School of Science and Engineering

Daniel Jelski, Ph.D., Dean

(845) 257-3728

Mildred and Louis Resnick Engineering Hall

www.newpaltz.edu/sse/

BIOLOGY

(845) 257-3770
www.newpaltz.edu/biology/

Professors:
Hon Ho (chair), Ph.D., University of Western Ontario
Denis Moran, Ph.D., New York University
Associate Professors:
Aaron Haselton, Ph.D., University of Massachusetts
Maureen Morrow, Ph.D., Columbia University
Thomas Nolen, Ph.D., Cornell University
Carol Rietsma, Ph.D., Rutgers University
Assistant Professors:
Jeffrey Reinking, Ph.D., Cornell University
Jennifer Waldo, Ph.D., Cornell University

■ MASTER OF ARTS IN BIOLOGY

Students may pursue the master's degree in biology as preparation for doctoral studies or to gain additional background and training to enter applied fields in biology. Students holding provisional certification as high school biology teachers may also use the program to complete requirements for permanent certification.

The Department of Biology offers two types of MA degrees:

(1) thesis MA
(2) non-thesis MA

The non-thesis option requires the student to take more formal course work than the thesis MA and to display competence in several areas of biology on a written comprehensive examination.

The thesis option, with its emphasis on research, continues to serve those students who intend to go on for the Ph.D. or for a career in research upon completion of the MA degree.

The non-thesis option, with its more structured program, serves all qualified students who want additional training in biology and a graduate degree upon completion of their studies.

Admission Requirements

Two official copies of all undergraduate and graduate course work; the baccalaureate degree in Biology or the equivalent should be from a regionally accredited institution with a 3.0 cumulative grade point average (GPA) in the major, and a 3.0 cumulative overall grade point average.

The undergraduate program should include one year of general chemistry and one semester each of organic chemistry, physics, calculus, and statistics.

Three letters of recommendation.

Satisfactory scores on the GRE Verbal and Quantitative Aptitude and the Advanced Biology test.

(Deficiencies in either of the above may be removed by taking appropriate undergraduate courses or by earning satisfactory scores on appraisal or proficiency tests as designated by the department).

Application Deadlines

October 1st for Spring Semester

April 1st for Fall Semester

Program Requirements

Thesis Option/Non-thesis Option

File a "plan of study" during the first semester after matriculation.

Complete prescribed course work within five years after matriculation.

Maintain a cumulative average of 3.0 or better, with no more than two grades below B-.

Curriculum Requirements Thesis Option / 30 credits

A minimum of 30 credits of graduate course work in Biology, including 24 credits in course work.

Independent research equal to at least six credits and culminating in a fully documented thesis to be examined by a faculty committee. The thesis must be defended orally and after approval by the committee, a final copy must be submitted to the library. The student is responsible for paying the binding fee.

Courses taken more than seven years prior to admission to the program will not be credited toward degree requirements.

Non-thesis Option / 32 credits

A minimum of 32 credits of graduate course work in Biology are required. The following course cannot be used to fulfill the 32-credit requirement: Thesis in Biology. Independent study or fieldwork shall be limited to no more than six credits.

A maximum of eight transfer credits from an accredited institution may be accepted toward the 32-credit requirement. A grade of B- or better is required for transfer credits.

Upon completion of the 32 credits, the student must pass a written comprehensive examination. The examination tests for competence in three areas of biology selected from among the following six areas: (1) Cell/Molecular Biology, (2) Developmental Biology, (3) Environmental Biology, (4) Genetics, (5) Organismal Biology, and (6) Physiology and Biochemistry. The MA comprehensive examination is given twice a year on common exam days in May and December. Arrangements must be made with the Biology Department Office at least one month ahead of time.

■ MA/MAT IN BIOLOGY

Motivated graduate students may complete the Master of Arts degree in Biology and the Master of Arts in Teaching (Biology) in a joint MA/MAT program. This joint program is intended for students who wish to have the benefits of additional graduate study in Biology through the MA program and who wish to earn a New York State teaching credential (grades 6-12, Biology) through the MAT program.

Joint Program – Who is Eligible?

Students who are accepted into the MA (Biology or MAT (Biology Education) may apply for admission to the Joint Program after they have satisfactorily completed at least 6 graduate credits in Biology with a GPA of at least 3.0. Students who have already completed the MAT or MA in Biology may apply for the additional degree that the Joint MA/MAT Program affords them. Their matriculation into the Joint Program must be within five years of the matriculation date for their first degree, and they must complete the Joint Degree program within seven years of the matriculation date for their first degree.

Joint Degree Application Process

- After completing 6 graduate credits in Biology, students meet with their graduate advisor to discuss their intentions;
- Students then will be advised to write an application essay in which they explicate their reasons for wanting the additional degree;
- Students request an additional letter of recommendation supporting them in this endeavor (if they are going the MAT+MA route, they would need a letter from a Biology professor. If they are going the MA+MAT route, they would need a letter from someone who can speak to their talents for working with young people);
- Students send a paper application (pages 1-2), application essay, additional letter of recommendation and a cover letter requesting consideration for the joint MA/MAT program to the Graduate School in the Haggerty Administration Building, Room 804. The Graduate School will direct the application to both departments for approval.

Transfer Credits

Students who are enrolled in or have completed the MA in Biology will be permitted to transfer up to 15 graduate credits in Biology into the MAT program. Students who are enrolled in or have completed the MAT in Biology will be permitted to transfer up to 15 graduate credits in Biology into the MA program.

This transfer policy is available only to students who are enrolled in or have completed the first graduate degree program at SUNY New Paltz, and the credits must be transferred within seven years of matriculation in the first degree program. No more than six credits of graduate work at another institution may be transferred into either the SUNY New Paltz MA or MAT program.

Degree Program Time Limit

Students have seven years to complete both degrees.

Graduate Student Support

A limited number of Graduate Research Assistantships and Graduate Teaching Assistantships are usually available for qualified full-time students. Contact the Biology Department as soon as possible for an application.

COURSES

BIO505 Transmission Electron Microscopy (4)
This course has the format of a research project. Students are taught how to use the transmission electron microscope (TEM) as a research tool in the bio-medical disciplines. Students learn first hand the procedures associated with biological sample preparation: embedding, sectioning, staining, examination in the TEM and printing of the final electron photomicrographs.

BIO508 Scanning Electron Microscopy (4)
The principles of microscopy sciences with emphasis on the use and applications of the scanning electron microscope (SEM). The course examines the theoretical basis of biological scanning electron microscopy and provides a practical introduction to the operation of the SEM.

