional disabilities. Focus will also center on the link between research and practice of counseling and special education including multicultural research, research on S.A.V.E. and child abuse. *Three credits*

724. Theories, Principles and Techniques of Career Development.

Practical application of major career development theories related to the world of work. Topics include: career assessment tools, information resources and the decision-making process. Trends, exploration of classification systems and, program development for counseling in the schools. *Three credits*

725. Practicum in Groups.

Discussion, evaluation, and demonstration of types of group counseling techniques; analysis of group dynamics; group counseling as it applies to educational, interpersonal and emotional problems, including alcohol, and substance abuse problems. The use of 12-Step self-help groups in recovery. *Three credits*

726. Foundations of Mental Health Counseling.

This class will provide students with an introduction to the roles, functions, and professional identity of mental health counselors in a variety of clinical settings. Students will develop a basic working knowledge of biopsychosocial mental health assessment, diagnosis, and case formulation. Students will develop a basic working knowledge of the principles of current diagnostic tools. Students will develop a basic knowledge of commonly prescribed psychopharmacological medications. *Three credits*

727. Organization and Administration of the Guidance Program.

Principles and problems in the organization, administration and evaluation of guidance programs at all levels; analysis of the role, responsibilities and duties of administrators, counselors, school psychologists, and teachers; computer applications for the guidance program for student support services including those with disabilities and who are English language learners. Field experience. Satisfies the requirement for S.A.V.E. legislation. *Three credits*

728. Alcohol and Substance Abuse Counseling-Internship and Professional Development Seminar.

Placements will be required within a licensed alcohol or substance abuse treatment agency, either inpatient or outpatient for a minimum of 150 hours. The internship experience will include the evaluation of clients, participation in counseling groups and individual counseling sessions with clients at the chosen treatment setting. A review of treatment sessions will be conducted with the student by the internship supervisor. As part of the internship experience, topics pertaining to the counselor/client professional relationship, transference/counter-transference issues, role boundaries and the use of clinical supervision as an ongoing aspect of practice will be the major focus of the internship experience. Minimum of 150 hours in the field. *Prerequisite: Matriculation, 27 credits and permission of the Program Director and Director of Graduate Education. Three credits*

729. Professional Writing.

This course is designed to enable the students to gain experience in professional writing and refine their writing skills. The emphasis will be on developing the organization and synthesis abilities required for more advanced writing demands in counseling, special education, or Leadership, including case studies, research papers, grant writing and program evaluations. While the course will also address issues related to grammar, syntax and the APA style manual, it will emphasize improvement in non-judgmental writing with clarity and professionalism. *Three credits*

730. Curriculum, Strategies, and Technology for the At Risk and Disabled.

A practicum to improve school success of At Risk students and disabled students within the inclusionary setting. Review of NYS Content and Performance Standards; emphasis on teaching strategies; differentiated instruction; modification of curriculum materials; application of instructional technol-

ogy; a curriculum based project is required. Permission of the Director of Special Education required.

Three credits

731. Counseling the At Risk, Disabled Student and Family.

Overview of trends and legal rights of the disabled; implication for counseling with regard to the special vocational, educational, social and emotional needs of the disabled; survey of programs, agencies, and services for the disabled. *Three credits*

732. Practicum in Counseling.

Advanced counseling practice with clients under the supervision of the faculty. Integrated seminar with case conferences designed to enable students to develop skills in case conceptualization, consultation, individual and group counseling. Minimum of 100 hours of experience required. Satisfies the requirement for S.A.V.E. and Child Abuse recognition and reporting. *Prerequisites: Matriculation, 27 credits, 722, 725, an accepted major paper and permission of Program Director. Three credits*

733. Approaches to Multicultural Education for the At Risk and Disabled Student.

Introduction to multicultural education, cultural diversity, and equity issues through examination of race, ethnicity, social class, gender, disabilities and sexual orientation and their impact on curriculum and classroom instruction. Best practices and multicultural materials explored. *Three credits*

735. Educational Leadership, Decision-Making, and Change.

Leadership styles and decision-making models and their implications for the role of school leaders and supervisors as change agents and visionary leaders; exploration of what it means and what it takes to be a school leader; organizational patterns (line and staff) and group dynamics (formal and informal); the school as a social (power) system; use of case studies, simulation and role play. Course related leadership activities required. *Three credits*

736. Issues in Educational Administration and Curriculum.

Analysis/discussion, lecture, collaborative learning, intensive study, field experience related to issues for developing or enhancing administrative and curricular leadership for the school administrator, assistant principal, and department chair. Participants present evidence of knowledge, skills and dispositions for effective leadership in diverse educational settings. Course projects that promote collaboration, communication, and planning with parents, students, staff, and community leaders may include action research, strategic planning, change processes,

design for staff development, computer application and/or multimedia presentations. Program portfolio and publication or multimedia presentation required. Satisfies the requirement for Child Abuse Recognition and Reporting and S.A.V.E. legislation. Course related leadership activities required. *Three credits*

737. Staff Development

Concepts, theories, principles of adult learning for application to school based professional development; design and evaluation of new and existing staff development programs; use of staff development programs for team building, succession planning and collaboration; emphasis on school wide technological integration for effective standards based teaching and learning that helps students meet state standards. Developing and enhancing visionary instructional leadership by infusing instructional technology. Designed for education administrators, staff developers, counselors, general and special education teachers and professionals from other fields. Course related leadership activities required. *Three credits*

738. Evaluating School Effectiveness.

Models, current practices, strategies, and a variety of data sources for determining school, personnel and program effectiveness. Involving constituencies and staff in assessing school effectiveness and accountability for helping students meet state standards; examination of self-study and accrediting agency school evaluation processes; authentic, integrated assessment including portfolio assessment, understanding and using standardized test results for continuously improving student learning. Course related leadership activities required. *Three credits*

739. Administrative and Curricular Concerns of Private Schools.

Analysis/discussion, lecture, collaborative learning, intensive study, field experience related to issues for developing or enhancing administrative and curricular leadership of the private school administrator, assistant principal, and department chair. Participants present evidence of knowledge, skills and dispositions for effective leadership in urban and suburban settings. Course projects that promote collaboration, communication, and planning with parents, students, staff, and community leaders may include action research, strategic planning, change processes, design for staff development, computer application and/or authoring professional papers. Program portfolio and publication or multimedia presenta-

tion required. Satisfies the requirement for Child Abuse Recognition and Reporting and S.A.V.E. legislation. *Three credits*

740. School Law for Administrators.

Legal issues concerned with the rights of students, parents, and professional personnel; negligence, equal opportunity, public and private schools court cases analyzed. Exploration of ethical behavior; application of statutes and regulations as required by law and implementation of school policies. Satisfies the requirement for Child Abuse Recognition and Reporting and S.A.V.E. legislation. *Three credits*

741. School Administration and Supervision.

Theory and practice of school administration and supervision; organizational patterns of the American elementary, middle and secondary schools; effective practices related to staff, instructional programs, pupil personnel services, discipline, evaluation of student progress, utilization of school plant, public relations; career guidance. Participants present evidence of knowledge, skills and dispositions for effective leadership in diverse educational settings. Intensive study of planning and design for staff development, school management, supervision of elementary, middle, secondary schools. Course projects related to safe, healthy supportive environments, budget and finance may include action research, strategic planning, change design, computer application and/or authoring professional papers. Satisfies the requirement for Child Abuse Recognition and Reporting and S.A.V.E. legislation. Course related leadership activities required. *Three credits*

743. Personnel Functions in the School.

Theory and practice for administrators, department chairs, supervisory personnel regarding the recruitment, selection, assignment, and orientation of personnel; and the impact of collective negotiations. *Three credits*

744. Contemporary Management Functions in the School.

Management techniques providing administrative leadership in schools in planning, programming, budgeting; utilizing facilities management and materials; scheduling; financial management; legal issues related to contract, negligence, state law, commissioner's regulations, safe environment. Satisfies the requirement for S.A.V.E. legislation. Course related leadership activities required. *Three credits*

745. Curriculum Development and Adaptation.

Principles, trends, and techniques of curriculum planning for early childhood through secondary schools; adaptation of curriculum to differentiate instruction and meet special needs including those of English language learners; the role of the teacher, supervisor and principal in meeting state curriculum standards and adapting curriculum for effective instructional delivery; study of curriculum issues related to instructional delivery and instructional leadership including technological enhancements. Emphasis on standards based teaching and learning that assists students to meet state standards, including those with special needs, and English language learners. Course related leadership activities required. *Three credits*

746. Administration and Supervision of Early Childhood Programs.

Theory and practice of the administration and supervision of early childhood programs; review of legislation and requirements; discussion of developmentally appropriate practice; effective practices related to the selection and supervision of personnel; training and supervision of paraprofessional personnel; and policies, records, reports, instructional methods, materials and programs. Includes Child Abuse Recognition and Reporting *Three credits*

747. Supervision for the Improvement of Instruction.

Role of principal, supervisor, unit head, department chair in enhancing the learning process; review, analysis and critique of existing models of instruction and supervision; techniques for providing instructional leadership through laboratory process, simulation. Planning with college personnel to provide experiences for new teachers to enhance student learning. Course related leadership experience required. *Three credits*

748. Internship/Seminar I in School Building Leadership.

This seminar integrates all previous learning experiences of the school leader, uses a problem solving approach to consider issues affecting administrators in elementary and secondary schools in urban or suburban areas, focuses on the content areas required for NYS certification. Participants complete 15 hours of seminar and at least 200 hours of supervised field experience. *Prerequisites: 18 credits plus 100 hours of course related field experiences in required strands taken at Manhattan College; permission of Program Director. Three credits*

749. Computer Applications for School Administrators.

The application of basic computer functions to administrative tasks of planning, budgeting and communication; issues in computer managed and computer assisted instruction; computer hardware and software for school administration and management. *Three credits*

750. Principles and Practices of Reading for the At Risk and Disabled.

Psychological principles of learning underlying reading instruction for diverse students (disabled and gifted); methods of instruction and classroom organization for general and special education students; materials, testing procedures, differentiated instructional strategies and computer applications in reading instruction. *Three credits*

753. Teaching Reading in the Content Areas for the At Risk and Disabled (Grades K-8).

Techniques for integrating reading and thinking skills into instruction in English, Social Studies, Science and Mathematics for grades K-8. Focus on the N.Y.S. Literacy Standards. Formal and informal assessment of word recognition, vocabulary development, comprehension, study skills. Emphasis on differentiated instructional practices for the At Risk and disabled student. *Three credits*

754. Literature for the At Risk and Disabled (Grades K-8).

Examination of literature. Inter relationship of dramatization, story telling, speaking, reading and writing explored for grades K-8. Study of authors and illustrators. Focus on N.Y.S. Literacy Standards and differentiated instruction and strategies for integrating literature into curriculum areas such as Social Studies, Science and Math for the At Risk and disabled student. *Three credits*

756. Organization, Administration and Supervision of Reading Programs.

Organizational and supervisory practices for all levels of reading instruction and literacy. Examination of: procedures for conducting a needs assessment of the school reading program; supervision of reading teachers; organization and implementation of a staff development program; development of funded programs; evaluation of reading instructional materials; training and supervision of paraprofessionals and other auxiliary personnel; computer applications in reading. *Three credits*

757. Organization, Administration and Supervision of Math, Science, and Technology Programs.

Theory and practice of administration and supervision of Mathematics and Science instruction in elementary and secondary schools emphasizing hands-on, multisensory, learning experiences that integrate technology for students; developmentally appropriate practice related to mathematics and science learning, especially in young children and those with special needs and English language learners; effective practices related to the selection, training, and supervision of personnel; integration of lifelong learning and use of current developments in Mathematics and Science related to careers, economy, and environment; state and national curriculum standards for elementary, middle, and secondary schools. *Three credits*

760. Mentoring.

Theories, principles, concepts and practice related to direction and supervision of student teachers, new and experienced professionals for mentors and principals; principles of adult learning; collaboration and team planning for a productive educational environment; use of technology for monitoring and assessing student progress; application of diverse instructional strategies; interdisciplinary teaching; succession planning. Collaboration of elementary, middle/secondary school and college faculty for effective teaching and learning. Use of technology for meeting learning standards. Course related leadership experience required. *Three credits*

761. Technology Utilization for Interactive Learning for the At Risk and Disabled.

Examination of the use of instructional technology in the delivery of standards-based instruction in the general and special education classroom. Exploration of assistive technology. Emphasis on: internet usage in the development of thematic instructional units; Webquests; presentation graphics and web page development. Opportunities for hands-on experience with instructional software in the computer lab. *Three credits*

766. Literacy Instruction for the At Risk and Disabled Student (Grades K-8).

Study of the physiological, psychological, and emotional development of exceptional students in relation to listening, speaking, reading and writing achievement; NYS Literacy Standards; techniques of diagnostic evaluation; differentiated instruction; modifications of curriculum and methods of teaching reading and communication skills to students – bilingual, disabled, as well as gifted. *Three credits*

768. Integrated Curriculum: Math, Science and Technology I for the At Risk and Disabled Student (Grades K-8).

Examination of Science, Math and Technology curriculum based upon the national, state and citywide standards and frameworks grades K-8. Focus on constructivism and inquiry based problem solving. Review of N.Y.S. assessments, alternative assessments and curriculum adaptations for the disabled. Overview of current research in the field. Focus on, methods, materials, questioning techniques and best practices based upon the inquiry approach. Opportunities for hands on experience with materials and software and use of cooperative learning strategies to explore concepts. *Three credits*

771. Assessment and Remediation of Reading Disabilities.

Diagnosis and remediation of reading, language and writing disabilities in a clinical setting for disabled students; training in alternative reading strategies and techniques; lesson planning and evaluation of progress with recommendations for instruction. *Prerequisites: EDUG 750, 766 or permission of the Director of Special Education.* *Three credits*

773. Communication Skills for the Learning Disabled.

Identification, diagnosis and etiology of specific learning disabilities; legislative trends; services; overview of methods employed in the remediation of communication problems; emphasis on differentiated instructional practices that can be used in the special education or inclusive setting. *Three credits*

775. Mathematics Instruction for the At Risk and Disabled (Grades K-8).

Review of the N.Y.S. Math standards and curriculum grades K-8 and current research. Emphasis on problem solving skills and curriculum integration; methods, materials and instructional technology appropriate for the At Risk and disabled student. Opportunity for hands-on experience, use of cooperative learning strategies and technology applications to explore concepts. *Three credits*

778. Nature and Needs of the Exceptional Individual.

Overview of the historical social and legal foundations of Special Education. Survey of the nature and needs of the mentally retarded, emotionally disturbed, physically disabled, deaf, blind, and learning disabled and gifted individuals; assistive technology. Introduction to agencies, programs, facilities and employment opportunities which support the dis-

abled individual and family. Minimum of 25 hours of observation/field work in programs serving the disabled and their families. *Three credits*

779. Independent Study in Instructional Technology for the Teacher of the At Risk and Disabled (Grades K-8).

Designed to allow the student with background and experience with instructional technology to pursue an area of interest. An overview and outline of the proposed project is required prior to registration. Permission of the Director of Special Education.

Three credits.

780. Psychology and Education of the Emotionally Disturbed.

Major syndromes of childhood and adolescence as seen within the context of normal development; consideration of various theoretical, diagnostic, etiological, and therapeutic viewpoints; practice with rating scales, inventories, methods and counseling techniques associated with these syndromes. Examination of educational programs serving the Behaviorally Disordered.

Three credits

781. Management Techniques and Curriculum for the At Risk and Behaviorally Disordered.

Study of models for the management of teaching and learning of the At Risk and the behaviorally disordered student; review of informal assessment techniques; emphasis on planning and management of teaching and learning; methods for developing positive social skills. Examination of support services in the school and community which strengthens family partnerships. Curriculum issues for students in inclusive or special education settings explored. Minimum of 25 hours of observation/fieldwork.

Three credits

782. Psychology and Education of the Mentally Retarded.

Analysis of biological, psychological, and social factors associated with mental retardation; etiology, definition, and classification treated; problems in differential diagnosis explored; and emphasis on exemplary programs and curriculum for the mentally retarded.

Three credits

783. Technological Applications for the At Risk and Disabled.

Examination of the use of technology in the general, special education and inclusive classroom. Experiences will include: internet; e-mail, educational database sites; the use of software across the curriculum; development and implementation of cur-

riculum based projects using technology. Opportunities for hands-on experience with instructional software.

