FORENSIC SCIENCE (FOR)

FOR 500 Introduction to Physical Chemistry (4 credits)
A one-semester course that covers the basic principles and applications of Physical Chemistry, it is designed for students majoring in sciences other than Chemistry and Biochemistry. It studies the concepts of energy-matter interaction. It starts with the basic thermodynamic relationships that describe the macroscopic aspects of energy exchange in systems with many components and many phases, such as real solutions. The thermodynamics part concludes with its implementation in understanding chemical equilibrium and reaction kinetics. Then the approach enters the microscopic level and the principles of Quantum Mechanics are introduced. The discussion is extended to elements of Molecular Quantum Mechanics and spectroscopy. Though the mathematic rigor of physical chemistry is maintained in this introductory course, emphasis is given to the physical and chemical principles.
Course Rotation: NY;Fall

FOR 501 Crime Scene Criminalistics (4 credits)
This course is intended to introduce students to the methods and techniques used at crime scenes and in a criminalistics laboratory to document, collect, and analyze physical evidence. Particular attention will be paid to photographic theory and use of the scientific method. Emphasis will be placed on the skills needed to recognize and characterize physical evidence, including trace evidence, firearms and toolmark evidence, controlled substances, fingerprints, fire debris, questioned documents, biological evidence, and physical pattern evidence. Laboratory exercises with mock evidence will allow hands on instruction. A mock court will give the students an opportunity to serve as expert witnesses.
Course Rotation: NY;Fall

FOR 502 Quantitative and Instrumental Analysis (0-4 credits)
This one semester lecture and laboratory course will focus on improving the level of student understanding in Instrumental Analysis. By the end of this course, you will have gained an understanding and appreciation for the theory, design and applications of three categories of chemical instrumentation: (1) spectroscopic (2) electrochemical and (3) chromatography.
Course Rotation: NY;Spring

FOR 503 Biochemistry (3 credits)
The proposed course "Molecular Biology" will focus on the principles of modern molecular biology. Topics covered: Central dogma, DNA, chromosomes, replication, recombination, transposons, transcription, RNA: tRNA, mRNA, rRNA, small RNAs, translation, genes, splicing, genetic code, gene expression, gene regulation, genetic code, development, specialized cells, post-transcriptional control, DNA methylation, bioinformatics. Methods in molecular biology: Southern, Northern, Western Blots, Sanger sequencing, next generation sequencing, microarrays, PCR, cloning, restriction enzymes, gel electrophoresis.

FOR 504 Genetics (3 credits)
The proposed course “Molecular Biology and Genetics of Humans and Mammals” will focus on the principles of modern molecular biology and genetics, with cell biology and biochemistry components. Course material will also present the current state of experimental techniques and procedures routinely used in this field.
Course Rotation: NY;Fall

FOR 505 Molecular Biology (3 credits)
The proposed course “Molecular Biology” will focus on the principles of modern molecular biology. Topics covered: Central dogma, DNA, chromosomes, replication, recombination, transposons, transcription, RNA, tRNA, mRNA, rRNA, small RNAs, translation, genes, splicing, genetic code, gene expression, gene regulation, genetic code, development, specialized cells, post-transcriptional control, DNA methylation, bioinformatics. Methods in molecular biology: Southern, Northern, Western Blots, Sanger sequencing, next generation sequencing, microarrays, PCR, cloning, restriction enzymes, gel electrophoresis.
Course Rotation: Spring, NY

FOR 531 Forensic Microscopy (0-3 credits)
This course is designed to provide an in-depth understanding of the theory and practice of microscopy as it applies to forensic applications, with a focus on trace evidence such as hairs, fibers, glass, paint, and soil. Emphasis will be placed on the use of various procedures with standard microscopy, polarized light microscopy, comparison microscopy, and scanning electron microscopy. Optical properties such as refractive index, retardation, birefringence, and interference will be discussed and practiced in laboratory. Various microscopical contrast techniques will be covered as well. Students will have the opportunity to analyze different types of trace evidence in the laboratory.
Course Rotation: FALL;NY

FOR 537 Forensic Biology (0-4 credits)
This one semester lecture and laboratory course will teach students the fundamentals of body fluid identification and provide in-depth study of the subsequent laboratory analysis. In addition to current methods of Forensic DNA analysis, lecture topics will also include result interpretation, the use of DNA in historical investigations, and practical aspects of mass disaster identification. This course is open to undergraduate students of Forensic Science that satisfy the prerequisites.
Course Rotation: NYC: Spring.