BIO509 Advanced Ornithology (4)
Birds of the world, their taxonomy, anatomy, geographic distribution, ethology, and ecology; laboratory devoted to anatomical studies; methods of photographing birds, recording of bird songs, uses of telemetry, bird behavior, life history studies, identification of local species.

BIO510 Fungal Biology (4)
Morphology, development, physiology, and ecology of fungi, their significance in diseases, and their utilization by man.

BIO511 Advanced Vertebrate Zoology (4)
Morphology, physiology, geographical distribution, and evolution of vertebrates of the world. Field and laboratory work devoted to studying.

BIO514 Plant Diseases (4)
Nature and cause of disease in plants. Special emphasis on fungal diseases of plants.

BIO516 Molecular Biology (3)
Basic theory and techniques of molecular biology with the analysis of current molecular advances in diverse fields of study. Class discussions, independent literature research, written and oral presentations required.

BIO517 Molecular Biology Laboratory (3)
Current molecular techniques and theory. Cloning, PCR, DNA preparation, RNA preparation, Southern blots, Northern blots and tissue culture techniques will be employed and analyzed within the context of the immune system. Project required..

BIO519 Wetlands Ecology (4)
An introduction to the ecology of wetland ecosystems. Structure and function of different types of wetlands will be compared. Alteration and protection will be examined as well as methods used to study them.

BIO520 Advanced Entomology (4)
Major orders of insects with emphasis of life histories. Laboratory opportunity for individual studies of life histories and taxonomic studies of selected orders and families.

BIO525 Animal Communication (3)
Theory and controversy in the study of animal communication. The various functions, mechanistic, adaptive and evolutionary approaches to communication, information theory, signal transmission, signal reception and human

language will be explored. Examples of communication systems will be surveyed across a wide range of taxonomic groups. Examples of hypothesis testing and the analysis of signals will be the focus of class discussions.

BIO528 Endocrinology (3)
An introduction to the basic principles of endocrinology followed by a study of the physiology and biological chemistry of endocrine tissue and their secretions.

BIO530 Human Genetics (2)
Current status of human genetics, with emphasis on molecular aspects. Topics include pedigree analysis, gene mapping strategies, genome organization, chromosone abnormalities, mutations, genetic basis of cancer and the Human Genome Project.

BIO540 Immunology (3)
The genetic, cellular, molecular, developmental and biochemical aspects of the immune system will be covered. These aspects are discussed in relation to the disease process and experimental analysis. Discussions of current research are included.

BIO545 Cell Development and Differentiation (3)
Emphasis is placed upon the mechanisms by which cells specialize during embryogenesis, wound healing, regeneration and transformation. Specific attention to the mechanisms of movement, shape acquisition, and biosynthesis as well as certain new ideas regarding their genetic control.

BIO546 Human Embryonic Development (3)
Focuses on the embryology and anatomy of human development. In addition the physiological changes in the pregnant woman are discussed with regard to the developing embryo and fetus.

BIO550 Recent Advances in Biology (1-4 variable)
Recent developments in a specialized field of biology. May be repeated for credit at five-year intervals for the same special field.

BIO561 Endangered Species (3)
Focuses on the conservation of biological diversity: Topics include value of bio-diversity, threats to bio-diversity, vulnerability of species to extinction, conservation of populations and species, and protection of bio-diversity at international, national and local levels.

BIO562 Biotechnology (3)
Underlying principles and recombinant DNA methods employed to produce genetically modified organisms for agricultural, environmental, industrial, pharmaceutical and biomedical purposes are covered. Discussions on societal and ethical issues involving biotechnology are included.

BIO563 Electron Microscopy (5)
Theory and application of scanning electron microscopy (SEM) and transmission electron microscopy (TEM) are covered. Laboratory includes all aspects of specimen preparation and use of SEM, x-ray diffraction analysis and TEM. This is an advanced course and requires that students have the ability to work individually, taking precautions with hazardous chemicals and delicate equipment.

BIO590 Thesis in Biology (6)
Writing and defense of a thesis under guidance of major professor. Required form available in the Records and Registration Office.

CHEMISTRY

(845) 257-3790
www.newpaltz.edu/chemistry

Professors:
Daniel Jelski, Ph.D. (Dean), Northern Illinois University
David Lavallee, Ph.D., Chicago University
Associate Professors:
Preeti Dhar, Ph.D., Indian Institute of Technology
Daniel Freedman (chair), Ph.D., University of Minnesota
Pamela St. John, Ph.D., University of California
Assistant Professors:
Megan Ferguson, Ph.D., California Institute of Technology
Frantz Folmer-Andersen, Ph.D., University of Texas
Albert Gawer, Ph.D., Columbia University
Lecturer:
Gissel Verdecia Mentore, Ph.D., Rensselaer Polytechnic Institute

■ MASTER OF ARTS IN CHEMISTRY

There are no fellowships for full-time students. The frequency of course offerings requires at least four semesters. Summer courses are required to finish course work.

The Chemistry Department is not accepting applications to the MA program at this time.

Admission Requirements

Two official copies of all undergraduate and graduate course work, including a baccalaureate transcript from a regionally accredited institution with a major in chemistry (curriculum approved by the American Chemical Society or equivalent).

A 3.0 cumulative undergraduate grade point average in science and mathematics courses, and a 3.0 overall grade point average. Applicants may be admitted if undergraduate deficiencies are satisfactorily removed with a 3.0 average.

Satisfactory scores on the GRE Verbal and Quantitative aptitude test or its equivalent.

Three letters of reference.

Formal admission to the program will require completion of at least six graduate credits with an average grade of B. This requirement must also be met before a student can commence research work.

Program Requirements

File a "plan of study" during the first semester after matriculation.

Completion of prescribed course work within six years after matriculation.

Maintain a cumulative grade point average of 3.0 or better, with no more than two grades below B-.

Recommendation for the degree by the graduate chemistry faculty.

Curriculum Requirements

The department offers two options for completing an MA in Chemistry: Thesis Option and Non-thesis Option. Three courses with a grade of B- or better may be transferred from approved institutions if taken no more than five years prior to matriculation.

Electives may be selected from chemistry courses. With permission, up to 12 credits in other disciplines may be selected.

Thesis Option / 30 credits
A minimum of 30 credits of graduate work, including six credits of 22590, Thesis in Chemistry. Students who complete a research thesis are required to defend the thesis orally.

Non-thesis Option / 36 credits
A minimum of 36 credits of which 3-6 credits are to be taken under advisement concentrating on a suggested project. This option is available only to part-time students.