Three credits

785. Life Science for the At Risk and Disabled Student (Grades K-8).

Basic concepts of Life Science as aligned with the N.Y.S. Learning Standards and Curriculum K-8. Emphasis on inquiry and problem solving skills. Examination of scientifically validated methods and materials for the at risk and disabled in the special education or inclusive setting. Provision for hands on activities and use of cooperative learning strategies.

Three credits

787. Psycho-Educational Assessment for the At Risk and Disabled Student.

Formal and informal techniques for assessing academic skills applicable to the at risk and disabled student; observational and interviewing procedures; inventories, rating scales, standardized tests; and instruments assessing language arts and math. Students must demonstrate competence in selection, administration, scoring and interpretation of psycho-educational tests, and conferencing with parents. Opportunity for hands on experience with data analysis and software. Course conducted in the Manhattan College Learning Center or field site. Minimum of 12 hours of supervised clinic/fieldwork.

Three credits

789. Methods of Teaching the At Risk and Disabled Student (Grades K-8).

Examination of N.Y.S. Content and Performance Standards, curriculum, methods, and materials applicable to at risk and special education students grades K-8; emphasis on the modification of materials and strategies for instruction in general, special education and inclusive classrooms. Students must demonstrate competence in the writing and implementation of an educational prescription, and conferencing skills with parents. Opportunities for hands-on experiences with materials and instructional software. Course conducted in Manhattan College Learning Center or field site. Minimum of 14 hours of supervised teaching.

Three credits

791. Independent Study in Special Education.

Independent project in area of Special Education conducted under the guidance of faculty member. Student must submit outline of proposed study prior to registration. Permission of the Director of Special Education Program required.

Three credits

799. Administration and Supervision of Special Education Programs.

Theory and practice of special education administration and supervision; review of legislation and regulations regarding Committee on Special Education, Individualized Education Program, inclusion and placement; effective practices related to supervision of teachers; and staff policies, records, reports, pupil personnel, instructional programs. Satisfies the requirement for Child Abuse and S.A.V.E. legislation.

Three credits

800. Internship in Community Counseling.

Participation in onsite counseling experiences under the supervision of agency personnel and faculty of Manhattan College. The nature of the experience will be determined by the area of specialization and agency placement. *Prerequisite: Matriculation in P.D. Program, 21 credits and permission of Program Director.*

Three credits

802. Foundations, Theory and Practice of Bilingual General and Special Education

This course examines the basic foundations, theories and practices related to bilingual education including the historical, political, and legal foundations. Theories, literature, and research related to multicultural practice as educators and/or counselors will be explored. The course will also include exposure to the social and cultural foundations of ethnicity, race, and gender as they relate to practice as teachers or counselors. Different models of bilingual programs including their psycholinguistic principles will be explored.

Three Credits

805. Integrated Learning I: Social Studies and Language Arts Instruction for the At Risk/Disabled Student (Grades K-8).

Constructivist approach to integrating Social Studies and Language Arts curriculum using instructional technology. Curriculum based upon N.Y.S. Content and Performance Standards in American History and Language Arts for grades K-8. Highlighted are best practices for differentiating instruction for all learners with emphasis on the at risk and disabled. Examination of issues and themes from multiple perspectives with emphasis on cultural differences.

Three credits

806. Inclusive Practices for the Disabled Student.

Examination of: research and legislation; different models; effective practices of collaboration, team building, management, grouping, instruction; adaptation of materials and differentiated instruction to facilitate learning for the disabled student.

Three credits

807. Measurement and Appraisal for Counselors.

Theoretical, methodological, sociocultural, and ethical factors in the interpretation of psychological test data will be studied. An examination of basic measurement fundamentals such as types of tests and scores, reliability and validity, and essential statistical concepts will be followed by a focus on the assessment of intelligence, abilities, achievement, and personality. Specific emphasis will be on the interpretation and integration of test scores for individuals. Ethical considerations in appraisal will also be addressed.

Three credits

808. Integrated Learning II: Social Studies and Language Arts Instruction for the At Risk/Disabled Student (Grades K-8).

World history, civics, and geography, integrated with the development of literacy skills and exploration of literacy genres for grades K-8. Incorporation of skills pertinent to Social Studies and Language Arts. Utilization of instructional technology as an instructional tool for learning. Curriculum based upon the New York State Content and Performance Standards. Review of research on teaching the at risk and disabled student. Learning presented utilizing the constructivist approach for interdisciplinary instruction. Highlighted are best practices for differentiated instruction. Use of field trips to explore concepts. Emphasis on investigation of issues from different cultural perspectives.

Three credits

809. Organization, Administration and Supervision of Physical Education Programs.

Theory and practice of administration and supervision of physical education instruction for general and special education students in elementary and secondary schools; review of legislation and requirements; discussion of developmentally appropriate practice; effective practices related to the selection, training, and supervision of personnel; integration of lifelong learning and practice of healthful behavior including nutrition and exercise; and policies, record keeping, reporting, instructional strategies, materials, and programs. Satisfies the requirement for Child Abuse Recognition and Reporting.

Three credits

810. Bilingual and Multicultural Assessment of Linguistically and Culturally Diverse Students

This course will focus on the development of competencies in multidisciplinary assessment of linguistically and culturally diverse students with a specific emphasis on general and special education with lim-

ited English proficiency (LEP). The course will also focus on the relationship between the linguistic and cultural influences of major racial and/or ethnic groups and their communication patterns. Formal and informal assessment of behavioral functioning and its relationship to academic functioning is included. Non discriminatory assessment and the development of both an instructional plan (IEP) and a related counseling plan will be required of counselors and Special Education teachers. Includes a 10 hour clinical requirement. *Three Credits*

811. Brain Compatible Learning for the At Risk and Disabled Student.

Overview of brain development research and theory; impact on learning; and application to classroom instruction for the at risk/disabled student. Opportunity for hands-on experience with materials and methods of brain compatible instruction. *Three credits*

812. Integrated Curriculum: Math, Science and Technology II for the At Risk and Disabled (Grades K-8).

Examination of Science, Math and Technology Content and Performance Standards and curriculum for at risk and disabled students for grades K-8. Review of research on teaching and learning presented utilizing the constructivist approach. Utilization of instructional technology, as an integral component of the instructional process. Focus on best practices for differentiated instruction to meet the needs of the at risk and disabled student. Use of cooperative learning strategies and technology to enhance teaching and learning. Exploration of concepts and strategies for enhancing instructional leadership. Opportunities for hand-on experience with materials and instructional technology. *Three credits*

813. Curriculum, Methods, and Materials in Core Subjects for Bilingual, General, and Special Education Students (native language and English)

Focus on instructional methods, materials and strategies for teaching standards based Social Studies, Language Arts, Math and Science using native language and English for the Bilingual, General and special education students. Exploration of instructional practices that meet the developmental and educational needs of the Bilingual English learner. Attention to cross cultural learning style that impacts instruction with emphasis given to differentiating and adapting instruction to meet educational and linguistic characteristics of bilingual general and special education students. (10 hours of observation in a bilingual/ special education setting) *Three Credits*

814. Curriculum Assessment and Methods of Teaching Native Language Arts in General and Special Education

Exploration of teaching methods, material, and assessment for teaching Language Arts using native language and English. Examination of strategies incorporating listening, speaking, reading, and writing in native language as they transition to English. Commercial and student made materials and assessment instruments explored. Attention to cross cultural learning style that impacts instruction with emphasis given to differentiating and adapting instruction to meet educational and linguistic characteristics of Bilingual, general and special education students (15 hours of observation in a Bilingual/Special Education setting) *Three Credits*

815. Curriculum, Assessment and Methods of Teaching English as a Second Language in General and Special Education

Examination of instructional practices to enhance the acquisition of English Language Proficiency focusing on listening, speaking, reading, and writing. To meet ESL learning standards. Commercial and student made materials explored. Focus on informal and formal assessment instruments, such as NY-SESLAT addressed. Attention to cross cultural learning style that impacts instruction with emphasis given to differentiating and adapting instruction to meet educational and linguistic characteristics of bilingual, general and special education students. (15 hours of observation in Bilingual/ Special Education setting) *Three Credits*

816. Approaches to Counseling Linguistically and Culturally Diverse Student

This course will focus on the development of general techniques for counseling and the use of techniques specifically applicable to diverse populations and populations who are linguistically different. A case study approach will be used. *Three Credits*

817. Cross Cultural Counseling: Multicultural Issues in the Schools

This course will focus on issues in multicultural counseling in urban multiethnic educational and human services settings. Awareness of and sensitivity to social and cultural influences in counseling and in consultation services provided by counselors will be emphasized. Included will be exploration of characteristics of clients from diverse ethnic groups and their impact on counseling strategies. Course will include an experiential assessment component and consultation. *Three Credits*

818. Internship: Bilingual and Multicultural Interventions for Linguistically and Culturally Diverse Students

Provides the student with an experience in gaining more knowledge of and experience in providing appropriate interventions to culturally and linguistically diverse clients. Case conceptualization and consultation, and understanding of leadership and organizational roles in relation to providing best practices for optimal schooling for culturally diverse and linguistically different students. *Three Credits*

819. Internship in Mental Health Counseling I.

Participation in on – site counseling experiences under the supervision of licensed or certified Mental Health Counselors, Social Workers, psychologists, or Medical Doctors in agencies, community centers, hospitals, and in certain instances, schools. Supervision and integrating seminar given by Manhattan College Faculty. *Prerequisite: Matriculation in Mental Health Master's, completion of EDUG 732, Completion of major paper, 30 credits and permission of Program Director. Three credits*

820. Consultation in the Schools.

Consultation skills for the general education teacher, special educator, support staff and school administrator. Analysis of various theories and models of school consultation. Review of current research strategies and supervised practice of observational, interactive communication, and collaborative problem solving skills for systems change. Laboratory and/or field experience required. *Prerequisite: Permission of the Director of Special Education. Three credits*

822. Differentiated Instruction for the At Risk and Disabled (Grades K-8).

Exploration of NYS Content and Performance Standards and sequence of curriculum for grades K-8. Techniques for adapting curriculum to meet the needs of the at risk and disabled student; strategies for bridging the gap between curriculum and methodology in special education and general education; and use of technology as a tool for learning and teaching. Strategies for grouping and individualization. Fundamentals of lesson planning stressing differentiated instructional practices. Provision for hands-on experience with materials and software. *Three credits*

835. Proficiencies for Educational Leadership.

Skills and strategies for creating the learning community that characterizes the quality school; group processes for shared decision-making and collaboration with staff and parents; communication skills for dealing with the school constituencies; case studies, simulations. Based on NYS Essentials for School Leaders. Course related leadership experience required. *Prerequisite: 735 or permission of Program Director. Three credits*

836. Issues in School Based Management, Supervision and Curriculum.

Through case studies, simulations, role play, and web resources, participants will plan to deal with pertinent issues arising from questions, advantages and obstacles to school based management, including but not limited to, school choice, parent and teacher involvement, goal driven instruction and delivery of instructional services, use of technology; financial and strategic planning. *Three credits*

837. Organizational Development.

Exploration of change factors and their effect on human behavior and interrelationships; effect on the school social system; leadership skills required for participatory decision-making; dealing with conflict and strategies for conflict resolution; power issues related to empowerment, authority, responsibility and accountability; and creating and developing the learning community. School wide development plans, school leadership teams, data-based strategic planning. Course related leadership experience required. *Three credits*

838. Evaluating Leadership Effectiveness.

Skills and strategies for determining needs, outcomes, and program effectiveness. Involving constituencies in assessing school effectiveness vis a vis student achievement, values promotion, ethics, accountability, staff participation; promoting parent and local board inclusion in philosophy and goal setting; and evaluating the quality of educational programs, supportive environments and school climate; exploration of the essential characteristics of school leaders in assisting students to meet state standards. Course related leadership experience required. *Three credits*

839. School Finance.

Issues for administrators, business managers, and other school personnel related to budget, finance and accounting. *Three credits*

841. Leadership, Administration and Supervision of the Middle School.

Theory and practice of school administration and supervision; organizational characteristics and components of the successful American middle school; effective practices related to advisement, staff collaboration, teaching teams, developmentally appropriate instructional programs for the middle school child, standards based teaching and learning, authentic assessment, guidance of the early adolescent, student engagement, parent involvement, safety and discipline issues, evaluation of student progress, career guidance. *Three credits*

842. Leadership, Administration and Supervision of the Secondary School.

Theory and practice of school administration and supervision; organizational characteristics and components of the successful secondary schools; consideration of cross cultural and international practices related to student achievement and involvement in learning; scheduling, advisement, collaboration, teaming, apprenticeships for the secondary school student; standards based teaching and learning, authentic assessment, guidance of the adolescent, safety and discipline issues, evaluation of student progress career guidance/internships/ developmentally appropriate service projects. *Three credits*

844. School Based Management Functions.

Analysis, discussion, intensive study of the evolution of educational reform movements leading to site based management for administrative and supervisory personnel; theory, principles and practices for team building, shared decision-making and relationships at the local, district, and system levels. Participants present evidence of knowledge, skills and dispositions for school building leadership. Course project integrates theory, concepts, principles and application of content to elementary, middle, or secondary school leadership in urban and suburban settings; includes strategic planning, collaboration and evaluation of outcomes for school leadership teams, board relationships, mentoring, and program development. Course related leadership experience required. *Three credits*

845. Computer and Technology Utilization for Instructional Delivery.

Role of the supervising teacher, consultant, and/or school administrator in improving teaching/learning by survey of computer programs for curriculum enhancement. Strategies for staff development/collaboration to assess effectiveness of such programs. Use of state standards for curriculum planning and instruction. Field experience will include exploration

of existing programs utilizing computers to improve instruction. Opportunity for hands-on experiences (lab) to investigate software and hardware. Course related leadership activities required. Prerequisites: EDUG 749, 745 or permission of Program Director. *Three Credits*

846. Managing the Quality School.

Applying concepts, principles, and techniques of Total Quality Management with emphasis on application to managing a school or district; using TQM to enhance management of the educational enterprise on the local or district level and administrative leadership. Course related leadership experience required. *Three credits*

847. Total Quality Management for Educational Leaders.

Course participants engage in reflective practice on ways to provide leadership for quality management in the school or district setting. With "real life" needs to attend to, potential and practicing school and district administrators will design strategies for data driven decision making based on TQM concepts, principles, and techniques for school and district wide improvements of student learning. Course related leadership experience required. *Three credits*

848. Standards Based Performance Assessment.

This advanced assessment course for school and district administrators, chairs, subject area coordinators, considers the effectiveness of the school program and teachers in meeting learning standards for the content areas. Relates student outcomes to standards, school programs and performance assessment of teaching; aligns standards, curriculum, and assessment to design student learning experiences. Course related leadership experience required. *Three credits*

849. Advanced Computer Applications for School Administrators.

Computerizing school offices; the selection and evaluation of interactive computer software for professional development, supervision, and improvement of instruction; use of technology for data based decision making. Selection of software and hardware for networking, internal and external communication. *Prerequisite: EDUG 749 or permission of Program Director.* *Three credits*

850. Advanced Practicum for Counselors in Group Procedures.

Advanced counseling practice with groups under the supervision of the faculty; seminars, supervisory conferences and consultations; group experiences. *Prerequisite: EDUG 725, 33 credits and permission of Program Director. Three credits*

851. Mentored Research in Counseling.

This course advances the student's skill in engaging in research and in evaluating research. Students complete a Master's paper in research conducted in the student's chosen area of specialization – elementary school, secondary school or non-school counseling. Permission of Program Director. Completion of project required for admittance into Practicum for School Counseling students. *Three credits*

852. Internship in Counseling I.

Participation in on-site counseling experiences under supervision of pupil personnel services staff of host school, agency or hospital and faculty of Manhattan College. *Prerequisite: Matriculation in P.D. or Mental Health Master's and completion of EDUG 732, 21 credits and permission of Program Director. Three credits*

853. Counseling the College Applicant.

Examination of the necessary components in the college admissions selection process, i.e. high school preparation, standardized test scores, advanced placement credit, career preparation and counseling, financial aid, special programs, academic criteria, and personal statement. Review of the various guides and technological information available to the counselor and applicant, i.e. Internet, Rezun, College Board, Peterson's College View and College Link. *Three credits*

854. Supervised Fieldwork in Counseling.

Opportunity for students to strengthen their knowledge and skills in the counseling setting. Students work under the supervision of a faculty member in an approved placement with individualized supervision regarding cases. Minimum of 90 hours in the field, project and supervision required. Matriculation in the Counseling program; EDUG 721, 722; and permission of Program Director. *Three credits*