FOR 551 Basic Criminalistics (0-3 credits)

FOR 552 Crime Scene Processing (0-3 credits)

FOR 561 Forensic Microscopy (0-3 credits)

FOR 610 Professional Issues in Forensic Science (4 credits)
Professional issues will introduce students to various topics they will encounter within the field of Forensic Science. Legal implications within the field will focus on expert witness testimony and procedural rules defined by both legislative statute and court decisions. These decisions affect the collection, analysis, and court admissibility of scientific evidence, such as the Frye and Daubert standards and the Federal Rules of Evidence. Existing and pending Forensic Science legislation will be covered, including laws governing state and national DNA databases. Ethical concerns stemming from the day-to-day balancing of competing priorities encountered by the forensic student will be discussed. Such competing priorities may cause conflicts between good scientific practice and the need to expedite work, meet legal requirements, and satisfy client's wishes. The role of individual morality in Forensic Science and competing ethical standards between state and defense experts will be addressed. Examinations of ethical guidelines issued by various professional forensic organizations will be conducted. Students will be presented with examples of ethical dilemmas for comment and resolution. The management of crime laboratories will provide discussion on quality assurance/quality control practices and the standards required by the accreditation of laboratories and those proposed by Scientific Working Groups in Forensic Science. The national Academy of Sciences report on Strengthening Forensic Science will be examined to determine the impact of the field.
Course Rotation: Fall;NY

FOR 615 Forensic Separations Chemistry (0-4 credits)
This one semester lecture and laboratory course focuses on improving the level of student understanding in separation chemistry. The lectures will be a selected mixture of theoretical and applied topics. Instrumentation and methods sued by forensic scientists for analysis of drugs, toxicology, arson, explosives, and trace evidence, and sample collection and processing will be covered with emphasis on the isolation, identification, and quantitation of illicit drugs and their metabolites. The experiments, with emphasis on forensic applications, will cover extraction, TLC, paper and column chromatography, GC, HPLC, GC-MS and CE.
Course Rotation: Fall;NY

FOR 620 Analytical Spectroscopy (0-4 credits)
This one semester lecture and laboratory course will focus on improving the level of student understanding in analytical spectroscopy. The lectures will be a selected mixture of theoretical and applied topics. Laboratory exercises will allow students to acquire hands-on experience and in-depth understanding of spectroscopy, especially in forensic analysis.
Course Rotation: NYC: Fall

FOR 621 Internship (4 credits)
As part of the graduate experience, students are equipped to conduct an internship in a working forensic laboratory . Internships are coordinated through the director of the Forensic Science Program.

FOR 625 Crime Scene Investigation and Reconstruction (0-4 credits)
Crime Scene Investigation & Reconstruction is a scientific endeavor, which requires keen observational skills, knowledge of specific techniques, and a general knowledge of all aspects of Forensic Science. This course will continue to expand the students' ability to gather evidence, preserve the scene, interpret physical evidence, and effectively synthesize information from many sources to recreate certain aspects of violent crime.
Course Rotation: Spring;NY

FOR 635 Principles of Forensic Pharmacology (4 credits)
This one semester lecture course will cover topics in pharmacology, Scope of Pharmacology, Mechanism of drug action, Absorption, distribution and elimination of drugs, Biotransformation, Dose-response relationships, Drug toxicity, Interpretation of drug concentrations in biological specimens, Pharmacologic aspects of drug abuse, CNS depressants, CNS stimulants, Hallucinogens.
Course Rotation: Fall;NY

FOR 696B Special Topics in Forensic Science - B (2-4 credits)
This course focuses on expanding the level of student understanding of photographic theory and its application in Forensic Science. Through a hands-on approach, students will learn the techniques used to document physical evidence both in the field and in laboratory environments.
Prerequisites: First three years of undergraduate program.

FOR 696C Special Topics: Forensic Science Education (0-2 credits)

FOR 696D Expert Witness Testimony (2 credits)

FOR 696G Forensically Oriented Human Anatomy and Physiology (4 credits)
This course will teach students the fundamentals of human anatomy and physiology. After successful completion of the course tasks, students are going to be able to better understand form and function of the human body and be able to participate in the courses dealing with different forensic aspects of human body, such as Forensic Pathology, Crime Scene Investigation, Blood Spatter Analysis, etc.
Prerequisites: Undergraduate Forensic Science curriculum.