COURSES

CHE503 Advanced Organic Chemistry (3)
Topics of current interest in organic research. Prerequisite: CHE319 or 22319.

CHE509 Spectrometric Identification of Organic Compounds (3)
Application of spectrometry (mass, infrared, ultraviolet and nuclear magnetic resonance) to the identification of organic compounds. Prerequisite: CHE319 or 22319 and PHY202 or 75202.

CHE512 Advanced Inorganic Chemistry (3)
Atomic structure, periodicity, ionic and covalent bonding; acid-base and solution chemistry; bonding theories and structure of transition metal complexes. Prerequisite: CHE314 or 22314 and CHE321 or 22321.

CHE531 Separation Methods in Chemistry (3)
A course that applies physical, chemical and equilibrium properties to the problems of isolating components in analytical processes with emphasis on chromatographic procedures. Applications from current literature. Prerequisite: CHE303 or 22303 and CHE321 or 22321.

CHE535 Chemical Engineering for Chemists (3)
Expands skills and techniques acquired in physical chemistry by providing applications to large systems of reaction occurring in flow systems. Introduction to the mass, momentum and energy balances and design concepts familiar to chemical engineers. Not for engineers.

CHE570 Biochemistry (3)
Structure of biomolecules and their assemblies and the chemical reactions of metabolic processes. Molecular aspects of gene replication, transcription and translation. Prerequisite: CHE319 or 22319 and CHE461 or 22461.

CHE572 Biotechnology Laboratory (4)
Methods of modern biotechnology, including molecular cloning, gene isolation, gene amplification, design and creation of recombinant plasmids and phages, site-specific mutagenesis, isolation and sequencing of recombinant DNA. Prerequisite: CHE319 or 22319 and CHE461 or 22461 and BIO320 or 15320 and BIO350 or 15350.

CHE573 Principles of Physical Chemistry (3)
Fundamental principles and their application in thermodynamics, solution and phase equilibria, the solid state, and topics such as physical chemistry of surfaces. Not open to undergraduate chemistry majors. Prerequisite: CHE202 or 22202 and MAT252 or 64252.

CHE574 Principles of Polymer Sciences (3)
Principles of formation and behavior of large molecules and their relationship to industrial and biochemical applications. Prerequisite: CHE319 or 22319.

CHE575 Principles of Materials Science (3)
Understanding of the relation between the properties of materials and composition and structure; electronic structure of the atom, and its relationship to the chemical bonding in solids; atom packing and crystal structures. Relationship of structure, including defects, to mechanical, electrical, and thermal properties of polymers in relation to structure; composite materials; and surface defects: corrosion, friction, adhesion. Prerequisite: CHE319 or 22319 and PHY202 and 75202.

CHE590 Thesis in Chemistry (1-6)
An individual research project conducted under the direction of a faculty advisor. Required form available in the Records and Registration Office.

COMPUTER SCIENCE

(845) 257-3990
www.newpaltz.edu/compsci

Professors:
Chirakkal Easwaran, Ph.D., University of Calgary
Lawrence Fialkow, Ph.D., University of Michigan
Keqin Li, Ph.D., University of Houston
Associate Professors:
Anthony J. DosReis, Ph.D., Rensselaer Polytechnic Institute
Hanh Hong Pham, Ph.D., Ikraine
Paul R. Zuckerman (chair), Ph.D., New York University, J.D., Yeshiva University
Assistant Professor:
Andrew Pletch, Ph.D., Carleton University

■ MASTER OF SCIENCE IN COMPUTER SCIENCE

This program provides students with a foundation for professional work or doctoral level study in Computer Science. Courses include current programming technologies and application areas, and theoretical Computer Science. Students use both Linux and Windows work stations for program development.

Admission Requirements

Two official copies of all undergraduate and graduate course work, including a baccalaureate transcript from a regionally accredited institution, indicating at least a 3.0 cumulative grade point average.

Three letters of reference.

Satisfactory scores on the TOEFL exam, for students whose primary language is not English.

The GRE Aptitude test is strongly recommended for international students.

Before taking graduate computer sciences courses, all students must first pass a preliminary examination covering the contents of Computer Science I: Foundations (25210) and Computer Science II: Data Structures (25310). Students who do not achieve a satisfactory score on the preliminary exam may be required to take preliminary courses, some of which may not count toward the MS degree.

Program Requirements

File a "plan of study" during the first semester after matriculation.

Complete prescribed course work within seven years after matriculation.

Complete course work with a cumulative grade point average of 3.0 or better. No more than two grades below B- will count toward the degree.

Pass the comprehensive examination or submit a thesis.

Submit degree application (see Schedule of Classes for due date).

Curriculum Requirements / 30 credits

Ten Computer Science graduate courses. However, a student may substitute up to three graduate Mathematics or Engineering courses approved by the Graduate Coordinator. Interested students who find a suitable advisor may choose to write a thesis. The thesis counts as two courses, and substitutes for the comprehensive examination as well. Each semester the Department offers a selection of courses from the following list and *topics* courses that reflect the current interests of individual faculty members.

COURSES

CPS500 Computer Graphics (3)
Graphics software and hardware, representation of points, lines, and surfaces in three dimensions, windowing, clipping, hidden surfaces and lines, shading. Prerequisite: CSPR – minimum score.

CPS501 Computer Systems (3)
A study of computer systems covering both software and hardware. Topics include number systems, machine language, assembly language, linking and loading, digital electronics, microprogramming, and computer architecture. Prerequisite: CSPR – minimum score.

CPS505 Computer Simulation (3)
Use of the computer as a simulation tool, discrete and continuous simulation techniques, simulation languages, selected applications such as queuing theory, financial analysis, and simulation of computer systems. Prerequisite: CSPR – minimum score.

CPS515 Programming Languages (3)
A critical evaluation of the design and implementation of programming languages. Topics include: history of programming languages, syntax and semantics, data and control structures, expressions, subprograms, scope and visibility, data abstraction, and exception handling. Prerequisite: CSPR – minimum score.

CPS520 Concurrent Programming (3)
Mutual exclusion, Dekker's algorithm, semaphores, languages for concurrent programming, applications in operating systems. Prerequisite: CSPR – minimum score.

CPS522 Operating Systems (3)
A comprehensive investigation of Operating Systems concepts, including the following topics: Process Management, Memory Management, File Management, Input/Output, and Deadlocks. Examples of these concepts will be illustrated using the Unix operating system. Prerequisite: CSPR – minimum score.