855. Supervised Fieldwork in Special Education.

Opportunity for students to strengthen their knowledge & skills in the special education or inclusive setting. Students work under supervision of a faculty member in an approved placement. Minimum of 75 hours in the field and project required. Matriculation in the Special Education Program, and permission of the Director of Special Education. *Three credits*

856. Supervised Fieldwork: General and Special Education.

Opportunity for students to strengthen their knowledge & skills in the special education or inclusive setting. Students work under supervision of a faculty member in an approved placement. Minimum of 50 hours in the general education classroom and 25 hours in the special education/inclusive classroom required. Matriculation in the Special Education Program, and permission of the Director of Special Education. *Three credits*

857. Supervised Fieldwork in Alcohol and Substance Abuse Counseling.

Opportunity for students to strengthen their knowledge and skills in an alcohol/substance abuse setting. Students must work under the supervision of a faculty member and appropriate on site staff in an approved setting. Minimum of 100 hours in the field and project required. Matriculation in the Alcohol/Substance Abuse program; EDUG 705, 721, 722 and permission of Program Director and Director of Graduate Education. *Three credits*

858. Seminar, Observation and Internship in Special Education [5 Year Program].

Observation and practice teaching to meet specific requirements to gain proficiency in teaching disabled students in the Special Education and/or Inclusive classroom. (Full-time student teaching for one semester.) Students must demonstrate teaching competence under the supervision of the teacher in the field and a faculty member. Seminar sessions include the discussion of: Behavior Management, New York State Content and Performance Standards, differentiated instructional strategies, Child Abuse Recognition and Reporting and SAVE requirements, diversity and current issues in the field of Special Education. Student teaching logs, journals, and special education program portfolio required. *Prerequisite: Matriculation in the five-year program, minimum G.P.A. 3.0 and meet the physical, mental, speech, language and other standards established for the profession. Permission of the Director of Special Education. Three credits*

859. Approaches to Multicultural Counseling: Theory and Practice.

An examination of the theories and practices of multicultural counseling in urban multiethnic educational and human services settings. Awareness of and sensitivity to cultural factors in counseling and in consultation services provided by counselors will be emphasized. Course will include an experiential component and consultation. *Three credits*

860. Teaching Literacy for Understanding to At Risk and Disabled (Grades K-8).

Examination of the knowledge and skills to implement standards-based literacy instruction with the at-risk and disabled student for grades K-8. Opportunities provided to discuss and create literacy curriculum which address issues such as identifying what students need to understand; how to help develop the understandings; how to gauge student progress; and how to provide feedback to students. *Three credits*

862. Seminar/Practicum in Teaching the Student with Disabilities 1-6.

Analysis of current problems, equity and legal issues, differentiated instructional strategies and trends in Special Education. Students must demonstrate satisfactory teaching competency under supervision of appropriate personnel in the field. Satisfies the requirement for S.A.V.E. and Child Abuse Recognition and Reporting. Minimum of 50 hours of supervised teaching at the 1-6 grade levels in Special Education/inclusive classroom. Student teaching logs, journals and special education program portfolio required. Prerequisite: Matriculation in the Special Education program, minimum G.P.A. 3.0 and meet the physical, mental, speech, language and other standards for the profession. Permission of the Director of Special Education. *Three credits*

863. Seminar/Internship in Teaching: General and Special Education 1-6.

Observation and practice teaching to meet the specific requirements to gain proficiency in teaching general and special education. A minimum of 20 days of student teaching in grades 1-3 or 4-6 in the special education or inclusive classroom is required. A minimum of 20 additional days of student teaching, at a different level (1-3 or 4-6), in the general education classroom is required, for a total of 40 days. Students must demonstrate teaching competence under the supervision of the teacher in the field and a faculty member. Seminar sessions include discussion of: behavior management, N.Y.S. Content and Performance Standards, differentiated instructional strategies, diversity and current issues in the field of Special Education. Satisfies the requirement for S.A.V.E. and Child Abuse Recognition and Reporting. Internship journals, logs and special education program portfolio required. Prerequisite: Matriculation in the Dual program, minimum G.P.A. 3.0 and meet the physical, mental, speech, language and other standards for the profession. Permission of the Director of Special Education. *Three credits*

864. Counseling the College Student.

This course is designed to focus on the theory, research and practice related issues relevant to the psychological; development of college students. Focus on intellectual, psychosocial, moral and vocational development with attention to the needs of special populations. Students will examine a service model including collaboration within and outside the institution and including examination of the legal and ethical issues related to counseling the college student. *Three credits*

866. Practicum in Leadership, Supervision and Consultation in Counseling.

Leadership, supervision and consultation provides the student with an experience in learning to facilitate the further professional development of a counselor-in-training. Although one goal is to prepare the experienced counselor in skills to supervise, the primary focus is on the ability to establish and develop counselor-supervisor relationships, case conceptualization and consultation, and understanding of leadership and organizational roles in relation to counseling sites. *Three credits*

867. Professional Orientation to Counseling: Standards, Law, Ethics, and Evaluation.

This course is designed for the beginning practitioner to provide exposure to issues related to professional functioning. Emphasis will be on ethical and legal issues as they relate to the profession of counseling and to each other. In addition the legal and ethical factors related to program development and evaluation will be considered. *Three credits*

868. Integrated Curriculum; Math/Science/Technology.

For District and School Administrators, department chairs, grade level and subject area coordinators, curriculum, and staff developers, this content based course incorporates content and performance standards from Math, Science and Technology, as well as literacy standards for differentiating instruction for a diverse student population including English language learners; data based evaluation strategies, and system wide decision making based on NYS content areas. *Three credits*

869. Integrated Curriculum; Social Studies/Language Arts.

For District and School Administrators, department chairs, grade level and subject area coordinators, curriculum, and staff developers, this content based course incorporates content and performance standards from English, Language Arts, Social Studies and Physical Education/Home Ec/Careers, as well as literacy standards for differentiating instruction

for a diverse student population including English language learners; data based evaluation strategies, and system wide decision making based on NYS content areas. *Three credits*

870. TQM: Quantitative Process Control in Education.

This course for district and school leaders and educators identifies key data analysis processes, roles of components and variations present in them. Using Pareto charts, histograms, control charts and other data mining tools, participants measure and count key data to develop a Plan, Do, Study, Act methodology to improve the administrative and educational process in the schools and district. Course related leadership experience required. *Three credits*

872. Probability and Statistics Using Technology.

This is a content course in Probability and Statistics for teachers. Topics include descriptive statistics, rules of probability, sampling distributions, statistical inferences, regression and correlation. Technological tools used include calculators, spreadsheet package Excel, the computer algebra Maple, and the classroom management system Blackboard. *Three credits*

873. Theory and Practice in the Middle Schools for the At Risk and Disabled Student.

Emphasis on research and theory relevant to the physical, cognitive, social and emotional development of the Middle School adolescent. Examination of developmentally appropriate practices in the Middle School. Overview of organizational patterns that take into account the developmental needs of the At Risk and disabled Middle School student in today's multicultural society. Different approaches to scheduling, advisement and grouping analyzed. Strategies that facilitate parental involvement explored. Review of innovative practices and current issues in Middle School education. *Three credits*

874. Curriculum and Pedagogy in the Middle Schools for the At Risk and Disabled Student.

Examination of standards based Middle School curriculum with emphasis on an integrated approach to instruction for the At Risk and disabled student. Exploration of learning and teaching within a multicultural context. Emphasis on developmentally appropriate methods, and instructional materials to enhance learning. Study of techniques and differentiated instructional strategies to adapt curriculum to meet the at risk needs of the At Risk and disabled

students in the special education, inclusive and general education classrooms. A minimum of 30 hours of clinical and/or field work required. *Three credits*

875. Foundations in Learning and Teaching with Technology.

The foundation course provides participants with background for integrating technology into education (societal issues, learning theories, planning and implementation); principles and strategies for using software, media tutors and tools (instructional and productivity software, multimedia and hypermedia); and integrating technology into specific teaching/learning discipline (language arts, science, math, social studies, art, music, physical ed, health, special education etc.) Designed for educational administrators, staff developers, counselors, general and special education teachers and professionals from other fields. Participants will learn to infuse the appropriate technologies into their own learning environment. Field experience required. *Three credits*

876. Integrating Technology in Adult Learning and Collaboration

Participants in this course will gain knowledge and understanding of adult learning theory and the ability to collaborate with professional staff to support instruction and enhance student learning using educational technology. Designed for educational administrators, staff developers, counselors, general and special education teachers and professionals from other fields. Participants will engage in web design and videography. Field Experience. *Three credits*

877. Instructional Design, Technology and Information Processing.

Focus on instructional design and the role of cognitive processing theory in the development of technologies for learning environments. Emphasis on curriculum and how participants best learn from multimedia technologies. Knowledge and understanding of adult learning theory provides the foundation for the development and implementation of collaborative strategies appropriate for adult learners. Designed for educational administrators, staff developers, counselors, general and special education teachers and professionals from other fields to enable them to integrate technology into professional practice in order to provide optimal learning content. Field Experience. *Three credits*

878. Advanced Group Counseling: Practice.

An experiential course that focuses on application of group process to different counseling situations. Team projects will include facilitating and co facilitating techniques, appropriate interventions and peer feed-

back. Participants will run outside groups and receive feedback and analysis. Group leadership styles will also be reviewed. *Three credits*

879. Integrative Project and Seminar in Teaching and Learning with Technology.

This capstone course in Teaching and Learning with Technology synthesizes the theoretical and technology components of the program. Participants will present a project that includes a research component conducted at a field site and demonstrate their understanding of teaching and learning with technology. Online and real time seminar sessions will provide support for effective needs assessment and strategic planning for the improvement of teaching and learning. This guided project will be a culmination of sixty hours of fieldwork done in the certificate courses. Designed for educational administrators, staff developers, counselors, general and special education teachers and professionals from other fields. Field Experience. *Three credits*

880. Nature and Needs of Students with Autism Spectrum Disorder.

Focus on etiology, major trends and issues concerning Autism Spectrum Disorder. Emphasis on: collaboration, inclusion, service delivery models, roles of special and general education teachers, individualized educational programs, family involvement, and community resources. *Three credits*

881. Psychoeducational Assessment of Autism Spectrum Disorder.

Focus on the educational assessment of students with Autism Spectrum Disorder. Analysis of formal and informal assessment instruments. Emphasis on gathering and analyzing information in order to plan meaningful instruction, evaluate interventions, select appropriate learning curricula and materials, and make appropriate educational decisions for individuals with Autism Spectrum Disorder. *Three credits*

882. Behavior Management and Counseling of Families of Individuals with Autism Spectrum Disorder.

Focus on models for the behavior management of students with Autism Spectrum Disorders. Emphasis on management techniques, classroom and family organization, conferencing issues based on student needs and development. *Three credits*

883. Curriculum, Methods, Social Skill Development and Instructional Design for Students with Autism Spectrum Disorder (Grades K-8).

Curriculum, methods and materials for social integration and teaching children with Autism Spectrum Disorder in self-contained and inclusive settings with attention paid to NYS Content and Performance Standards (K-8). Design of individualized educational plans and creation of lesson plans. Demonstration of teaching skills emphasized in order to accommodate instruction and materials to the Autism Spectrum Disorder student. *Three credits*

884. Integrative Project in Autism Spectrum Disorder.

Project in area of Autism Spectrum Disorder conducted under the guidance of Faculty member. Student must submit an outline of proposed study prior to registration. Permission of the Director of Special Education required. *Three credits*

885. Internship: Teaching Students with Autism Spectrum Disorder.

The internship experience and seminar provide the opportunity to apply knowledge, skills and strategies related to teaching children with Autism Spectrum Disorder in the classroom setting. Each internship is guided by a certified teacher and college supervisor. Students will develop teaching competencies while experiencing the personal and professional roles of a teacher of students with Autism Spectrum Disorder. The seminar is an opportunity for students and faculty to discuss current issues and ideas related to Autism Spectrum Disorder and to examine the relationship between these ideas and the classroom experiences. Internship portfolio, logs and journals required. *Three credits*

888. Mentored Research.

Designed to provide mentoring for the collection of data, analysis of findings, discussion, conclusions and recommendations of the research paper. Students must have completed sections I, II and III of their major paper. Special Education and School Leadership participants register for the section designated for their program. Does not apply to the degree. *Prerequisite: EDUG 713. Permission of the Program Director. One credit*

889. Internship/Seminar II in School Building Leadership.

This course is a continuation of EDUG 748 Internship/Seminar I in School Building Leadership. Participants complete 15 hours of seminar and at least 200 hours of supervised field experience so that the total Internship experience comprises a minimum of 400 hours of supervised field experience. Prerequisite: Internship/Seminar I in School Building Leadership; permission of the Program Director.

Three credits

890. Implementing Continuous Improvement in Schools.

Participants in this field based course will use Total Quality Management theory, principles and methods to design and undertake an improvement project in the classroom, school or district. This will involve process definition, operational definition of components and desired outcomes along with determination of appropriate data. Participants will use the PDSA model for improvement by collecting, analyzing and interpreting the data to bring about improvement in the district, school or grade level. Participants will work at the school or district level and document results of the 15 week full-time or 30 week part-time leadership experience. *Three credits*

891. Foundations in Evaluation, Assessment and Diagnosis

This foundation course is aimed at providing a theoretical and practical basis for individual assessment of personality, intelligence and aptitude, such as WISC-IV, WAIS-III, WIAT-II and TAT. Concepts of intelligence, applications to the educational settings, social and ethical issues of individual testing will be considered. Initial practice in administering major instruments of psychological assessment will allow students to develop an understanding of their diagnostic and therapeutic value. Theory of projective psychology and its application to personality assessment is combined with supervised practice in administering and interpreting projective tests. Special attention to figure drawings and TAT, but projective component of Bender-Gestalt Visual-Perceptual Test is also included. The course provides initial experience in evaluation, assessment, diagnosis and treatment planning. Students will practice by administering the instruments to each other. Focus will be on integrating test material into comprehensive reports having meaning for the referral source and the client. *Prerequisite: 18 credits in P.D. program.*

Three credits

894. Internship in Counseling II

Continued participation in on-site counseling, experiences under the supervision of certified or licensed personnel of host school, agency or hospital. Particular emphasis on case assessment, analysis, diagnosis, recommendations for services, and the delivery of planned interventions. *Prerequisite: Matriculation in P.D. program, successful completion of 24 credits and EDUG 852, and permission of Program Director.*

896. Concepts of Wellness.

A study of the diversified nature of health as it relates to everyday living by examining vital health areas and issues relevant to the concerns of students. An introduction to identification and reporting of suspected child abuse and maltreatment; instruction in preventing child abduction and abuse of alcohol, tobacco and other drugs; and providing safety education including instruction in fire and arson prevention. (Dual M.S.Ed.)

Three credits

897. Principles and Practices of Education.

Crucial issues in education: curricula objectives and designs, drug and child abuse, types of schools, special education programs, moral and spiritual values, community resources, educational law and school finances. 15 hours field visitation required. (Dual M.S. Ed)

Three credits

898. Techniques for Language and Literacy Development.

Introduction to language acquisition and literacy development by native English speakers and students who are English Language Learners. Techniques for developing and listening, speaking, reading and writing skills. 10 hours of field required. (Dual M.S. Ed)

Three credits

899. Physical Science for the Teacher of the At Risk and Disabled (Grades K-8).

Introduction to basic principles and concepts of physical science as aligned with the N.Y.S. Learning Standards for grades K-8. Emphasis is on constructivist inquiry based problem solving, methods and materials appropriate for the at risk and disabled student. Appropriate hands-on activities to illustrate fundamental concepts.

Three credits

SCHOOL OF ENGINEERING GRADUATE PROGRAMS

Graduate Engineering Calendar 2009 - 2011

Day and Evening

Fall Semester 2009*

August	31	Monday	Engineering Classes begin
September	07	Monday	No Classes – Labor Day
October	12	Monday	No Classes – Columbus Day
	13	Tuesday	Monday Class Schedule
November	25-27	Wed-Fri	No Classes – Thanksgiving Holiday
December	18	Friday	Last Day of Graduate Classes

Spring Semester 2010*

January	25	Monday	Engineering Classes Begin
March	15-19	Mon – Fri	Spring Recess – No Classes
April	2-5	Fri – Mon	No Classes – Easter Holiday
May	11	Tuesday	Friday Schedule
	19	Wednesday	Last Day of Graduate Classes
	26	Wednesday	Graduate Commencement

Fall Semester 2010*

August	30	Monday	Engineering Classes begin
September	06	Monday	No Classes – Labor Day
October	11	Monday	No Classes – Columbus Day
	12	Tuesday	Monday Class Schedule
November	24-26	Wed-Fri	No Classes – Thanksgiving Holiday
December	17	Friday	Last Day of Graduate Classes

Spring Semester 2011*

January	24	Monday	Engineering Classes Begin
March	14-18	Mon – Fri	Spring Recess – No Classes
April	22-25	Fri – Mon	No Classes – Easter Holiday
May	18	Wednesday	Last Day of Graduate Classes
	25	Wednesday	Graduate Commencement

*Subject to changes.