CPS524 Parallel Computation (3)
Efficient parallel algorithms on arrays, trees, hypercubes, and PRAMS for a variety of problems. Structural properties of various network architectures and their relationships. Prerequisite: CSPR – minimum score.

CPS526 Advanced Data Structures (3)
In-depth study of methods for organizing, retrieving, and modifying data in digital computers, as well as mathematical analysis of these techniques. Prerequisite: CSPR – minimum score.

CPS528 Algorithms (3)
Algorithms for a variety of applications. Various design and analysis techniques. Probabilistic and approximation algorithms. Prerequisite: CSPR minimum score.

CPS530 Computer Networks (3)
Network topology and communication media, resource sharing, performance analysis, protocols, local networks. Prerequisite: CSPR – minimum score.

CPS532 Theory of Computation (3)
Computability by Turing machines, grammars, and recursive functions. Uncomputability and computational complexity. Prerequisite: CSPR – minimum score.

CPS535 Formal Languages (3)
Phrase-structure languages, automata and their languages, applications of formal languages to pattern recognition. Prerequisite: CSPR – minimum score.

CPS540 Artificial Intelligence (3)
Basic problem solving methods, game playing, knowledge representation using first order logic, knowledge representation using other logics, theorem proving, pattern recognition, symbolic processing. Prerequisite: CSPR – minimum score.

CPS545 Advanced Operating Systems (3)
The study of modern operating systems: Process, memory, device, and file management; virtual machines, distributed systems, security, reliability, performance analysis. Prerequisite: CSPR – minimum score.

CPS550 Software Engineering (3)
Program development tools, structured design and programming methodologies, software testing and validation, managing software development. Prerequisite: CSPR – minimum score.

CPS 552 Object Oriented Programming (3)
The concepts of object oriented programming -- encapsulation, aggregation, inheritance, constructors, destructors, polymorphism, and templates. Various choices for design and implementation. Writing programs is typically a major component of this course. Prerequisite: CSPR – minimum score.

CPS554 User Interface Programming (3)
Introduction to methodologies, techniques, libraries, interfaces, and tools to design and implement window-based graphical user interfaces. The course is typically a programming intensive course. Prerequisite: CSPR – minimum score.

CPS555 Advanced Database Principles (3)
Recovery, integrity, concurrency, data models, extended relational model, distributed databases, database machines. Prerequisite: CSPR – minimum score.

CPS560 Cryptography (3)
Transposition ciphers, substitution ciphers, algebraic systems, block ciphers, public key systems, data encryption standard. Prerequisite: CSPR – minimum score.

CPS565 Compiler Design (3)
Compiler design and implementation using top-down and bottom-up parsing. Scanner and parser generators. Prerequisite: CSPR – minimum score.

CPS567 Compiler Optimizations (3)
An overview of the evolving field of compiler optimizations. Internal program representations, local and global optimizations, control flow analysis, data flow frameworks, static single assignment form, control dependence analysis, automatic parallelization, interprocedural analysis, pointer alias analysis, loop transformations. Prerequisite: CSPR – minimum score.

CPS570 Systems Programming (3)
Systems programming in assembly and/or high-level language. Students will write several systems programs, such as a RAM disk and a virus detection program. Prerequisite: CSPR – minimum score.

CPS575 Advanced Computer Architecture (3)
Study of current trends in computer architecture with topics selected by instructor. Among these may be parallel processing, capability-based systems and microprocessor architecture. Prerequisite: CSPR – minimum score.

CPS580 Functional Programming (3)
The functional language mode, lambda calculus, functional programming in one or more languages, the design and implementation of an interpreter for a functional programming language. Prerequisite: CSPR – minimum score.

CPS590 Thesis in Computer Science (6)
Preparation and writing of a thesis under the guidance of graduate faculty. Required form available in the Records and Registration Office. Prerequisite: CSPR – minimum score.

ELECTRICAL ENGINEERING AND COMPUTER ENGINEERING

(845) 257-3720
www.engr.newpaltz.edu

Professors:
Ghader Eftekhari, Ph.D., PE, University of Nottingham, England
Hassan Kalhor, Ph.D., PE, University of California, Berkeley
Associate Professors:
Julio Gonzalez (Associate Dean, School of Science and Engineering), Ph.D., Colorado State University
Baback Izadi (chair), Ph.D., Ohio State University
Damodaran Radhakrishnan, Ph.D., University of Idaho
Faramarz Vaziri, Ph.D., University of Houston
Mohammad Zunoubi, Ph.D., Mississippi State University
Assistant Professors:
Yaser Khalifa, Ph.D., University of Wales Cardiff
Ying Lin, Ph.D., Syracuse University
Instructor:
Michael Otis, M.S.A.S., SUNY Binghamton

■ MASTER OF SCIENCE IN ELECTRICAL ENGINEERING *(265)*

The Master of Science in Electrical Engineering program offers courses in electromagnetic fields and waves, telecommunications, computer engineering, electronics and control systems. The program has two options: thesis and non-thesis. The thesis option emphasizes research and requires submission of a thesis in addition to taking elective courses in electrical engineering. This option requires the completion of 30 credits, 24 course credits and 6 thesis credits. The non-thesis option requires completion of 30 course credits and successful passing of a comprehensive examination. Each student can elect courses from an approved list of electrical engineering and cognate courses according to his/her research interest.

The program, which can be pursued either full- or part-time, is designed to serve recent graduates and practicing engineers who need in-depth knowledge in the rapidly changing and expanding areas of electrical engineering beyond what can be included in the traditional bachelor's program.

Admission Requirements

Two official copies of all undergraduate and graduate course work. A bachelor's degree in Electrical Engineering or a closely related field from an ABET-accredited program.

A minimum undergraduate cumulative grade point average of 3.0.

Three letters of recommendation attesting to the applicant's aptitude and promise for graduate study.

Acceptable scores on the Graduate Record Examination (GRE), general portion.

English competency according to College procedures and standards. These include a TOEFL score of 550 (213 on the computerized test) and satisfactory performance on the campus-designed and administered English proficiency examination.

On a case-by-case basis, applicants who do not meet all of the conditions for admission may be granted conditional admissions status. These students may register as non-matriculated students for courses of a preparatory nature following the guidance of the Department. They can be considered by the Graduate School for matriculation after this prescribed preparatory work is completed.

Program Requirements

File a "plan of study" during the first semester after matriculation.

Completion of prescribed course work and other requirements within seven years after matriculation.

Maintain a cumulative average of 3.0 or better, with no more than two grades below B-.