Tuition and Fees (2009–2010)*

Tuition and other fees are payable by mail or in person at the Bursar's Office, Miguel Hall, at or before the time of registration. Check or money order should be made payable to Manhattan College.

Regular Fees*

Application for all students (nonrefundable)	\$60.00
Registration per term (nonrefundable)	\$75.00
Graduate Tuition per credit	\$745.00
Tuition per credit for Undergraduate courses	\$680.00
Graduation fee (required of all students who will be graduated)	\$300.00
Telecommunications Fee (per term) (For students enrolled for 5 or more credits)	\$105.00

Special Fees*

Reactivation of Matriculation	\$50.00
Returned check fee	\$75.00
Off-campus courses	\$125.00
Deferral Fee	\$100.00
Each transcript of record from Registrar	\$5.00
Finance charge (per month on overdue balance)	1%

**Subject to change.*

ENGINEERING PROGRAMS

Mission

The mission of the Manhattan College School of Engineering is to prepare students for a productive and rewarding career in engineering or a related profession.

Through Engineering Graduate Degree Programs and Graduate Engineering Certificates, the School of Engineering seeks to provide the academic and professional needs of those who are already engaged in engineering (or related) professions or those who, having completed their undergraduate preparation, desire to enter immediately into advanced study. Post-baccalaureate programs offered by the School of Engineering are intended to prepare professionals for advanced level technical and administrative positions or for admission to doctoral programs at other institutions. All these programs lead to the Masters Degree and are available on a full-time or a part-time basis and also through the School of Engineering Seamless Master's Program. Courses are generally conducted in the late afternoons or early evenings during the fall and spring sessions. Distance learning opportunities and Continuing Education Hour (CEH) opportunities for PE licensed registration are also available.

Application Procedures

Application forms for admission to all programs in the School of Engineering may be obtained from the Office of the Dean of the School of Engineering, from the School of Engineering web site (www.manhattan.edu/academics/engineering/), or from the Office of Admissions. The completed form accompanied by the application fee (non-refundable) must be submitted to the Office of Admissions. Applicants for admission are responsible for having official transcripts of all undergraduate and graduate courses mailed directly to the Office of Admissions, paying the application fee, submitting letters of recommendation, and submitting required standardized test scores.

Official transcripts (not student copies) of all undergraduate and graduate records must be sent to the Office of Admissions by the institutions issuing them. Applicants who file an application before the baccalaureate degree has been conferred may be accepted pending the successful completion of their undergraduate work. A final transcript must be received in the Office of Admissions prior to course registration.

Graduates of Manhattan College should write to the Office of the Registrar requesting that an official transcript be sent to the Office of Admissions.

An application is not complete until all the necessary materials and application fee have been received by the Office of Admissions. Incomplete applications cannot be processed. Students who file an application and whose official transcripts arrive after the deadline date cannot be assured that their application will be processed in time for the semester for which they are applying.

Filing of the graduate application should be completed before May 1st for summer session application; August 10th for fall session applicants, and January 7th for spring session applicants. Students seeking admission into the full-time Engineering programs must have their application for the fall session completed by March 1st if they are applying for a fellowship or scholarship for the fall semester.

A committee of the Engineering program for which a person is applying reviews the application and supportive documents and forwards a recommendation to the Office of the Dean of the School of Engineering. That Office then informs the applicant of the decision. Those who have been accepted will receive the instructions for registration at the beginning of the session for which they have been accepted.

The documents submitted in support of application cannot be returned to the applicant nor can they be duplicated for any purpose. All documents received are part of the records of the College.

Admission

Applicants for admission into any graduate program in the School of Engineering must hold, before beginning graduate courses, a baccalaureate degree from an accredited college or institution acceptable to Manhattan College. In addition, they must meet the specific requirements as stated in the introduction to the respective programs. Normally, an undergraduate grade point average of 3.00 on a 4.00 scale is required, although other factors can be considered in the decision for admission. Applicants may be requested to take the Graduate Record Examination for certain programs.

Admission into graduate Engineering programs will be granted as a matriculated student, one seeking to fulfill the requirements for a degree. A student may be granted permission to take an approved graduate course on a non-matriculated basis or, in special cases, as an auditor. A non-matriculated student is one earning graduate credit for a specific course but not necessarily working for a degree. For example, the student may be interested in earning a Graduate Engineering Certificate (see below for details). For both non-matriculated and auditing students, tuition and fees are the same as for matriculated students.

A student who lacks undergraduate prerequisites for a specific program may be asked to complete satisfactorily certain undergraduate (bridging) courses as a non-matriculated student. When these courses are completed satisfactorily, the student may be admitted to matriculation.

Students requesting to take graduate courses as a non-matriculated student must have the necessary prerequisites for those courses. Students may not register for more than 12 credits as a non-matriculated student without the permission of the Dean of the School of Engineering.

All students must comply with immunization regulations as previously stated in the introductory section of the catalogue.

Students who take graduate courses at Manhattan College on a non-matriculated basis and apply thereafter for admission to a graduate program as a matriculated student will be informed at the time of acceptance which courses may be applied to that degree program.

Students who have earned a master's degree or who are pursuing a master's degree in one Engineering program from Manhattan College and desire to seek admission into another program must file a new application with the Office of Admissions.

All documents of applicants who have been accepted and who for extenuating circumstances cannot register for courses during the session for which they were admitted will be kept on file for two years. The documents will be destroyed if the applicant does not register for courses within that period.

Visiting Students

Students who are matriculated in a graduate program at another institution and who wish to take a course (or courses) at Manhattan College may do so as non-matriculated students for individual courses for which they have the prerequisites. For non-matriculated students, tuition and fees are the same as for matriculated students.

Applicants from Foreign Countries

The College accepts students from foreign countries for its full-time graduate programs in the School of Engineering. Application procedures and admission criteria and information can be found in the individual sections of the catalog. In general, the College cannot accept these students into its part-time graduate programs. The student who is accepted and receives a student visa must be enrolled in each term of the academic year for 12 credits or, in special cases, a minimum of 9 credits. Such students must complete the program within 18 months.

Applicants from foreign countries should submit their admission application, official transcripts, and the admission fee four months before the beginning of the session they wish to enter. In addition, they must submit a notarized statement that they have sufficient funds to finance their education and their maintenance. Many of the sources of financial assistance are limited to the residents of the United States.

All students applying from foreign countries must take the TOEFL (Test of English as a Foreign

Language) and have the test results sent to the Office of Admissions. A minimum TOEFL score of *0 (internet based exam), 213 (computer based exam), or 550 (paper based exam) will satisfy Manhattan College admission requirements and criteria for issuance of the I-20 form. However, admission and issuance of an I-20 form is also possible for students with TOEFL scores below 80, 213 or 550 levels for the internet, computer and paper based exams, respectively, provided they complete successfully an approved English as a Second Language course at another institution or an acceptable substitute at Manhattan College.

Foreign students graduating from a four year undergraduate engineering program in the United States accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc., will not need to submit a TOEFL exam score. Similarly, graduates of undergraduate engineering programs in English speaking countries which are signatories to the Washington Accord with the USA (<http://www.washingtonaccord.org/>), specifically Australia, Canada, Ireland, New Zealand and the United Kingdom, will not need to submit TOEFL scores.

A student from another country who is informed of acceptance must deposit \$300 which will be credited toward tuition. This fee is non-refundable if the student does not register but will be credited to his/her account for two years. When the \$300 is received, the student will be sent an I-20 form which must be presented to the United States authority to arrange for an F1 student visa.

The Graduate Engineering Core Courses

Recognizing the growing importance of professional diversity among the engineering disciplines, graduate study at the School of Engineering emphasizes both breadth and depth in our students' chosen field of study. The development of innovative graduate engineering Core courses allows students in all engineering graduate programs to enroll in courses designed to span a variety of engineering disciplines. These Core courses are taught by engineering faculty from different disciplines and emphasize inter-

disciplinary approaches to the engineering course material. Students in all programs may enroll in these Core courses thus exposing graduate students in any one discipline to students and faculty in other engineering disciplines. Permission of the Department Chair or Graduate Program Director is required to enroll in Graduate Core courses. In addition to the Core courses, each program still provides discipline specific, advanced level courses that students need to complete their specialized degree programs.

Graduate Engineering Certificates

Modern engineering practice increasingly demands integration of knowledge and expertise from more than one engineering discipline. It is often desirable for the practicing engineer to acquire specific knowledge outside their area of expertise without devoting the time and effort to earn an advanced degree. To address these needs, the School of Engineering offers a Graduate Engineering Certificate Program through which various combinations of related courses from the Engineering Graduate Core and from Departmental offerings can be used to complete the requirements for a Graduate Engineering Certificate in a particular area of study. While the Graduate Engineering Certificate is not an engineering degree, it does allow an individual, who is qualified to take the courses and meets any prerequisite requirements, an opportunity to acquire knowledge and expertise in a focused area of engineering in a relatively short period of time. Typically, an individual will be required to complete successfully three or four courses in a particular topical area to earn a Graduate Engineering Certificate. While approval of a Department Chair or Graduate Program Director is required to enroll in a graduate course, admission to the Graduate Program is not required to participate in the Certificate Program. It is expected, however, that individuals desiring to take graduate-level courses in the Certificate program will have a baccalaureate degree in either an engineering field, a science or applied science field, or mathematics. Specific information regarding Graduate Engineering Certificates is available from the Engineering Dean's Office or from individual Department Offices or on the School of Engineering website, www.manhattan.edu/academics/engineering/.

Continuing Education Hours

The School of Engineering is a New York State approved provider of Continuing Education Hours (CEH) for PE registration. The School of Engineering offers a wide range of short courses in a variety of formats (e.g., on-campus, on-site, distance delivery) for Professional Engineers to earn Continuing Education Hours. In addition, graduate courses and other offerings will also generally count as CEH's to be used for professional license registration. For details concerning short course offerings and schedules, contact the Office of the Dean of Engineering (718-862-7281) or visit the School of Engineering web site (www.manhattan.edu/academics/engineering).

Core Course Descriptions (ENGG)

610. Numerical Methods.

Formulation of numerical techniques for solution of engineering problems; typical subject material includes linear and nonlinear equations, systems of equations, boundary value and initial value problems in ordinary and partial differential equations and matrix algebra. Applications from various engineering disciplines are emphasized and computer solutions stressed. *Prerequisite: Permission of the Instructor* *Three credits*

612. Finite Element Methods.

Derivation of element equations using direct, variational, and residual methods; multidimensional problems in the steady state and transient domains; use of general purpose finite element computer programs; applications from a variety of engineering disciplines. *Prerequisite: Permission of the Instructor.* *Three credits*

614. Engineering Mathematics.

Mathematical formulation of problems of importance to engineering; solutions of ordinary and partial differential equations; mathematical series and orthogonal functions and their applications; matrix algebra; applications from a variety of engineering disciplines are emphasized. *Prerequisite: Permission of the Instructor* *Three credits*

620. Applications of Instrumentation and Data Acquisition.

Operation, application, and selection of engineering instruments for measuring common engineering variables, e.g. position, velocity, temperature, pH, force, pressure, strain, flow rate, light intensity, and concen-

tration; sensors; and data acquisition and processing. Output devices, including logic and actuator operation and selection. Computer-based data acquisition and automated analysis are considered. *Three credits*

630. System Control.

Formulation of process models; transfer functions; multivariable systems; linear control and feedback systems; stability; steady state optimal control; adaptive control; applications from a variety of engineering disciplines. *Prerequisite: Permission of the Instructor.* *Three credits*

632. Modern Engineering Computations.

Applications of contemporary computer software to increase speed, improve comprehension, and enhance presentation; of results when analyzing, modeling and solving a wide variety of engineering problems in various branches of engineering and computer science. *Prerequisite: Permission of the Instructor.* *Three credits*

640. Information Processing and Technology.

Examination of the technological issues, including design of integrated engineering information systems and environments. Topics to be taken from: the computer as an organizational information system; computer-based information system; manufacturing information systems; the virtual office; databases and database systems; knowledge-based systems; technology and role of the internet in integrated engineering information systems; organizational system theory and methodologies. *Three credits*

650. Engineering Economics.

Techniques for estimating investment and operating expenses; profitability analysis including depreciation and taxes in cash flow; methods for comparing alternate investments; market estimation and location efforts; applications from a variety of engineering disciplines. *Three credits*

652. Project Management.

Study of the content, planning, and control of an industrial project; comparison of functional management and project management, the role of the Engineering Manager, project organization structures, project planning, use of critical path methods and project control; emphasis on the project management concept and its applicability to a wide range of industrial projects; the case study method is used to examine a variety of specific management issues, e.g. staffing, controlling and directing the project, identifying and resolving critical issues, anticipating and solving team personnel problems, etc.;

various managerial decision tools and project control methods, such as CPM and PERT are discussed. *Three credits*

653. Statistics and Statistical Decision-Making.

Methods dealing with the collection, tabulation, summarization, and presentation of data. Inferential statistics; reaching conclusions and making estimates about populations based upon sample information. Hypothesis testing is explored as a basis for decision-making. Design experiments to learn more about the natural world and how to model physical relationships. Engineering quality into a product. *Three credits*

654. Quality Management for Engineers.

Methods for improving the quality of engineered products and processes. Total Quality Management (TQM), Quality Function Deployment (QFD), Concurrent Engineering, Basic Statistics, Acceptance Sampling, Statistic Process Control (SPC), Reliability, Taguchi Techniques, introduction to Quality Assurance. *Three credits*

656. Engineering Optimization.

Introduction to optimization problems; mathematical preliminaries; unconstrained nonlinear optimization; one-dimensional search methods; equality and inequality constrained nonlinear optimization; linear programming; engineering applications to cost minimization, optimum system design and operation. *Three credits*

658. Legal Aspects of Engineering.

Basic legal doctrines, professional-client relationship, design and practice problems. Fundamental concepts of contract law. Topics include American judicial system, contracts, quasicontracts, agency, licensing, client obligations, construction process, liability of engineers, copyrights, patents and trade secrets. *Three credits*

660. Engineering Ethics.

Ethical issues in engineering are examined such as whistle blowing, computer ethics, employer/employee relationships and responsibilities, use of technology and the environment, public safety, codes of ethics. Case studies are emphasized. *Three credits*

670. Pollution Prevention.

Regulations, advantages and disadvantages of pollution prevention; EPA's pollution prevention hierarchy, including source reduction, recycling, control and ultimate disposal; Multimedia approaches and total systems analysis of pollution prevention options; applications to specific processes and industries from various engineering disciplines. *Three credits*

672. Accident and Emergency Management.

Engineering process safety, including emergency planning and response; fires, explosions and other accidents; dispersion fundamentals, applications and analysis; hazard and risk assessment; legal considerations; examples from various engineering disciplines. *Three credits*

674. Green Engineering Design.

Multi-disciplinary considerations and techniques for greener engineering design; historical perspective of the industrial revolution and the impacts of industrialization; industrial activity and the environment, including energy usage and resource depletion; improved industrial and municipal (POTW) operations, including process design and development; green engineering economics, including life cycle cost assessment; design for the environment, including waste prevention, water and energy conservation, and packaging; wastewater treatment, air pollution and fugitive emissions control, and solid waste disposal methods; and, sustainable development and the role of engineers. *Three credits*

680. Advanced Strength of Materials.

Stresses in multidimensions; symmetrical and unsymmetrical bending; shear center; curved beams; beams on elastic foundation; beam columns; thin plates; torsion of noncircular sections; thin walled cylinders; general and symmetric bending of straight bars, curved beam and plates; applications from several engineering disciplines. *Prerequisite: Undergraduate solid mechanics course.* *Three credits*

682. Applied Heat Transfer.

Topics in process heat transfer including: steady state and transient conduction, free and forced convection, radiation and combined models, heat transfer with phase change; applications come from a variety of engineering disciplines and can include: design and rating of various heat exchangers, condensers and evaporators; heat pipes; solar collectors; electronic cooling, etc. *Prerequisite: Undergraduate heat transfer course.* *Three credits*

Chemical Engineering Program

Ann Marie Flynn, Ph.D.