Curriculum Requirements

For completion of the program and graduation, students must meet the following requirements:

Thesis Option / 30 credits

Completion of 24 credits (all electives) of graduate courses.

Completion of research and presentation of a thesis counting as 6 credits.

Non-Thesis Option / 30 credits

Completion of 30 credits (all electives) of graduate courses.

Successful passing of comprehensive examination.

Electrical Engineering Electives

Eight (thesis option) and ten (non-thesis option) courses are elected by the student from a list of the department graduate courses in electromagnetic fields and waves, telecommunications, electronics, computer and control systems depending on the students' needs and interest.

The program does not require specialization in a concentration and the student under guidance of a graduate advisor may select courses of interest that will prepare him/her to pursue thesis or future work. Appropriate courses offered by cognate departments may be used to meet this requirement.

MS Thesis in Electrical Engineering

Research, writing and defense of a thesis under the guidance of the major professor. Prerequisite: MS in Electrical Engineering candidate and PI.

Comprehensive Examination

Students with non-thesis option must pass a written comprehensive examination after completing their course work. This examination covers several subjects.

COURSES

EGE505 Analytical Techniques I (3)
Theory of complex variables, analytics, singularities, and complex integration. Cauchy's and residue theorems. Series expansions, Taylor and Laurent series. Conformal mapping. Laplace, Fourier and Z transforms.

EGE506 Analytical Techniques II (3)
Linear algebra. State variables applied to continuous and discrete systems. Linear vector spaces. Matrices and matrix transformation. Cayley-Hamilton theorem. Solution to state equations.

EGE511 Digital Data and Computer Communication (3)
Data transmission. Data encoding. Link control and multiplexing. Network configurations. Packet switching. Computer communications. Protocols and architecture.

EGE512 Advanced Communications (3)
Probability theory and random processes. Behavior of communications systems in presence of noise. Optimum signal detection. Information theory. Error connecting codes. Prerequisite: EGE312 or 40312.

EGE513 Digital Signal Processing (3)
Continuous-time signals and systems. Discrete-time linear systems. State space representation. Discrete Fourier transform. Fast Fourier transform. Digital filter design. Finite wavelength and quantization effects. Prerequisite: EGE311I or 40311.

EGE522 Advanced Analog Circuits (3)
Review of bipolar and MOS transistors. GaAs transistors and circuits. CMOS and BiCMOS amplifiers. Cascade amplifier and its frequency response. Common collector-common emitter cascade and its frequency response. Frequency response of differential amplifiers. Differential amplifier as a wide band amplifier. CMOS and cascade CMOS operational amplifiers. Power MOSFET and class AB power amplifier. Non-linear waveform shaping circuits. Filters, including switched capacitor filters. Prerequisite: EGE321 or 40321.

EGE523 Wireless Communications (3)

Overview of wireless systems, propagation characteristics of wireless channels, modems for wireless communications, cells and cellular traffic, fading and multiple access techniques. Prerequisite: EGE312 or 40312 EGE393 or 40393.

EGE525 Microelectronic Fabrication (3)
The physics and technology of various steps required to fabricate complicated integrated circuits are explained. The Si and GaAs materials will be covered. The course will cover microelectromechanical systems (MEMS) fabrication as well.

EGE532 Computer Arithmetic (3)
Deals with algorithms and architectures used for computer arithmetic. Issues that will be addressed include: number systems and representation, redundant and residue systems. Addition/subtraction circuits. Multiplication, division, square route algorithms, cordic arithmetic system. Floating-point arithmetic systems. Implementation issues -- pipelining, low-power, fault-tolerant designs.

EGE533 Introduction to Parallel Computing (3)
Paradigms of parallel computer systems. Memory system implementation. Cache memory design of multiprocessors. Pipelining, superscalar, and vector processing. Instruction level concurrency. Parallel algorithms. Survey of commercial parallel machines.

EGE534 Fault-Tolerant Design of Digital Systems (3)
Faults and their manifestations. Reliability, availability and maintainability analysis. System evaluation and performance reliability tradeoffs. Hardware, software, code and time redundancy techniques. Fault-tolerant communication in distributed systems. Real-time fault tolerance. Case study of fault-tolerant systems.

EGE535 Low Power VLSI Design (3)
Deals with the design of digital systems for low power dissipation. Issues that will be addressed include CMOS power dissipation, analysis and design tools used for low power digital circuits, design methodologies for low power CMOS circuits, low power memory system designs and a discussion on future challenges in low power digital design. Builds on the VLSI design course previously covered by students in Electrical Engineering/Computer Engineering/Computer Science areas. Students are expected to have a background in circuit theory, electronics, digital logic fundamentals, and probability theory fundamentals. These courses are all covered under core courses in the undergraduate program.

EGE542 Numerical Methods in Engineering (3)
Review of electromagnetic theory and analytical methods. Time domain and frequency domain finite difference methods. Moment methods application to radiation and scattering problems.

EGE543 Antennas and Wave Propagation (3)
Wire antennas and arrays. Aperature antennas and arrays. Solutions of antennas by the moment method. Antenna synthesis and optimization.

EGE544 Microwave Circuits (3)
Review of transmission lines, waveguides, impedance matching and scattering parameters. Microwave resonators, power dividers, directional couplers, and hybrids, microwave litters, microwave defectors, mixers, amplifiers, and oscillators.

EGE545 Satellite Communication (3)
Satellite orbits and their effect on communication systems. Design of communication satellites and their sub systems. Communication link analysis. Modulation. Multiplexing. Multiple access. Encoding and error correction. Atmospheric propagation effects.

EGE551 Logic Synthesis Optimization (3)
The aim of this course is to present automatic logic synthesis techniques for computer-aided design (CAD) of very large-scale integrated (VLSI) circuits and systems. This course will broadly survey the state of the art optimization, and give a detailed study of various problems pertaining to the logic-level synthesis of VLSI circuits and systems, including: two level Boolean network optimization, multi-level Boolean network optimization, technology mapping for library-designs and field programmable gate-array (FPGA) designs, and state-assignment and re-timing for sequential circuits. This course will also cover various representations of Boolean functions, such as binary decision diagrams (BDDS), and discuss their applications in logic synthesis.

EGE561 Adaptive Control (3)
Basic concept of adaptive control. Real time parameter estimation. Model reference adaptive systems. Self-tuning regulators stability. Auto tuning. Gain scheduling. Perspectives on neural networks. Prerequisite: EGE317 or 40317.

EGE562 Optimal Control (3)
Review of matrix algebra, gradients and series. Introduction to optimization problems. Static optimization. Dynamic optimization. Maximum principle -Hamiltonian. Linear regulator and associated topics. Output feedback problems. Prerequisite: EGE316 or 40316.

EGE564 Non-Linear Control (3)
Phase plane analysis. Lyapunov analysis. Advanced stability theory. Describing function analysis. Feedback linearization design. Sliding control design. Prerequisite: EGE316 or 40316.

EGE570 Fiber Optic Technology (3)
This class will provide an introduction to optical fiber communication systems. Topics to be covered include lasers and other optical transmitters, optical receivers, fiber optic cable design, link budgets and noise sources, and the design of practical fiber networks. Data encoding and standard protocols including SONET, Ethernet, Fibre Channel, and others will be covered, as well as time and wavelength multiplexing, optical amplifiers, and advanced research topics such as optical MEMs, nanofibers and parallel optical links.

EGE575 Heterostructure Devices (3)
This course deals with physics of semiconductor devices made using different semiconductors such as bipolar heterojunction transistor and modulation doped field effect transistor. In some cases the thickness of layers are thin enough that electron shows quantum behavior effect such as resonant tunneling transistor and superlattices. Prerequisite: Graduate standing.

EGE580 Power Electronics (3)
Covers the fundamentals of power electronics such as steady state modeling of converters in continuous and discontinuous conduction modes, operation of inductor, transformer and semiconductor switches, buck converter topology manipulation, dynamics of converters in continuous conduction mode, control theory in the context of switching converters and design of feedback controllers.

EGE590 Thesis in Electrical Engineering (6)
Research, writing and defense of a thesis under the guidance of the major professor. Required form available in the Records and Registration Office. Required each semester after thesis research project is begun.

GEOLOGY

(845) 257-3760
www.newpaltz.edu/geology

Professor:
Martin S. Rutstein, Ph.D., Brown University
Associate Professors:
Shafiul Chowdhury, Ph.D., Western Michigan University
Alvin Konigsberg, Ph.D., Syracuse University
Frederick W. Vollmer (chair), Ph.D., University of Minnesota
Assistant Professors:
Alexander Bartholomew, M.S., University of Cincinnati
John Rayburn, Ph.D., SUNY Binghamton

■ MASTER OF ARTS IN GEOLOGY *(205)*

The Geology Department is not accepting applications to the MA program at this time.

Admission Requirements

Two official copies of all undergraduate and graduate course work, including a baccalaureate transcript from a regionally accredited institution including a major in geological sciences with one year's work in chemistry, mathematics through integral calculus, and physics. Our undergraduate liberal arts Option I is used as the basis for beginning work toward the MA degree. (Deficiencies must be removed to the satisfaction of the graduate geology faculty).

A 3.0 cumulative grade point average in the major and an overall cumulative grade point average of 3.0.

Satisfactory scores on the GRE aptitude test. (The 3.0 average may be waived if scores on the GRE aptitude and achievement tests are high.)

Three letters of reference. (A personal interview, while not required, is often helpful).

Program Requirements

File a "plan of study" during the first semester after matriculation.

Completion of the prescribed course work within five years after matriculation.

Maintain a cumulative grade point average of 3.0 or better, with no more than two grades below B-.

Proficiency in a foreign language deemed useful in scientific work (e.g., French, German, Russian, Chinese) or a computer language useful in scientific work. (Foreign language proficiency is evidenced by: completion of two years undergraduate or equivalent graduate study with a 2.5 average; satisfactory scores on the Graduate Foreign Language Examination administered by the Educational Testing Service; or a language translation examination given by a department member with the approval of the department chairperson. Proficiency in a computer language is evidenced by satisfactory completion [C+ or better] of either one semester's study of a scientific computer language [e.g., C or FORTRAN], or by passing an examination administered by the departmental faculty.)

Successful performance on both written and oral components of the comprehensive examination, to be taken after the student has completed 24 credit hours of graduate work.

Curriculum Requirements / 30 credits

A minimum of 30 credits, selected under advisement and approved by the candidate's thesis committee. There are limitations on credits transferable from other schools (8) as well as from when the student was in a non-matriculated status. Thus, candidates for the graduate degree should meet with an advisor early in their program to insure a proper plan of study is prepared.

At least 24 credits must be in course work closely related to the student's interests and area of specialization. Eighteen of these credits must be in geology; six credits may be in cognate fields with the consent of the advisor.

Completion of six credits of 50590, Thesis in Geology. This is independent research culminating in a thesis on

which the student is examined. Each student must maintain active enrollment in 50590 until the thesis is completed. Detailed guidelines for the thesis project are available in the department office.

Competence in field geology demonstrated through a field geology course or completion of an approved term of employment as a geologist in the field.

Detailed and more explanatory graduate student guidelines are available in the Geology Department office. Each student should read these and be familiar with departmental requirements and deadlines.

COURSES

GLG501 Economic Geology (4)
Practical applications of geology. Origin and occurrence of metallic and non-metallic mineral resources such as oil, coal, and uranium and their importance in the world's economy as "one-crop " deposits. Conservation of such valuable natural resources as oil and water. Field trips. Prerequisite: GLG311 or 50311.

GLG502 Advanced Geomorphology (4)
Fluvial, glacial, volcanic, eolian, and solutional land forms and their interpretation. Relationships of climate, weathering, mass wasting, soil development, rock types, and ground water to landscape. Geologic and geomorphic interpretation of topographic maps. Prerequisite: GLG338 or 50338.

GLG504 Geochemistry (4)
Geochemical knowledge and methods of geochemical research. Geochemistry of the lithosphere. Distribution and mobility of the elements in the earth, their relative abundance, migration, and mode of occurrence, and the geochemical structure of the earth. Detailed study of the applications of the principles of physical chemistry to selected geochemical problems. Prerequisite: GLG314 or 50314.

GLG505 Tectonics (3)
Origin and characteristics of the major structures of the earth's crust. Emphasis on plate tectonic theory, including the geometry and kinematics of plate motions, and the structural evolution of mountain belts, rifts, transcurrent fault zones and other regions of crustal deformation. Prerequisite: GLG338 or 50338.

GLG507 Introduction to Hydrogeology (4)
Hydrologic cycle, occurrence and movement of ground water, aquifer analysis and ground water hydrology. Water quality and pollution measurement and abatement. Nature of water supplies, ground water exploration, and conservation of ground water. Prerequisite: GLG220 or 50220 and PHY201 or 75201.