Chair, Department of Chemical Engineering

Director, Graduate Program

Mission:

The Chemical Engineering graduate degree program is designed to offer engineers and scientists the opportunity to acquire the Master of Science in Chemical Engineering with an emphasis on practice-oriented knowledge of analysis and design.

Objectives:

The objectives of this program are to: (a) expand the students' understanding of the basic fundamentals and principles of chemical engineering; (b) expose students to contemporary advances in the areas of separations, alternative energy, water purification, biochemical and food processes, green engineering, pollution prevention and process safety, engineering management and advanced computer skills; and (c) provide opportunities for students to conduct fundamental or applied research, and to improve their oral and written communication skills.

Admission Requirements:

Applicants must possess (1) a baccalaureate degree in a chemical engineering program accredited by the Engineering Accreditation Commission of ABET, Inc., or from a recognized foreign institution; or (2) a baccalaureate degree in another area of engineering, chemistry, or biology. A minimum grade point average of 3.00 is required.

Applicants who have a baccalaureate degree in biology, chemistry, or another engineering program will be considered for admission if they present satisfactory grades in calculus I, II and III, differential equations, chemistry I and II, physics I and II, organic chemistry I and II, and physical chemistry I and II. These students can expect to be admitted and matriculate when they have completed the following bridge courses: CHML 207 Process Calculations, CHML 208 Chemical

Engineering Principles I (Fluids), CHML 305 Chemical Engineering Principles II (Heat Transfer), and CHML 321 Chemical Reaction Engineering (Kinetics) with a minimum grade point average of 3.00 with no grade lower than C. The order in which these courses are taken will be determined by the graduate director on a case by case basis. These courses will not satisfy any requirements for the Master of Science in Chemical Engineering degree. Generally, students must complete prerequisite courses before they are permitted to register for graduate courses. Exceptions require the recommendation of the Chair and the approval of the Dean of Engineering.

Degree Requirements:

All students must complete thirty credits of graduate course work including: (a) three required courses from CHMG-511, 707, 708, 713, 714; (b) two or more courses from CHMG-525, 527, 529, 539, 549, 709, 717, 727, 728, 729, ENGG-632, 670, 672, 674; (c) up to five electives from CHMG-735, 736, 742, ENGG-650, 652, or other approved graduate courses offered by the Engineering School, including the Graduate Engineering Core (ENGG) courses. All courses are to be approved by the Graduate Program Director. Students who have a baccalaureate degree in a field other than chemical engineering are required to complete CHMG 739 and CHMG 740 as part of the total thirty credits. Full-time students and Seamless Masters students who are granted industrial fellowships are required to complete a three to six credit Independent Project or Thesis (either CHMG 735, 736 or CHMG 739, 740) as part of the total thirty credits leading to an oral presentation, as well as a written report and/or peer-reviewed publication.

Course Descriptions (CHMG)

511. Transport Phenomena.

Development of the mass, energy and momentum transport equations. Use of these equations in solving chemical engineering problems. *Prerequisite: Undergraduate transport course.* Three credits

525. Biotechnology for Engineers.

Application of engineering principles to biological processes. Topics include enzyme-catalyzed reactions, kinetics of cell growth and product formation, bioreactor design and scale-up, agitation and aeration, and introduction to biological waste treatment. Includes fermentation experiments. *Prerequisite: Undergraduate reaction engineering course.* Three credits

527. Bioengineering Separations.

Presentation of the engineering aspects of separation and purification processes for biochemical and pharmaceutical products. Downstream processing is discussed, including removal of insolubles, product isolation, product purification, and polishing. *Prerequisite: Undergraduate mass transfer course.* Three Credits

529. Fuel Cell Systems and Technology.

This course will review the technical and design aspects associated with various stationary and transportation fuel cell applications. Course material will focus on electrochemical kinetics, electrode catalysis, system thermodynamics, fuel processing, and H₂ storage. Topics to be covered will include basic electrochemical principles of a unitized electrode assembly the combination of multiple unitized assemblies into a cell stack assembly, the design of fuel and oxidizer supply systems, and safety issues related to the design and operation of fuel cell power plants. *Prerequisite: Mass and energy balances, general electrochemistry and basic transport phenomena (momentum, heat and mass transfer).* Three credits

539. Industrial Catalysis I

Fundamentals and application of catalysts used in the chemical, petroleum and environmental industries. Students will learn: the application of chemistry, materials, surface science, kinetics, reactor design and general engineering as applied to making everyday products; how catalysts allow the effective production of transportation fuels, modern catalytic converters for automobiles, bulk chemicals, polymers, foods, fertilizers, etc. Industrially-oriented course for engineers and chemists. *Prerequisite: Physical Chemistry* Three credits

549. Advanced Combustion and Fuel Process Technology

This course will review the technical and design aspects associated with various stationary and transportation fuel cell applications. Course material will focus on electrochemical kinetics, electrode catalysis, system thermodynamics, fuel processing, and H₂ storage. Topics to be covered will include basic electrochemical principles of a unitized electrode assembly, the combination of multiple unitized assemblies into cell stack assembly, the design of fuel and oxidizer supply systems, and safety issues related to the design and operation of fuel cell power plants. *Prerequisite: Mass and Energy Balance, general electrode chemistry and basic transport phenomena (momentum, heat and mass transfer).* Three credits

575. Contemporary Food Engineering

This course examines the application of chemical engineering unit operations to food manufacturing. Topics include heating, cooling and freezing of foods; mass transfer in foods; reaction kinetics; chemical, microbiological and biochemical aspects of food engineering; dehydration, thermal and non-thermal processing; food handling, public health and sanitation; green and sustainable technologies in food processing; food packaging, transport, storage and shelf-life. Pre-requisites: CHML 208, 305, 306, 321. Three credits

707. Process Thermodynamics.

Emphasis on the application of thermodynamics to process design; development and use of thermodynamic principles in single-phase and multi-phase processes; applications in reactor design. *Prerequisite: Undergraduate thermodynamics course.* Three credits

708. Advanced Heat Transfer Applications

This course will cover heat transfer mechanisms and models for unsteady state and transient conduction, convection, and radiation in engineering systems. Applications include novel thermal and fluidic components and heat-exchange systems in the areas of alternative energy, green materials, food technology and bio-processing. *Prerequisite: Undergraduate heat transfer course* Three credits

709. Membrane Process Technology.

Principles of membrane processes: reverse osmosis, ultrafiltration, microfiltration, electro dialysis, pervaporation, gas separation membranes, and their applications to traditional and emerging engineering fields. Mass transfer and design aspects for both liquid and gas separation systems. *Prerequisite: Undergraduate mass transfer course.* Three credits

713. Chemical Reactor Design.

Application of engineering analysis, computer design and optimization of chemical reactor systems.

Prerequisite: Undergraduate reaction engineering course.

Three credits

714. Modern Separation Processes.

Mass transfer principles and design techniques applied to absorption and adsorption systems; gas-liquid, gas-solid and liquid-solid separation processes; mass transfer with chemical reaction; thermal effects; multi-component transfer. *Prerequisite: Undergraduate mass transfer course.*

Three credits

717. Process Simulation and Design.

Applications of contemporary computer software to increase speed, improve comprehension, and enhance presentation; of results when analyzing, modeling and solving a wide variety of process design problems. Topics include design of fired heaters, bubble column reactors, generalized shell-and-tube exchangers, and multi-component condensers; FUG calculations for sloppy splits; and plate-to-plate calculations.

Three credits

726. Separation and Recovery Processes.

Emphasis on non-thermal separation and recovery processes used primarily for solid-liquid separations. Topics include crystallization, precipitation, sedimentation, centrifugation, particle filtration, and microfiltration. Applications in chemical processing, industrial wastewater treatment and biological processing. *Prerequisite: Undergraduate mass transfer course.*

Three credits

727. Air Pollution Control.

Emphasis on particulate control. Industrial sources and regulatory codes for particulate emissions; review of fine particle technology; development of performance equations and design procedures for gravity settlers, cyclone-electrostatic precipitators, baghouse and venturi scrubbers; atmospheric dispersion and stack design; overview of gaseous control equipment.

Three credits

729. Hazardous Waste Incineration.

Stoichiometric and thermochemical calculations; legislation, permitting and siting; other options; incineration of solid waste, sludge, liquid waste, and gases; land-based and ship-borne incineration; design of incinerators, quenchers, waste heat boilers, fans and gaseous control equipment; design project application.

Three credits

735, 736. Independent Project or Thesis.

Chemical engineering project or thesis on selected topics, involving experimental research, process design, computer simulation, and/or authoring technical papers. Written report or publication, and oral presentation are required. Topic to be selected by the student with approval of a faculty advisor and the Chair.

Three to Six credits

739. Introduction to Design Project.

Reaction path screening; exploratory technical and economic process evaluations; process synthesis; preliminary process flow diagram; material and energy balances; quick sizing design techniques and factored cost estimate; material selection. Written report or publication and oral presentation are required. *Prerequisite: Undergraduate process calculation, separation process design and chemical reactor design.*

Three credits

740. Design Project.

Preliminary equipment design techniques; computer-aided process optimization studies; hazards and safety evaluation; site location and layout studies; detailed economic evaluation. Written report or publication and oral presentation are required. *Prerequisite: CHMG 739.*

Three credits

741. Special Topics in Chemical Engineering.

Special topics of current interest to graduate students; subject matter will be announced in advance of semester offering. Written report or publication and oral presentation are required. A thesis option is available

Variable credit

742. Seminar in Selected Chemical Engineering Topics

Seminar course in specialized and contemporary topics not covered in regular chemical engineering classes with an emphasis on written and oral communications skills. Topic examples may include nanotechnology, food chemistry and technology, genetic engineering, carbon sequestration and trading, climate change, water and disease, financial engineering. *Prerequisite: permission of instructor*

Three credits

743. Advanced Fluid Mechanics

A course focused on differential equations of motion for incompressible fluids. Major topics include tensor notation and vector calculus, linear and angular momentum conservation, scaling, Stokes flow, inviscid flow, boundary layer, vorticity, potential flow, and lubrication. *Prerequisites: Math 203, CHML 208.*

Three credits

Department of Civil and Environmental Engineering

Moujalli Hourani, D.Sc.

Chair, Department of Civil and Environmental Engineering

Civil Engineering Program

Moujalli Hourani, D.Sc.

Director, Graduate Program

Mission:

The Master of Science in Civil Engineering degree program, with a strong emphasis on design, is intended for practicing civil engineers, as well as those who wish to pursue doctoral studies. Programs of study include structural engineering, geotechnical engineering, and construction management.

Objectives:

The objectives of the program are: (a) to provide knowledge of advanced topics related to the structural engineering and geotechnical engineering and construction management areas of civil engineering, and (b) to provide a practice-based knowledge founded on application of advanced techniques in analysis and design.

Admission Requirements

Applicants possessing a baccalaureate degree in Civil Engineering from a program accredited by the Engineering Accreditation Commission of ABET, Inc., or from a recognized foreign institution, and having a minimum grade point of 3.00 will be ordinarily admitted to the graduate program.

Applicants with baccalaureate degrees in other engineering disciplines, having a minimum grade point average of 3.00, will ordinarily be admitted to the program upon completion of specific prerequisite courses assigned by the Chair of the Department with a grade point average of 3.00 and no grade lower than C.

These prerequisite courses will not satisfy any requirement for the Master of Science in Civil Engineering degree. Generally, students must complete all prerequisite courses before they are permitted to register for graduate courses. Exceptions require the recommendation of the Chair of the Department of Civil Engineering and the approval of the Dean of Engineering.

Degree Requirements:

A student must complete thirty credits. Specific requirements follow:

Structural Engineering: CIVG 777, 778, 779, 789, 797, 784, 785; one course from ENGG 612, 614, CIVG 796, 799; two approved departmental and Graduate Core electives or a thesis.

Geotechnical Engineering: CIVG 777, 778, 786, 789, 791, 792, 797; one course from CIVG 784, 785; two approved departmental and Graduate Core electives or a thesis.

Construction Management: COMG: Minimum of six approved courses in construction from the list shown below, and four or less courses in structural and geotechnical engineering.

- 602 – Introduction to Construction Management
- 603 – Construction Management
- 604 – Construction Cost and Estimating
- 605 – Construction Planning and Scheduling
- 606 – Building System Design
- 607 – Engineering Practices
- 608 – Construction Quality & Safety
- 609 – Engineering Risk and Decision Analysis
- 610 – Construction Law
- 611 – Environmental Impacts
- 612 – Marketing and Finance of Engineering Projects
- 613 – Computer Applications in Construction
- 614 – Contracts & Specifications
- 615 – Project Controls
- 616 – Construction Estimation
- 617 – Fire Protection Piping Systems Design
- 618 – Safety and Environmental Issues in Construction
- 619 – Temporary Works in Heavy Construction

With the approval of the Department Chair a student may take a maximum of three courses offered in other School of Engineering graduate programs. Electives may also be selected from the Graduate Core courses with the advice and approval of the Department Chair.

Course Descriptions (COMG)

602. Construction Engineering and Management

Techniques for the decisions and actions of the various participants involved in the design and construction of civil engineering projects; techniques used in estimating, planning, coordinating and controlling time, cost, quality and usage. *Three credits*

605. Construction Planning and Scheduling

This course deals with the planning and control of construction projects. This course will cover topics on time schedules for materials, labor, equipment, expediting material delivery and bar charts. Emphasis on the theory behind the scheduling techniques used in the construction industry such as Critical Path Methods (CPM), precedence diagrams and Program Evaluation Review Techniques (PERT). *Three credits*

606. Building Systems Design

In this course, students will gain familiarity with the various systems required within buildings. Students will gain knowledge of various code issues as they relate to buildings and building construction. Systems covered will include: Mechanical & HHAV, Electrical, Plumbing/Sanitary, Fire Protection, and Life Safety. The course will also address the interaction between building systems as they relate to the Architectural and Structural components of buildings. The course will also address the evolution of building systems, and what to expect in the coming years. At the completion of this course, students will be able to identify as well as understand the purpose of the major components of building systems and understand how they relate to the overall building. *Three credits*

608. Construction Safety and Quality

In this course, students will take a practical look at project safety issues, OSHA 1926, site specific Health and Safety Plan (HASP) Quality Plan, Quality Assurance, Quality Control. *Three credits*

610. Construction Law

The American Jurisprudential System as it applies to the management of the construction process; principals of contract formation, subcontracts and contract documents; public works bidding and the Wicks Law; contract performance, suspension and termination; surety bonds; changed conditions, extra work, change orders and claims, time of performance, delay and acceleration, mechanics' liens and trust funds; design professionals' duties and liabilities; insurance and warranties; Alternative Dispute Resolution, including mediation and arbitration. *Three credits*

611. Environmental Impact Assessment for Construction Projects

To provide the student with an introductory overview of the environmental law system, including the legal & regulatory process. To acquaint the student with the major federal (e.g. NEPA), state (e.g. SEQRA), and local (e.g. CEQR, ULURP, zoning) environmental impact legislation and procedures affecting the practice of engineering. To provide the student with the tools necessary to find, understand, use and comply with relevant laws, regulations, codes, forms, permitting, etc. To familiarize the student with real world practice applications of environmental laws and regulations to major construction projects. To enhance understanding of the interaction of the environmental law system with engineering through case studies. *Three credits*

612. Marketing and Finance of Engineering Projects

Formulation of financial techniques for solution of viability of engineering projects; typical subject material includes development and use of Internal Rate of Return and Net Present Value. Presenting an understanding of marketing, its components and how the construction manager/engineer fits into the corporate marketing equation. *Three credits*

614. Contracts and Specifications

Fundamental concepts of contract law; types and selection of contracts, e.g. construction; procedures for advertising, awarding and administering contracts; specifications and their cost impacts; liability of engineers; engineering professional services. *Three credits*

615. Project Controls

The course will start with a discussion of project control systems involved in design and construction of projects. It will then move into an introduction and examination of two specific control systems: CPM Scheduling and Cost/Resource loading. The student will become intimately familiar with the industry's leading methodology for scheduling design and construction. The student can expect to be-

come conversant with the terminology, calculations, and computer reporting utilized in CPM Scheduling. Finally, the course will examine cost engineering aspects for the design and construction industry. The student can expect to become conversant in Labor Budgeting and Variance Analysis for design/construction firms and the cost engineering aspects for construction of a project. *Three credits*