GLG519 Geophysics (3)
Introduction to concepts of geophysics and methods used to study earth; its internal structure. Earth temperatures, seismic waves, gravity, isostasy, and magnetism. Phenomena such as earthquakes, continental drift, sea floor spreading, and mountain building considered. Prerequisite: GLG338 or 50338 and MAT252 or 64252.

GLG533 Analysis of Soils and Sediments (3)
Studies of soils, unconsolidated and consolidated sediments. Investigations: soil pH, bulk density, porosity, soil moisture, beneficiation of acid soils by limestone treatment, particle size distribution. Mineral analyses by chemical stains, microscopy, and X-ray powder diffraction. Prerequisite: GLG311 or 50311 and GLG331 or 50331.

GLG535 Sedimentation (4)
Analysis of the mode of origin of the sedimentary rocks. Principles of sedimentary processes. Relation between sedimentary processes and the sediments found in the continental, eolian, marginal marine, shallow marine, and deep marine environments. Pertinent papers in the literature discussed. Prerequisite: GLG311 or 50311 or GLG331 or 50331.

GLG541 Geology and Geophysics of Petroleum (4)
Origin of petroleum and its mode of occurrence in Earth and the stratigraphic and structural problems involved in the accumulation of petroleum. Principles used in geophysical exploration by the gravitational, magnetic, electric, seismic and radioactive methods. Prerequisite: GLG338 or 50338 and PHY202 or 75202.

GLG543 Principles of Sedimentary Petrology (3)
Petrology and classification of sedimentary rocks. Factors governing sediment dispersal, lithification and diagenesis. Mineralogy and texture of terrigenous clastic sediments as a reflection of possible source terrains. Carbonate petrology

and petrography; consideration of limestone and dolostone textures as environmental indicators. Prerequisite: GLG331 or 50331.

GLG545 Advanced Igneous and Metamorphic Petrology (4)
Origin, classification, distribution and association of igneous and metamorphic rocks. Introduction to the use of microcomputers in petrology. Individual projects emphasizing advanced studies of rocks in thin section and/or computer analysis of petrogenesis. Prerequisite: GLG314 or 50314 and CHE202 or 22202 and PHY201 or 75201.

GLG575 Geology for Teachers (3)
Development of life on earth and geological processes that have shaped its surface: glaciation, erosion, mountain building; earth movements and volcanism. Study of minerals, rocks and a few common fossils. One or two field trips to inspect local geological features. Not open to students seeking a graduate degree in geology or earth science, or those who have taken GLG220 or equivalent.

GLG578 Geology of New York State (3)
Principles, methods and knowledge from the science of geology pertinent to a study of the geologic history of the eastern United States. Emphasis on the development of New York State geology. Evolution of life as shown by the fossil record. Field trips. Not open to students seeking a graduate degree in geology or earth science. Prerequisite: GLG220 or 50220 and GLG575 or 50575.

GLG581 Regional Geology (1-3)
Geology of selected areas of North America. Readings and discussions of the detailed tectonic and petrological evolution of selected classical geological areas. Field excursions to type areas. May be repeated for credit provided listed topic changes.

GLG583 Computer Applications in Geology (3)
Use of computers in the geological sciences. Use of drafting, graphing, contouring, and other software. Basic theory of contouring, curve and surface fitting, least squares methods, data analysis, matrix manipulation, and equation solving. Prerequisite: MPL – minimum score.

GLG585 Geology Seminar (3)
An integrated consideration of some current problems selected from the various branches of geology. Critical reading and evaluation of primary source materials.

GLG590 Thesis in Geology (1-3)
Research, writing and defense of a thesis under the guidance of the major professor. Required form available in the Records and Registration Office. Required each semester after thesis research project is begun.

MATHEMATICS

(845) 257-3532
http://www.newpaltz.edu/math/programs_grad.cfm

Distinguished Professor:
Michael Adams, Ph.D., Bristol University
David M. Clark, Ph.D., Emory University
Professors:
Sunday Chikwendu, Ph.D., University of Washington
Krishnamurthi Ravishankar, Ph.D., Yeshiva University
Hanamantagouda P. Sankappanavar, Ph.D., University of Waterloo
Associate Professors:
Stanley Hayes, Ph.D., University of Texas
David Hobby (chair), Ph.D., University of California, Berkeley
Elaine Kolitch, Ph.D., University of Colorado, Boulder
Assistant Professor:
Diego Dominici, Ph.D., University of Illinois, Chicago
Lecturers:
Melissa Cass, M.S.Ed., SUNY New Paltz
Jacqueline Grace, M.S., Western Washington State College

■ MASTER OF ARTS IN MATHEMATICS *(206)*

The Mathematics Department is not accepting applications to the MA program at this time.

Graduates of this program are well prepared for beginning doctoral work in mathematics, for faculty positions in two-year colleges, and for a variety of occupations in industry.

Admission Requirements

Two official copies of all undergraduate and graduate course work, including a baccalaureate transcript from a regionally accredited institution. Applicants with deficiencies may be required to take appropriate undergraduate courses before admission.

A cumulative grade point average of at least 3.0 in a major in or related to mathematics, an overage grade point average of 3.0, and a satisfactory score on the GRE aptitude test or permission of the Program Director.

Two letters of recommendation from individuals qualified to judge the applicant's mathematical ability.

Program Requirements

File a "plan of study" during the first semester after matriculation.

Complete the prescribed course work within six years after matriculation.

Complete course work with a cumulative grade point average of 3.0 or better. No more than two grades below B- will count toward the degree.

Submit degree application (see Schedule of Classes for due date).

Curriculum Requirements / 30 credits

The 30 credits are distributed as follows:
■ Abstract Algebra I, II (6 credits)
■ Real Analysis I, II (6 credits)
■ Four courses chosen from among: (12 credits) Combinatorics and Graph Theory Point Set Topology I, II Topics in Mathematical Logic and Set Theory I, II Topics in Algebra I, II Other courses approved by the Program Director
■ Successful completion, acceptance, and oral defense of a master's thesis (6 credits)

■ MA/MAT PROGRAM IN MATHEMATICS

The Mathematics Department is not accepting applications to the MA/MAT program at this time.

Motivated graduate students may complete the Master of Arts degree in Mathematics and the Master of Arts in Teaching (Mathematics) in a joint MA/MAT program. This joint program is intended for students who wish to have the benefits of an additional graduate study in Mathematics through the MA program and who wish to earn a New York State teaching credential (grades 6-12, Mathematics) through the MAT program.

Joint Program – Who is Eligible?