616. Construction Estimation

A key parameter for all types of construction emerges from the answer to the fundamental question: "How much is the work expected to cost?" This course examines the process used by the construction industry to arrive at an answer and how the result fits into the overall construction process. Key concepts covered include quantity and quality takeoffs, assigning costs, and finalizing estimates and proposals. Implementation of classic estimating approaches via spreadsheet models will be stressed using examples of particular interest to Civil, Environmental, and Construction Management students. *Three credits*

617. Fire Protection Piping System Design

The course deals with the design of fire protection piping systems with an emphasis on water-based piping systems. In this course students will: Analyze occupancy and construction classifications for existing and new building using the New York State and the New York City Building code; determine appropriate system types to be installed in specific hazardous environments; design fire protection piping systems to meet the architectural and structural requirements; determine design densities in areas of application for the systems being installed; understand type of piping configurations and advantages of each; and, determine water supplies required for each type of building occupancy. *Three credits*

618. Safety and Environmental Issues in Construction for Engineers

This course presents an overview of safety and environmental issues related to construction. Included are a review of the federal occupational safety and health administration (OSHA) construction safety standards, as well as an introduction to specific safety and environmental construction related issues such as regulated substances that may be encountered and green building (LEED) certification. *Three credits*

619. Temporary Works in Heavy Construction

Course provides an overview of contractor's temporary works means in heavy underground construction. This course will include the engineering design of these temporary works. Temporary works

are normally the full responsibility of the contractor. However, an understanding of the selection and design of temporary works by contractors is also vital to owners and consulting engineers because they directly influence the constructability and cost of their projects. This course will include: geotechnical parameters and design loadings in temporary works; the design of support of excavation systems including soldier pile and lagging, sheet piling, concrete diaphragm (slurry wall) and secant wall; monitoring and settlement analysis of structures adjacent to excavations; soil improvements and grouting; dewatering; underpinning; and initial supports in rock and soft ground tunnels. *Three credits*

Course Descriptions (CIVG)

505. Wood Structures.

Mechanical properties of wood; orthotropic nature of wood as a material, dimensional instability, susceptibility to biological deterioration, implications of duration and types of load. Design of solid, laminated and composite beams, columns, shear walls, diaphragms, roofs, and trusses. Behavior and design of mechanical connections. Introduction to light framed wood structures, arches, bridges, and other timber structures. *Prerequisite: senior standing and permission of the Chair.* *Three credits*

506 Tunneling

This course provides analysis, design and construction issues for the tunneling in soils and/or rocks. The specific areas covered include planning, rock mass classification, rock failure mechanisms, initial excavation supports, design considerations for permanent linings, tunnel excavation methods, groundwater control, ground control measures, and tunnel security. The design considerations of high pressure water tunnels are also discussed including selection of permanent liners, coupled hydromechanical behavior of jointed rock mass and evaluation of hydrojacking potential. Finally, tunnel security against earthquake, fire, and explosion, which is one of the Nation's current important concerns, is discussed. *Prerequisite: senior standing and permission of the Chair.* *Three credits*

756. Fracture and Fatigue in Structures.

Comprehensive study of fracture and fatigue failures of structural system; fracture mechanics of steel structures; fatigue crack initiation and propagation; fatigue of welded structures; corrosion and nondestructive investigation. *Three credits*

757. Advanced Study in Civil Engineering.

Individual study of selected advanced topics in civil engineering under the supervision of a faculty member. *Three credits*

772. Hydrology.

Hydrologic cycle, interception, infiltration, evapotranspiration, measurement and analysis of precipitation; design hyetograph, unit hydrographs—analysis, synthetic generation of unit hydrograph; measurement and analysis of runoff, synthetic generation of flow, analysis of stream gages, statistical and probability analysis of stream flow, regional frequency analysis; probable maximum precipitation, probable maximum floods; flood routing methods and applications; hydrologic study of complex stream network. *Three credits*

773. Hydropower Engineering.

Fundamentals of water power equation, schemes of water power development, analysis of stream flow data, flow duration curve, power duration curve, mass curve, firm power; selection of turbine, passages and power houses; appurtenances for hydro plants; conservation, economic and environmental aspects. *Three credits*

777. Advanced Structural Analysis I.

Review of classical methods of structural analysis; matrix formulations; arch analysis; influence lines for indeterminate structures by the Muller-Breslau principle and numerical methods; limit analysis of simple structures; cable support structures. *Three credits*

778. Advanced Structural Analysis II.

Analysis of frameworks under dynamic loads; computation of mode shapes and frequencies; calculation of response using model superposition and numerical methods; the use of response spectra for seismic analysis; buckling of structures using the geometric stiffness matrix. *Prerequisite: CIVG 777 or equivalent. Three credits*

779. Design of Steel Structures.

Review of load specifications and design philosophy; design of single and multistory rigid frames; behavior of connections and the influence of connections on member behavior; moment-rotation curves; composite construction; light gage steel. *Prerequisite: CIVG 777 or equivalent. Three credits*

780. Long Span Metal Structures.

Classical forms of long span bridges; loads on bridges; suspension systems; cable-stayed bridges; space frameworks; orthotropic bridge decks; box girder bridges. *Prerequisite: CIVG 779 or equivalent. Three credits*

781. Special Topics in Structural Engineering.

Special topics in structural engineering of current interest to graduate students; subject matter will be announced in advance of particular semester offering. *Three credits*

784. Reinforced Concrete Structure I.

Research on the concrete stress-strain curve; specimen-testing machine interaction; micro-cracking; time-dependent strain in concrete; creep and shrinkage; ultimate strength analysis of reinforced concrete members; diagonal tension failure of reinforced concrete beam, design of determinate and indeterminate pre-stressed concrete structures. *Prerequisite: CIVG 777 or equivalent. Three credits*

785. Reinforced Concrete Structures II.

Cracking in beams and slabs; torsion of reinforced concrete beams; yield line theory of slabs; shear-wall construction and its application to the design of tall concrete structures; immediate and sustained deflections; problems in the design of multistory reinforced concrete structures. *Prerequisite: CIVG 777 or equivalent. Three credits*

786. Ground Improvement.

Comprehensive coverage of technologies used to modify the engineering properties of earth and non-earth materials both in situ and artificially placed. Overviews of the use of waste and manufactured non-earth materials as alternatives for backfills and fills, and the use of geosynthetic tensile reinforcement. *Prerequisite: CIVL 308 or equivalent. Three credits*

787. Special Topics in Geotechnical and Geoenvironmental Engineering.

Special topics in geotechnical and/or geoenvironmental engineering of current interest to graduate students and engineers in practice. Subject matter will be announced in advance of particular semester offering. *Permission of the instructor. Three credits*

789. Advanced Geotechnical Applications: Foundations.

Detailed consideration of the application of geomechanics principles to the analysis and design of shallow and deep foundations including footings, mats, piles, drilled shafts, and modern hybrids (piled rafts). Overviews of site characterization, criteria for selection of foundation alternatives, allowable settlements, construction and constructability. *Prerequisite: CIVL 308, 438, or their equivalents. Three credits*

791. Advanced Geotechnical Applications: Earth-Retaining Structures.

Detailed consideration of the application of geomechanics principles to the analysis and design of earth-retaining structures including basement walls, rigid retaining walls, modern internally-reinforced structures (MSEW, SRW, soil nailing), cantilever and anchored bulkheads, braced excavations, and cellular structures under both gravity and seismic loading. Introduction to state-of-art concepts such as controlled yielding using geofoam compressible inclusions. *Prerequisite: CIVL 308, 438, or their equivalents.* *Three credits*

792. Advanced Geotechnical Applications: Earthworks.

Detailed consideration of the application of geomechanics principles to the analysis and design of unsupported slopes including natural slopes, cut slopes, embankments, earth dams, and levees. Introduction to the use of geosynthetic tensile reinforcement for basal reinforcement, RSS and soil nailing. *Prerequisite: CIVL 308, 438, or their equivalents.* *Three credits*

796. Elastic and Inelastic Stability of Structures.

Elastic and inelastic buckling of axially loaded members; lateral buckling of beams; energy methods; flexural-torsional buckling of centrally and eccentrically loaded columns of open cross section in the elastic and plastic ranges. *Three credits*

797. Advanced Geomechanics.

Advanced topics in soil mechanics including effective stresses under partially saturated conditions, advanced constitutive models, vibratory loading, and seismic liquefaction. *Prerequisite: CIVL 308 or equivalent.* *Three credits*

798. Site Characterization and Design Verification.

Detailed consideration of the processes and methodologies for determining soil and rock properties for a wide variety of geotechnical applications for both simple and complex projects. The role of pre- and post-construction design verification in practice using centrifuge testing and in-situ instrumentation. *Prerequisite: CIVL 308, 438, or their equivalents.* *Three credits*

799. Theory of Plates and Shells.

Analysis of plates loaded transversely and in their plane; general theory of shells of revolution; shallow shells; membrane theories of shells; Levy's method; theory of folded plates; solutions using finite difference methods. *Three credits*

Department of Civil and Environmental Engineering

Moujalli Hourani, D.Sc.

Chair, Department of Civil and Environmental Engineering

Environmental Engineering Program

Kevin J. Farley, Ph.D.

Director, Graduate Program

Mission:

The Master of Engineering (Environmental Engineering) and the Master of Science in Environmental Engineering programs are designed to provide engineers and scientists with advanced training in environmental process engineering, water quality assessment modeling, geoenvironmental engineering, and environmental management. Emphasis is placed on both current applications and the underlying theoretical basis for sound engineering practice, in keeping with the humanistic need for maintaining and improving environmental quality.

Objectives:

Educational Objectives for Environmental Engineering Graduate Program state that "Environmental Engineering graduates will be recognized for (1) their leadership, achievement and involvement in engineering and related professions, through service in private and public agencies and in research and academic institutions; (2) their dedication to enhance the engineering profession through continuous self-improvement; (3) their commitment to working towards engineering a sustainable environment for New York and the world; and (4) their ethical practices and professionalism.

Admission Requirements:

Master of Engineering (Environmental Engineering) Degree: Applicants must possess a baccalaureate degree in engineering from a program accredited by the Engineering Accreditation Commission of ABET, Inc., or from a recognized foreign institution. A minimum grade point average of 3.0 is generally required. In addition, applicants must present adequate preparation in two courses in chemistry, one course in calculus-based physics, three courses in calculus, differential equations, and one course in computer applications, statistics, fluid mechanics, a biological science, an earth science, and principles of environmental engineering. These undergraduate courses must be completed with a minimum grade point average of 3.00 with no grade lower than a C.

Prerequisite courses will not satisfy any requirements for the Master of Engineering (Environmental Engineering) degree. Generally, students must complete the appropriate prerequisite courses before they may register for the graduate courses. Exceptions require the recommendation of the Environmental Engineering Graduate Program Director and the approval of the Dean of Engineering.

Master of Science in Environmental Engineering Degree: Applicants must possess a baccalaureate degree in engineering or science. A minimum grade point average of 3.0 is generally required. In addition, applicants must present adequate preparation in two courses in chemistry, one course in physics, three courses in calculus, differential equations, one course in computer applications, statistics, fluid mechanics, a biological science or an earth science, and principles of environmental engineering. These undergraduate courses must be completed with a minimum grade point average of 3.0 with no grade lower than a C.

Prerequisite courses will not satisfy any requirements for the Master of Science in Environmental Engineering degree. Generally, students must complete the majority of prerequisite courses before they may register for the designated graduate courses. Exceptions require the recommendation

of the Environmental Engineering Graduate Program Director and the approval of the Dean of Engineering.

Degree Requirements:

Master of Environmental Engineering Degree: students must complete thirty credits of graduate coursework with a cumulative GPA of 3.0 or better. Graduate coursework must include the four required core courses: ENVG 505, 506, 706, 739. In addition, students are required to complete a minimum of four courses with upper-level engineering design content including: ENVG 718; ENVG 736; ENVG 703 or 704; and ENVG 712 or 740. Technical electives may be selected from other offerings in environmental engineering, from select courses in construction management (COMG 602, 611, 612, 614, 616, 618), or from Graduate Core courses with the advice and approval of the Program Director. If students do not achieve the required GPA within the specified course requirements, they may take additional courses with the permission of the Environmental Engineering Graduate Program Director to achieve the minimum 3.0 GPA requirement.

Master of Science in Environmental Engineering Degree: Students must complete thirty credits of graduate coursework with a cumulative GPA of 3.0 or better. Graduate coursework must include the three required core courses: ENVG 505, 506, 706. In addition, students are required to complete a minimum of three courses with upper-level engineering design content from the following list of courses: ENVG 703, 704, 712, 718, 736, 740. Technical electives may be selected from other offerings in environmental engineering, from select courses in construction management (COMG 602, 611, 612, 614, 616, 618), or from Graduate Core courses with the advice and approval of the Environmental Engineering Graduate Program Director. If students do not achieve the required GPA within the specified course requirements, they may take additional courses with the permission of the Program Director to achieve the minimum 3.0 GPA requirement.

Course Descriptions (ENVG)

505. Surface Water Quality Modeling.

Principles governing the transport and fate of contaminants in surface water systems. Water quality standards, wastewater inputs, water quality modeling for water-borne disease, dissolved oxygen, and toxic chemicals. Engineering controls to meet water quality objectives and case studies are presented. Computer solution to some problems are required.

Prerequisite: ENGS 204. Three credits

506. Water and Wastewater Treatment Processes.

Study of the fundamental principles used to treat both drinking water and wastewater. Drinking water treatment principles include Stokes law for particle settling, theory of coagulation and flocculation, porous media filtration, and disinfection. Principles for wastewater treatment include reactor analyses, growth and degradation kinetics for biological oxidation processes anaerobic digestion of complex organics, and hindered and compression settling.

Prerequisite: ENGS 204, CEEN 303. Three credits

507. Geohydrology.

Basic principles of groundwater hydrology and subsurface contaminant transport. Construction and use of flow nets; pumping well and aquifer response under confined and unconfined conditions. Contaminant sources, transport, and retardation; the behavior of nonaqueous phase liquids (NAPLs) in the subsurface. Design of groundwater extraction systems, subsurface cutoff walls, caps, and emerging technologies for soil treatment.

Prerequisite: ENGS 204, CEEN 303. Three credits

517. Environmental Law.

Introduction to legal aspects of environmental regulations. Historical perspectives and current regulations for air, land and water quality. Application of "cradle to grave" tracking.

Three credits

535. Surface Water Quality Laboratory.

Field laboratory in the metropolitan New York area. Stream flow gaging, tracer studies, and dissolved oxygen water quality analyses. Written reports and oral presentations on data collection, data analysis, and engineering application are required. Two hour laboratory.

Co-requisite: ENVG 505. One credit

536. Water and Wastewater Treatment Process Laboratory.

Laboratory experiments involving the study of drinking water treatment processes including coagulation and flocculation, settling, filtration and over-all pilot plant design operation. Also includes a lab on activated sludge treatment of wastewater and a treatment plant field trip.

Co-requisite: ENVG 506. One credit

700. Mathematical Models I.

Development of mathematical solutions for static and dynamic mass balances. Specific problems to be addressed include chemical speciation equilibria; linear and non-linear kinetics; bacterial population dynamics; and transport speciation models for flow-through and multi-dimensional systems. Statistical evaluation of environmental data, numerical solution techniques, and computer programming will also be presented. Applications will focus on water and wastewater treatment, remediation technologies and water quality.

Prerequisite: ENGS 204 Three credits

702. Air Quality Models.

Concepts and development of air quality models; introduction to numerical methods used in air modeling, Eulerian and Lagrangian techniques; application of Gaussian Plume, line source and area source models as well as indoor air quality models. A project oriented course where students develop a two-dimensional air pollution model of New York City, and utilize plume dispersion and urban air shed models.

Three credits

703. Environmental Fate and Effects of Toxic Contaminants.

Principles governing the transport, fate, and effect of toxic organic contaminants and metals in surface water systems. Topics include: physical-chemical characterization of toxic organic contaminants; phase behavior and chemical transformation kinetics; metal speciation; sediment contamination and transport; bioaccumulation in aquatic food webs; human and ecological risk assessment; sediment remediation technologies and environmental site restoration. Mathematical solutions and computer models used throughout the course.

Prerequisite: ENVG 505. Three credits

704. Advanced Water Quality Modeling.

Analytical and numerical modeling for contaminant fate and transport in stratified lakes and estuaries. Topics include: transport and circulation in lakes, estuaries, and coastal waters; analytical solutions and finite-difference models for dissolved oxygen and toxic contaminants in lakes and estuaries; nutrient cycling and eutrophication in lakes and estuaries;

sediment diagenesis and nutrient recycling; pollution of the marine environment. *Prerequisite: ENVG 505.* *Three credits*

705. Environmental Chemistry.

An introduction to the chemistry of natural waters and the atmosphere. The application of the principles of physical and analytical chemistry to the solution of problems related to environmental engineering practice. The course also includes a unit on the relevant properties of organic compounds of environmental interest. *Three credits*

706. Aquatic and Sediment Chemistry.

The environmentally important chemical processes that take place in natural marine waters, and in soils and sediments. The sources, reactions, transport, and fate of chemical substances in these environments. Extensive examples of the application of chemical principles to the solution of relevant environmental engineering problems are included. *Prerequisite: ENVG 705.* *Three credits*

708. Environmental Biotechnology.

Fundamentals of biotechnology and its applications to environmental engineering. Principles of microbial genetics, microbial ecology and biochemistry and how they relate to biological treatment of water, air, wastewater and hazardous wastes. Biofilm process fundamentals and applications. Molecular methods and their use in the study and analysis of ideal and non-ideal biological systems. Specific applications to public health, bioremediation, biosolids reuse and industrial treatment. *Prerequisite: ENVG 506, ENVG 718.* *Three credits*

709. Geochemistry.

Review of fundamental geologic processes. Solution-mineral equilibria of carbonates and silicates. Surface chemistry at the solution-mineral interface. Relevant phase equilibria, weathering and soils, inorganic and organic sedimentation and diagenesis, isotope geochemistry, and metamorphism. *Three credits*

710. Environmental Organic Chemistry.

The structure and nomenclature of relevant organic compounds. Kinetics, fate and transport of xenophobic chemicals in the environment. Important hydrolytic, photolytic, oxidative and reductive reactions. Use of quantitative structure activity relationships (QSARS) in predicting toxicity and related properties of various classes of environmentally active organic compounds. *Three credits*

712. Advanced Geohydrology.

Review of basic principles. Introduction to numerical groundwater modeling; application of Visual MODFLOW to flow and transport modeling. Pumping well and aquifer response under confined, unconfined, and semi-confined conditions. Hydraulic conductivity testing; borehole and surface geophysical methods for site characterization. *Prerequisite: ENVG 507.* *Three credits*

718. Biological Treatment of Wastewaters.

Application of microbiology to treatment of organic wastes including toxic chemicals. Treatment models, aerobic, facultative and anaerobic processes, cell synthesis and respiration, oxygen and nutrient requirements. Biological nutrient removal, attached growth systems, bioremediation and process designs. *Prerequisite: ENVG 506* *Three credits*

721. Regulatory & Engineering Aspects of Water & Residuals Reuse.

Fundamentals of wastewater reuse including: State and Federal water reclamation and reuse regulation; municipal, industrial and storm water reuse; public health aspects of reuse; and economics of reuse. Design and operation of specific reuse technologies including membrane systems, advanced oxidation systems, etc. Regulations and technologies addressing beneficial reuse of biosolids and drinking water residuals, including land application and soil conditioning, will also be covered. Finally the role of water and residuals reuse in industrial, local and global sustainability will be addressed. *Prerequisite: ENVG 506.* *Three credits*

722. Subsurface Bioremediation (online, self-paced course).

Fundamentals of sub-surface processes, abiotic and biotic, which contribute to the bioremediation of common subsurface contaminants including petroleum hydrocarbons, chlorinated solvents, nitroaromatics, heavy metals and radionuclides. Areas of study will include multi-phase flow, convective transport, sorption/desorption, phase partitioning, as well as microbial ecology, biodegradation kinetics, biomass growth and degradative metabolisms. Specific examples of intrinsic and engineered bioremediation of aromatics and chlorinated solvents will be included. The course will utilize a text book, web-based tutorial material and three interactive bioremediation spreadsheet based models. The course will meet only three times during the semester; all other correspondence will be carried out via email. *Prerequisites: ENVG 506, ENVG 507.* *Three credits*

723. Fundamentals of Geographical Information Systems (GIS) for Civil and Environmental Engineers.

This course will provide students with an introduction to spatial data analysis and the application of geographic information systems (GIS) to environmental problem solving. It will examine a range of spatial statistical techniques, spatial estimation methods, and data visualization tools. Practical issues involved in spatial analysis and the implementation of GIS will also be addressed. The course will include lab sessions to gain hands-on experience with GIS and spatial analytical software. Students will complete a semester project. *Three credits*

731. Special Project.

Environmental engineering project on selected topics, involving experimental research, process design, computer modeling, and/or graduate internship. Written report or publication, and oral presentation are required. Topics to be selected by the student with approval of a faculty advisor and the Program Director. Three credits

732. Thesis.

A technical paper under faculty supervision based upon original study or research, an original design, or a thorough analysis of an existing or proposed system of either a scientific or engineering nature. *Six credits*

736. Advanced Unit Operations.

Advanced study of the processes used for water and wastewater treatment with an emphasis on design principles and process modeling. Processes covered include aeration, air stripping, carbon adsorption, ion exchange, chemical treatment and disinfection. *Prerequisite: ENVG 506. Three credits*

738. Biological Waste Treatment Laboratory.

Laboratory experiments and demonstrations are performed for the analysis of environmental microbiology and microbial ecology, characterization of wastewater, and determination of bacterial kinetics and process design parameters. Includes evaluations of treatment variables on the performance and effectiveness of biological processes. Traditional and advanced wastewater processes are examined for nutrient removal, attached growth systems, and hazardous waste remediation. Laboratory fee. *Prerequisite: ENVG/L 506, Corequisite: ENVG 718. Three credits*

739. Experimental Analysis in Environmental Engineering.

This course is an advanced laboratory covering principles of modern experimental and analytical techniques and their applications to problems in environmental engineering. Experiments include the measurement of water quality parameters, determination of contaminant partition coefficients, kinetics of transformation reactions in the environment, and risk assessment for a contaminated soil sample. This course includes a large focus on technical writing. *Three credits*

740. Advanced Hydraulic Design

Introduction to advanced concepts in hydraulic design. Use of computer software to analyze and design complex stormwater, sanitary sewer and water distribution systems. Analysis of water quality issues in stormwater system design. Water quality analysis of water distribution systems. *Prerequisite: CEEN 307 Three credits*

Electrical Engineering and Computer Engineering Programs

Robert Mauro, Ph.D.

Chair, Department of Electrical and Computer Engineering

Director, Graduate Program

Mission:

The Master of Science in Electrical Engineering and the Master of Science in Computer Engineering degree programs are designed to provide a higher degree of mastery of electrical and computer engineering fundamentals, emphasizing practical applications, thereby expanding the students' technological horizons and preparing professionals for advanced level positions and for admission to doctoral programs.

Objectives:

The objective of these programs is to prepare graduates for successful and dynamic professional careers through a course of study that provides: (a) a strong grasp of electrical engineering and computer engineering fundamentals through a diverse and flexible curriculum, (b) skills in practical applications, contemporary industrial needs and emerging technologies, and (c) a foundation for increasing professional responsibilities or continued study at the doctoral level.

Admission Requirements:

Electrical Engineering Degree:

Applicants must possess:

1. A baccalaureate degree in electrical engineering from a program accredited by the Engineering Accreditation Commission of ABET, Inc., or from a recognized foreign institution;
- or,
2. A baccalaureate degree in another area of engineering, physics, or mathematics.

Applicants who have a baccalaureate degree in another area of engineering, physics, or mathematics may be admitted into the program provided they complete undergraduate prerequisites specified by the Chair of the Department of Electrical and Computer Engineering. These courses must be completed with a minimum grade point average of 3.00 with no grade lower than C. These courses will not satisfy any requirements for the Master of Science in Electrical Engineering degree. Generally, students must complete prerequisite courses before they are permitted to register for graduate courses. Exceptions require the recommendation of the Chair of the Department of Electrical and Computer Engineering and the approval of the Dean of Engineering.

Computer Engineering Degree:

Applicants must possess:

1. A baccalaureate degree in computer (or electrical) engineering from a program accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology or from a recognized foreign institution;
- or,
2. A baccalaureate degree in another area of engineering, physics or mathematics.

Applicants who have a baccalaureate degree in another area of engineering, mathematics, or physics may be admitted if they have a background which includes nine credits of calculus and three credits of probability. They must also complete undergraduate courses in Computer Programming, Introduction to Digital Systems, and Microcomputers with a minimum grade point average of 3.0 with no grade lower than C (these courses will not satisfy any requirements for the Master of Science in Electrical Engineering degree). Generally, students must complete prerequisite courses before they are permitted to register for graduate courses. Exceptions require the recommendation of the Chair of the Department of Electrical and Computer Engineering and the approval of the Dean of Engineering.

Degree Requirements:

A student must complete thirty credits. Specific requirements follow:

Electrical Engineering Degree: ECEG 701, 702. One course from ECEG 706, ECEG 710. Four courses from the following offerings: electrical engineering, electrical and computer engineering. Three courses from the following course offerings: electrical engineering, electrical and computer engineering, computer engineering. Electives may also be selected from the Graduate Core courses with the advice and approval of the Department Chair. Any modifications to program requirements must be approved by the Department Chair.

Computer Engineering Degree: ECEG 520, 727. One course from ECEG 723, ECEG 721. Four courses from the following course offerings: electrical and computer engineering, computer engineering. Three courses from any course offered by the electrical and computer engineering department or any Graduate Core course. Any modifications to program requirements must be approved by the Department Chair.

Course Descriptions (ECEG)

Electrical Engineering Courses

547. Optical Information Processing Systems.

Response of linear spatially invariant systems; signal detection by matched filtering; mutual coherence; transform properties of linear optical imaging systems; optical information processing and filtering; linear holography. *Three credits*

548. Fiber Optics Communication.

Optical fiber structures and physical characteristics; electromagnetic waveguiding properties and modes, fiber materials, loss mechanisms, and dispersion. Semiconductor laser and LED sources and photodetectors. Connectors, Fiber measurements, communication aspects of fiber transmission. Fiber system examples and design procedures. *Three credits*

706. Radiation and Optics.

Radiation and simple radiating systems, wave optics, interference and diffraction: first order and higher order coherence functions; Fourier optics, properties of coherent optical beams. *Three credits*

714. Integrated Electronic Systems.

Analysis and design of analog and digital electronic systems with emphasis on use of medium and large scale integrated circuits; introduction to MSI and LSI technologies; interfacing integrated circuits. *Three credits*

715. Analog Integrated Circuits.

Analysis, design and applications of analog integrated circuits. Operational amplifiers, voltage regulators, VCOs, phase locked loops and circuits for consumer electronics are considered. Design principles, including feedback theory and computer aided design are investigated and implemented in computer calculations. *Three credits*

731. Control Systems.

Multivariable systems; controllability and observability; observer design and pole assignment; stability analysis. *Three credits*

732. Optimal Control Theory.

Performance measures: dynamic programming and its application to optimal control problems; calculus of variations; minimum principle; numerical techniques for finding optimal controls and trajectories. *Prerequisite: ENGG 630. Three credits*

733. Digital Control System Analysis and Design.

State-space representation of discrete-time systems. Stability, observability, controllability. Digital controller design using transform techniques. State-space design methods. *Three credits*

735. Direct Energy Conversion.

Principles of energy conversion; thermoelectric, photovoltaic, and thermionic generators; magneto-hydrodynamic power generators: solar and nuclear energy conversion. *Three credits*

736. Power Systems I.

Steady state operation of electric power systems; power network representation; load flow analysis; economic dispatch and steady state control of energy systems. *Three credits*

738. Power Systems II.

Analysis of faulted power systems; symmetrical and asymmetrical systems; transient stability, emergency control and system protection. *Prerequisite: ECEG 736 or approval of Instructor. Three credits*

740. Electro-Optics.

Propagation of rays and beams, optical resonators; theory of laser oscillation; modulation of laser beams; optical detection. *Three credits*

741. Quantum Electronics.

Interaction of radiation with matter, spontaneous and simulated emission and absorption; semi-classical theory of lasers; traveling wave and cavity lasers; laser saturation; noise limitation of light detectors and amplifiers. *Three credits*

742. Semiconductor Devices.

An examination of concepts underlying contemporary devices as well as emerging technologies such as the superlattice, GaAs FETs, and the heterojunction FET. How and why diodes and transistors work. Also included are amorphous semiconductor and super-conductive devices. *Three credits*

744. Signal Detection and Estimation.

Hypothesis testing; decision criteria: North and Wiener filtering; detection and estimation of signals with known and random parameters in white and colored Gaussian noise; recursive estimation of constant and time-varying signal parameters; Kalman-

Bucy filtering; applications to communication systems, radar and biological signal processing. *Prerequisite: ECEG 710. Three credits*

747. Voice and Data Communications.

Concepts of M-ary communications, signal design, and fixed and adaptive optimum receivers such as MLSE, linear, decision feedback equalization and adaptive equalization receivers. Timing acquisition and tracking, carrier acquisition. Scrambling and encryption. Echo cancellation. *Three credits*

749. Optical Communication Theory.

Overview of the optical communication system; the optical field; free space and fiber guided channels; optical modulation schemes; principles of receiver design; statistical modeling of the optical receiver; incoherent and coherent detection; digital transmission. *Prerequisite: ECEG 710 or approval of Instructor. Three credits*

750. Antenna Engineering.

Analysis and design of various antenna types such as dipoles, horns, reflectors, apertures, microstrip and wire antennas. Electronically scanned arrays. Radiation pattern antenna impedance, gain, directivity, bandwidth, beam width, and frequency dependence. Reciprocity between receiving and transmitting antennas. Amplitude tapering to achieve desired side-lobe characteristics. *Three credits*

751. Microwave Circuits.

Transmission lines and waveguides; circuit representation of waveguide systems using impedance and scattering formulation, impedance transformation and matching; Faraday rotation in ferrites; passive microwave devices; terminations; attenuators, couplers, circulators, the magic tee; emphasis on developing a circuit view point for analyzing microwave devices. *Three credits*

754. Coding and Its Applications.

Fundamental concepts of coding. Error correction coding for digital and computer communications. Group codes, design and decoding algorithms. Soft and hard decision decoding of block codes. Codes for multiple error correction. Convolutional code structure and Viterbi decoding algorithm. Application of coding to the white Gaussian and burst noise channel. Channel coding for bandwidth constraint channels—coding in modulation. *Three credits*

794. Selected Topics in Electrical Engineering.

Topics of current interest to graduate Electrical Engineering students; subject matter will be announced in advance of semester offering. *Three credits*

Electrical Engineering and Computer Engineering Courses

701. Signals, Systems and Transforms I.

Description and analysis of continuous-time signals and systems in the time and the frequency domains; Laplace transform; inversion of transforms by complex integration; application to lumped and distributed parameter systems; analysis of continuous-time linear systems using state space techniques; controllability and observability; stability analysis. *Three credits*

702. Signals, Systems and Transforms II.

Discrete-time signals and systems; discrete convolution; sampling and quantizing; Z-transform; discrete Fourier transform; Fast Fourier transform; state space techniques for discrete-time systems; controllability and observability; stability. *Three credits*

709. Linear Mathematical Methods.

Matrix calculations; linear systems and linear vector spaces; operators and their representation; function of operators and matrices; systems of differential equations; Eigen function representations; electrical engineering applications. *Three credits*

710. Probability and Stochastic Processes.

Random variables; distribution and density functions; functions of random variables; random processes; stationarity, ergodicity; correlation functions and power spectra; noise theory; system analysis with stochastic inputs; Gaussian, Markoff and Poisson processes. *Three credits*

721. Embedded Systems.

Design of embedded systems including system level modeling/specification, and architecture synthesis, compilation for area/power/performance, code compression, scheduling and real-time operating systems, and verification and functional validation of embedded systems. Case studies and platform-based design encompassing microcontrollers/digital signal processors, distributed computing and peripherals. *Three credits*

725. Microprocessor Systems.

Detailed study of the 8086 and 68000 families of 16-bit microprocessors, including their architecture, instruction sets, programming, interfacing, and interrupt handling. Applications to communications, control, and instrumentation. Selected additional topics such as bit-slice microprocessors and graphics processors. *Prerequisite or Co-requisite: ECEG 520 or equivalent or approval of Instructor. Three credits*

726. Transmission of Digital Data.

The Architecture of Digital Data Transmission Systems. The protocols: TCP/IP models. The physical layer: Wire, cable, fiber, terrestrial microwave and satellite microwave. The key concepts: bandwidth, noise, channel capacity and error detection and correction. The applications: modulation and modems. Multiplexing: FDM, slotted TDM, and statistical TDM. The data link: asynchronous and synchronous transmission, circuit switching, packet switching. *Three credits*