Students who are accepted into the MA (Mathematics) or MAT (Mathematics Education) may apply for admission to the Joint Program after they have satisfactorily completed at least 6 graduate credits in Mathematics with a GPA of at least 3.0.

Students who have already completed the MAT or MA in Mathematics may apply for the additional degree that the Joint MA/MAT Program affords them. Their matriculation into the Joint Program must be within five years of the matriculation date for their first degree, and they must complete the Joint Degree program within seven years of the matriculation date for their first degree.

Joint Degree Application Process

- After completing 6 graduate credits in Mathematics, students meet with their graduate advisor to discuss their intentions;
- Students then will be advised to write an application essay in which they explicate their reasons for wanting the additional degree;
- Students request an additional letter of recommendation supporting them in this endeavor (if they are going the MAT+MA route, they would need a letter from an Mathematics professor. If students are going the MA+MAT route, they would need a letter from someone who can speak to their talents for working with young people);
- Students send a paper application (pages 1-2), application essay, additional letter of recommendation and a cover letter requesting consideration for the joint MA/MAT program to the Graduate School in the Haggerty Administration Building, Room 804. The Graduate School will direct the application to both departments for approval.

Transfer Credits

Students who are enrolled in or have completed the MA in Mathematics will be permitted to transfer up to 15 graduate credits in Mathematics into the MAT program. Students who are enrolled in or have completed the MAT in Mathematics will be permitted to transfer up to 15 graduate credits in Mathematics into the MA program.
This transfer policy is available only to students who are enrolled in or have completed the first graduate degree program at SUNY New Paltz, and the credits must be transferred within seven years of matriculation in the first degree program. No more than six credits of graduate work at another institution may be transferred into either the SUNY New Paltz MA or MAT program.

Degree Program Time Limit

Students have seven years to complete both degrees. Exceptions to this rule will be considered on a case-by-case basis.

COURSES

Courses numbered 64500-64509 are provided for the MS in Computer Science, courses 64511-64519 for the MS in Ed. 7-12 Mathematics, and 64500 and 64531-64590 for the MA in Mathematics. See course descriptions of 64510 and 64520 for their prerequisites.

MAT500 Combinatorics and Graph Theory (3)
Combinatorial and graphical techniques for complexity analysis, generating functions, recurrence relations, Polya's Theory of Counting, graph theory, NP-complete problems.

MAT510 Geometry for Elementary and Middle School Teachers (3)

This course provides a geometric experience which clarifies, extends, and unifies geometric topics in Euclidean, analytic, transformational, and projective geometries. This course is open only to students doing graduate course work in elementary or middle school education in the School of Education. Prerequisite: Matriculated (037A, 107A or 206) status students may not register for this course.

MAT511 Theory of Groups (3)
First course in algebraic structures. Basic set theory and number theory. Axioms of groups. Homomorphisms, isomorphisms, and quotient groups. For MS in Education degree students only. Not open to undergraduates. Prerequisite: MAT252 or 64252. Cannot be used toward 206 major.

MAT512 Real and Complex Number Systems (3)
Survey and development of number systems from the natural numbers to the complex numbers. Basic theory and properties. Applications to high school mathematics. For MS in Education degree students only. Not open to undergraduates. Prerequisite: MAT252 or 64252. Cannot be used toward 206 major.

MAT514 Linear Algebra with Applications to Geometry (3)
Matrices, linear transformations, and quadratic forms. Solutions of linear systems. Applications to analytic geometry of 2, 3, or n dimensions. For MS in Education degree students only. Not open to undergraduates. Prerequisite: MAT 252 or 64252. Cannot be used toward 206 major.

MAT517 History of Mathematics (3)
Topics in mathematics from a historical perspective. The course may be a survey of the history of mathematics or it may concentrate on a few specific topics. In either case, students are required to solve problems and to prove theorems. Recommended for MS in Education degree students. Prerequisite: MAT 252 or 64252. Cannot be used toward 206 major.

MAT518 Theory of Rings and Fields (3)
Rings, Fields and their extensions. Introduction to Galois Theory. Solutions of equations by radicals. For MS in Education degree students only. Not open to undergraduates. Prerequisite: MAT511 or 64511.

MAT519 Sequences, Series, and Their Applications (3)
Sequences of real and complex numbers. Convergence criteria, series, uniform convergence, definition of functions by series and Taylor's theorem. For MS in Education degree students only. Not open to undergraduates. Prerequisite: Cannot be used toward 206 major.

MAT520 Statistics for Elementary/Middle School Teachers (3)
Liberal arts course in basic statistical ideas and their application to public policy and education. Emphasis on statistical reasoning and numerical arguments. Focus on drawing conclusions from data taken from diverse settings and contexts. Prerequisite: Cannot be used toward 037A, 107A or 206 major.

MAT531 Point Set Topology I (3)
Part of a two-semester sequence covering the fundamental theorems of geometric topology in abstract topological and metric spaces.

MAT532 Point Set Topology II (3)
Part of a two-semester sequence covering the fundamental theorems of geometric topology in abstract topological and metric spaces.

MAT541 Complex Analysis I (3)
Provides a foundation for advanced work in analysis. Differentiation, Cauchy-Riemann Equations, elementary functions, conformal mapping, expansions, and analytic continuation.

MAT543 Real Analysis I (3)
Part of a two-semester sequence covering the following topics: The real number system, topology of Rn, measure theory, and the Lebesque integral. Convergence theorems, differentiation, and Lebesque decompositions. Fubini's theorem, Radon-Nikodym theorem, and other advanced topics.

MAT544 Real Analysis II (3)
Part of a two-semester sequence covering the following topics: The real number system, topology of Rn, measure theory, and the Lebesque integral. Convergence theorems, differentiation, and Lebesque decompositions. Fubini's theorem, Radon-Nikodym theorem, and other advanced topics. Prerequisite: MAT543 or 64543.

MAT561 Abstract Algebra I (3)
Part of a two-semester sequence covering the following topics: Groups, rings, integral domains, fields, modules, and vector spaces.

MAT562 Abstract Algebra II (3)
Part of a two-semester sequence covering the following topics: Groups, rings, integral domains, fields, modules, and vector spaces. Prerequisite: Mat561 or 64561.

MAT563 Topics in Algebra I (3)
Topics chosen by the instructor, may include structure theory of Abelian groups, commutative rings and finite fields, lattice theory, universal algebra. Prerequisite: MAT562 or 64562.

MAT590 Thesis in Mathematics (6)
Writing and preparation of an expository or original thesis under the guidance of graduate faculty. Required form available in the Records and Registration Office.