727. Computer Networks.

A structured coverage of Data and Computer Communications Networks. Protocols from the physical and data link layers to the applications layer. Network modeling and fundamentals of performance analysis. Time delay and reliability. Design issues, tools, and procedures regarding capacity assignments, terminal assignment, and switching node location. Routing. Examples from high speed Local Area Networks, Internet, Asynchronous Transfer Mode, and Wireless Networks. *Three credits*

745. Signals, Noise and Information Transmission.

Spectral analysis of signals; system response and filtering of deterministic and random signals; noise in communication systems; information and channel capacity; transmission of digital information over baseband channels; digital carrier modulation schemes. *Three credits*

746. Digital Signal Processing.

Discrete-time signals and system analysis; infinite and finite impulse response digital filter design techniques, random discrete time signals and spectral analysis; detection and estimation of signals in noise. Kalman filters. *Three credits*

792. Advanced Projects in Electrical or Computer Engineering.

A project course of an advanced nature conducted by assigning individual investigations to be performed by the student under the supervision of a staff member; consists of theoretical and experimental investigations in specialized fields of electrical engineering of interest to the student. *Three credits*

793. Advanced Study in Electrical or Computer Engineering.

Individual study of a selected topic in electrical engineering under the supervision of a staff member. *Three credits*

796. Selected Topics in Electrical and Computer Engineering.

Topics of current interest to graduate Computer Engineering students; subject matter will be announced in advanced of semester offering. *Three credits*

Computer Engineering Courses**520. Computer Architecture I.**

Evolution of computer architecture from the Von Neumann concepts and the CISC machines to the RISC machines. Hardware and Software design methods. Processor design; Data representation and instruction sets. Control design: Hardware and Microprogrammed. Memory organization: Virtual, segmentation and cache; system organization: Bus control, I/O and operating systems. *Three credits*

721. Artificial Intelligence.

Systems with the potential to learn, understand, interpret and arrive at conclusions in a manner considered intelligent if a person were doing it. Topics will be taken from: knowledge representation, inference, search strategies, fuzzy logic, and neural nets. *Three credits*

722. Switching and Automata Theory.

Analysis and synthesis of finite state machines; Turing and universal machines; information loss less machines; modular realization of machines; introduction to machine languages and computability. *Three credits*

723. Software Engineering.

The evolution of programming from art to science. Program design tools and techniques; structured programming and modular design; complexity, storage, and processing-time analysis; program testing and debugging; software reliability, repair and availability. *Three credits*

724. Computer Architecture II.

Computer Systems; multi processors and pipelined processors; array processors; computer networks; techniques for analysis of computer systems. *Three credits*

728. Operating Systems.

A study of the modular design of operating systems; the concept of interrupts, multiple processors and I/O programming; memory management techniques, demand paging and virtual memory; job scheduling algorithms, race conditions between processes; file systems, analytic tools for the evaluation of operating systems. *Prerequisite: ECEG 520 or equivalent. Three credits*

729. Interactive Computer Graphics.

Basic concepts; model of the graphics display and user interface; point-plotting techniques and line drawing displays; two dimensional transformations; windowing and clipping; graphical input devices and techniques; event handling; raster graphics; display hardware; three dimensional graphics; realism and modeling; curves and surfaces; transformation, perspective; hidden surface elimination and shading. Graphics projects carried out in the E.E. Computer Laboratory. *Prerequisite: ECEG 520 or equivalent.* *Three credits*

730. Compiler Design.

Overview of compilers; programming languages and the syntactic specification of programming languages; lexical analysis, parsing techniques; top down parsing; recursive descent parsing; shift-reduce parsing; error recovery techniques; code generation and optimization; design and implementation of a compiler carried out as a class project. (Required is knowledge of a high level programming language-Fortran, Basic, PL/I.) *Three credits*

762. Modeling and Simulation.

Review of probability distributions; random number testing and generation; mathematical models; Markov chains; simulation methods; data analysis; Monte Carlo methods. *Three credits*

763. Data Structures and Computer Algorithms.

Sequential and parallel algorithms for non-numerical and numerical applications. Algorithm complexity analysis, basic data structures, searching, sorting graph, and numerical algorithms. *Three credits*

764. Data Base Management Systems (DBMS).

Software and hardware design problems for DBMS; an overview of data base systems, data manipulation languages, normal forms, machine architectures. *Three credits*

795. Selected Topics in Computer Engineering.

Topics of current interest to graduate Computer Engineering students; subject matter will be announced in advanced of semester offering. *Three credits*

Mechanical Engineering Program

Zella L. Kahn-Jetter, Ph.D., P.E.
Chair, Department of Mechanical Engineering

Bahman Litkouhi, Ph.D., P.E.
Director, Graduate Program

Mission:

The Master of Science in Mechanical Engineering degree program is designed to provide a contemporary, person-centered educational experience characterized by high academic standards, reflection on values and principles, and preparation for a lifelong career. It is intended to prepare individuals for advanced technical positions or for admission to doctoral programs.

Objectives:

The objectives of the program are: (a) to instruct graduate students on the theories associated with advanced mechanical engineering topics with particular emphasis on the areas of HVAC, computer aided engineering, and thermal/fluid systems, (b) to instruct them on the practices and operations associated with working in industry so that graduates will be able to function effectively and efficiently in the high technology industrial environment of today, and (c) to prepare them for more advanced studies.

Admission Requirements:

Applicants must possess:

1. a baccalaureate degree in mechanical engineering from a program accredited by the Engineering Accreditation Commission of ABET, Inc., or from a recognized foreign institution;
- or,
2. a baccalaureate degree in another area of engineering, physics, or mathematics.

Applicants who have a baccalaureate degree in another area of engineering, physics, or mathematics may be admitted into the program provided they complete undergraduate prerequisites specified by the Department Graduate Program

Director. These courses must be completed with a minimum grade point average of 3.00 with no grade lower than C. These courses will not satisfy any requirements for the Master of Science in Mechanical Engineering degree.

Generally, students must complete prerequisite courses before they are permitted to register for graduate courses. Exceptions require the recommendation of the Department Graduate Program Director and the approval of the Dean of Engineering.

Degree Requirements:

A student must complete thirty credits, including ENGG 614 Engineering Mathematics. Except for students enrolled in the Seamless Masters program, a maximum of four 500-level courses may be credited to the MS degree. Students enrolled in the Seamless Masters program may receive credit for a maximum of five 500-level courses. Either MCEG 742 Advanced Study or MCEG 748 Thesis may be undertaken by a student who has successfully completed nine credits as a matriculated graduate student. A proposal approved by the Department Graduate Program Director is required before a student may register for either of these courses. Electives may also be selected from Graduate Core courses with the advice and approval of the Department Graduate Program Director.

Course Descriptions (MCEG)

512. Energy Conversion.

Overview of thermodynamic concepts, application of first and second laws of thermodynamics to improve efficiency of gas turbines and power generation systems, combustion of hydrocarbon fuels, reacting systems, conventional and innovative energy conversion applications such as solar, wind, wave, tidal, ocean thermal, and geothermal energy. *Three credits*

516. Turbo Machinery.

Review of fundamentals of fluid mechanics; dimensional analysis in fluid machinery; classification and characteristics of fluid machinery; component efficiencies; incompressible flow machines; compressible flow machines. *Three credits*

525. Analysis and Design HVAC Systems.

Indoor air quality and human comfort, economy and environmental protection requirements. Heating and cooling loads. Introduction to equipment selection and system analysis. *Three credits*

528. Combustion Systems.

Fundamentals of combustion processes, thermochemistry, equilibrium, adiabatic flame temperature calculations, thermodynamic cycle analyses and performance estimations of turbojets, turbofans, turboshaft, and ramjet engines, preliminary design of liquid and solid propellant rockets. *Three credits*

546. Manufacturing Engineering.

Group projects emphasizing design for manufacturing, manufacturing system simulation, and prototype fabrication. Concurrent with projects are lectures on modern manufacturing technologies. Includes a two-hour laboratory. *Three credits*

548. Introduction to Robotics.

The geometry and mathematical representation of rigid body motion, forward and inverse robot kinematics, robot dynamics, trajectory generation, position sensing and actuation, and the control of manipulators. *Three credits*

701. Viscous Flow Theory.

Development of the Navier-Stokes equation; solutions for special cases. Dimensionless forms; low and high Reynolds number forms. Boundary layer theory (similarity solution); Application to flow over a flat plate, and flow in ducts. Introduction to potential theory. *Three credits*

702. Compressible Flow.

Linearized sub- and supersonic flow past slender bodies. One- and two-dimensional and axisymmetric flows, including normal and oblique shocks. Similarity laws. Method of characteristics. *Three credits*

704. Computational Fluid Dynamics.

Study of numerical methods in fluid mechanics including: finite differencing, numerical errors and stability, nonlinear convection terms, boundary conditions, and turbulence. *Three credits*

706. Advanced Engineering Thermodynamics.

First and second law analysis of engineering systems; equations of state and properties of working fluids, including real gases; multi-phase and multi-component systems in thermodynamic equilibrium; availability and irreversibility. *Three credits*

707. Conduction Heat Transfer.

Development of basic equations of heat conduction; analytical and numerical solutions of transient and steady state temperature distributions in solids; applications involving heat generation and varying physical properties. Computer projects. *Three credits*

708. Convection Heat Transfer.

Continuity, momentum, and energy equations for engineering fluids; exact and approximate solutions for laminar and turbulent flows; free and forced convection, boiling and condensation; selected applications. *Three credits*

709. Radiation Heat Transfer.

Black body and non-black surface radiation; radiative properties of real materials; configuration factors; multi-face radiation exchange in enclosures; radiative transfer in participating and radiative properties of gases; application to problems involving convection and radiation. *Three credits*

711. Aerodynamics.

Principles of aerodynamics, wing theory, one-dimensional isentropic flow, steady and unsteady normal shock waves, oblique shock waves, steady and unsteady expansion waves, nozzle flow. *Three credits*

714. Computer Aided Design.

Introduction to CAD, solid modeling, analysis and optimization. Introduction to finite element packages, practical integration of CAD, system assembly and dynamic simulation. *Three credits*

720. Robotics and Automation.

Introduction to robotics and automation; flow-line production; numerical control and CAD/CAM; group technology and flexible manufacturing systems; robotic industrial applications; robot decision making; programmable robotic automation. *Three credits*

728. Introduction to MEMS.

Study of microelectromechanical (MEM) devices, with an emphasis on their manufacturing, mechanical behavior and application, including material properties, microfabrication technology, mechanical behavior of microstructures, design, packaging, and fabrication of MEMS, with an emphasis on micro engines, actuators, and sensors. *Three credits*

734. Production Engineering.

Presentation of the analysis associated with managing manufacturing operations. Topics covered will be decision-making, forecasting, materials requirement planning, queuing, project management, and aggregate planning. *Three credits*

735. Theory of Vibration.

Concepts underlying the dynamics of vibrations for single-degree of freedom and multi-degree of freedom mechanical systems, the use of Newtonian, virtual-work, and Lagrangian variation methods for analyzing vibrating systems for transient, steady state, and forced single and multi-degree of freedom linear system, an introduction to non-linear systems, and the use of numerical and simulation techniques. *Three credits*

736. Design of Machine Elements.

Strain energy method for analyzing statistically indeterminate machine members; theories of failure; fatigue; optimum design of machine elements; stress waves and impact loading, critical speed. Finite element modeling of various machine members. *Three credits*

738. Advanced Dynamics.

Kinematics, formulation of equations of motion for a particle, system of particles and rigid bodies, holonomic conservative and non-conservative systems, work-energy principles, three dimensional motion of rigid bodies, Lagrangian methods, and the Hamilton methods. *Three credits*

741. Special Topics in Mechanical Engineering.

Special topics in mechanical engineering of current interest to graduate students; subject matter will be announced in advance of particular semester offering. *Three credits*

742. Advanced Study in Mechanical Engineering.

Individual study of a selected topic in mechanical engineering under the supervision of a faculty member. *Prerequisite: Advisor's approval of topic.* *Three credits*

748. Thesis in Mechanical Engineering.

Original investigation or design in field of mechanical engineering; topic is to be chosen by student with approval of faculty advisor and the graduate program director; written report and oral presentation required. *Prerequisite: Advisor's approval of topic.* *Six credits*

Course Descriptions (ENGG — Mechanical Related)

610. Numerical Methods.

Formulation of numerical techniques for solution of engineering problems; typical subject material includes linear and nonlinear equations, systems of equations, boundary value and initial value problems in ordinary and partial differential equations, matrix algebra, etc. Applications from various engineering disciplines are emphasized and computer solutions stressed. *Prerequisite: Permission of the Instructor.* *Three credits*

612. Finite Element Methods.

Derivation of element equations using direct, variational, and residual methods; multidimensional problems in the steady state and transient domains; use of general purpose finite element computer programs; application from a variety of engineering disciplines. *Prerequisite: Permission of the Instructor.* *Three Credits*

614. Engineering Mathematics.

Mathematical formulation of problems of importance to engineering; solutions of ordinary and partial differential equations; mathematical series and orthogonal functions and their applications; matrix algebra; applications from a variety of engineering disciplines are emphasized. *Prerequisite: Permission of the Instructor.* *Three Credits*

620. Applications of Instrumentation and Data Acquisition.

Operation, application, and selection of engineering instruments for measuring common engineering variables, e.g. position, velocity, temperature, pH, force, pressure, strain, flow rate, light intensity, concentration, etc.; sensors, data acquisition and processing. Output devices, including logic and actuator operation and selection. Computer-based data acquisition and automated analysis are considered. *Three credits*

650. Engineering Economics.

Techniques for estimating investment and operating expenses; profitability analysis including depreciation and taxes in cash flow; methods for comparing alternate investments; market estimation and location efforts; applications from a variety of engineering disciplines. *Three credits*

652. Project Management

Study of the content, planning, and control of an industrial project; comparison of functional management and project management, the role of the Engineering Manager, project organization structures, project planning, use of critical path methods and project control; emphasis on the project management concept and its applicability to a wide

range of industrial projects; the case study method is used to examine a variety of specific management issues, e.g. staffing, controlling and directing the project, identifying and resolving critical issues, anticipating and solving team personnel problems, etc.; various managerial decision tools and project control methods, such as CPS and PERT are discussed. *Three credits*

654. Quality Management for Engineers.

Methods for improving the quality of engineered products and processes. Total Quality Management (TQM), Quality Function Deployment (QFD), Concurrent Engineering, Basic Statistics, Acceptance Sampling, Statistic Process Control (SPC), Reliability, Taguchi Techniques, introduction to Quality Assurance. *Three credits*

656. Engineering Optimization.

Introduction to optimization problems; mathematical preliminaries; unconstrained nonlinear optimization; one-dimensional search methods; equality and inequality constrained nonlinear optimization; linear programming; engineering applications to cost minimization, optimum system design and operation. *Three credits*

658. Legal Aspects of Engineering.

Basic legal doctrines, professional-client relationship, design and practice problems. Fundamental concepts of contract law. Topics include American judicial system, contracts, quasicontracts, agency, licensing, client obligations, construction process, liability of engineers, copyrights, patents and trade secrets. *Three credits*

680. Advanced Strength of Materials.

Stressed in multidimensions; symmetrical and unsymmetrical bending; shear center; curved beams; beams on elastic foundation; beam columns; thin plates; torsion of noncircular sections; thin walled cylinders; general and symmetric bending of straight bars, curved beam and plates; applications from several engineering disciplines. *Prerequisite: Undergraduate solid mechanics course.* *Three credits*

682. Applied Heat Transfer.

Topics in the process heat transfer including: steady state and transient conduction, free and forced convection, radiation and combined models, heat transfer with phase change; applications come from a variety of engineering disciplines and can include: design and rating of various heat exchangers, condensers and evaporators; heat pipes; solar collectors; electronic cooling, etc. *Prerequisite: Undergraduate heat transfer course.* *Three credits*

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(Date in parentheses following the listing of each person indicates the academic year of appointment to Manhattan College.)

Brennan R. O'Donnell

President of the College

B.A. 1981, Penn State University; M.A. 1983, Ph.D. 1987, University of North Carolina at Chapel Hill. (2009)

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Executive Vice President and Provost

B.A. 1972, Morehouse College; Ph.D. 1978, Harvard University. (1996)

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Director of the Libraries

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