FOR 696H Entomology (2 credits)
An introduction to the biology of insects, which includes the introductory treatment of insect morphology, insect life history, insect behavior, insect ecology, and basic taxonomy of major insect families. There will be an emphasis on groups that are of forensic importance.
Prerequisites: BIO 101 and BIO 102 or their equivalent.

FOR 699 Forensic Science Seminar (1 credits)
This one credit seminar will expose students to issues relevant to professional practice in Forensic Science. Topics such as accurately conveying scientific concepts in reports and testimony, crime laboratory management, and conducting research in Forensic Science will be covered in detail. Important cases in various areas of Forensic Science will be discussed. Two of three guest speakers will be invited to present a topic relevant to their area of expertise within Forensic Science.
Course Rotation: Fall;NY

FOR 701 Introduction to Forensic Pathology (4 credits)
In this course, students will be introduced to the fundamentals of Forensic Pathology. They will be provided with an in-depth study of the latest standards in procedures used in the field of Forensic Pathology. Lecture topics will also include differential diagnosis, external and internal examination and interpretation, the use of medical-legal principles in the science of forensic bio-pathology, human identification, and practical aspects of mass disaster identification.
Course Rotation: NYC: Fall

Prerequisites: Restricted to graduate Forensic Science majors.

FOR 702 Forensically Oriented Human Anatomy and Physiology (4 credits)
This course will teach students the fundamentals of human anatomy and physiology. After successful completion of the course tasks, students are going to be able to better understand form and function of the human body and be able to participate in the courses dealing with different forensic aspects of human body, such as Forensic Pathology, Crime Scene Investigation, Blood Splatter Analysis, etc.
Course Rotation: NYC: Fall

FOR 705 Forensic Anthropology (4 credits)
Forensic Anthropology is an applied subfield of biological anthropology that provides expert analysis of skeletal remains in a medicolegal setting by utilizing methods developed in skeletal biology, archaeology, and the forensic sciences. Students will gain an understanding of the forensic anthropologists role in death investigations and be introduced to the theory and applied techniques utilized to recover and identify individuals. Students will learn how anthropologists interpret skeletal features in the determination of the biological profile (age, ancestry, sex, and stature) and how they assess manner/mode of death through the interpretation of skeletal trauma and taphonomy. Course grades are based on a bone quiz, article critique and presentation, a research paper, and a final exam.
Course Rotation: NY: Fall.

FOR 706 Forensic Toxicology (4 credits)
This one semester lecture course will cover numerous topics in forensic toxicology. Topics will include an overview of forensic toxicology applications, laboratory overview, quality assurance, and analytical challenges. Common drugs seen in forensic toxicology testing will also be discussed; this will include pharmacological properties, testing methodologies, interpretation of findings, and case reviews.
Course Rotation: NYC; Spring

FOR 707 Advanced Topics in Forensic DNA Analysis (4 credits)
Advanced Forensic Biology will provide more detailed discussions on all steps in Forensic DNA testing, beginning with evidence examination and continuing through DNA extraction, quantitation, amplification, and STR analysis. Emphasis will be placed on the origin and variations in methods at each step. Additional topics will cover the following: mixture interpretation, relationship testing, different statistical approaches, courtroom testimony, mitochondrial DNA, Y-STR testing, DNA databases, accreditation of a DNA lab, low copy number testing, research in Forensic DNA, and the use of SNPs. Laboratory exercises will supplement the lecture material and provide the students with the opportunity to perform experiments that mirror DNA variation studies and to use different software programs for results interpretation and statistical calculations.
Course Rotation: Fall;NY

FOR 736 Advanced Topics on Criminalistics (4 credits)
This course will cover advanced techniques for analysis of crime scene evidence. It includes field collection of physical evidence, pattern recognition methods, computer crime, bloodstains, document examination and courtroom testimony.
Course Rotation: Fall;NY

FOR 770 Physical Optics with Forensic Applications (4 credits)
This course covers the theoretical background and practical techniques of sample preparation, operation of light microscopes, image acquisition and image processing. In addition, students will receive training on different microscopes; Polarized Light Microscope (PLM), Fluorescent Speckle Microscope (FSM) and stereoscope, which will facilitate their research involving Light Microscope in future. It also includes advanced topics, such as Non-Linear Microscopy, and the Super resolution Light Microscopy Techniques.
Course Rotation: NYC: Spring

FOR 798 Research Methodology in Forensic Science (4 credits)
This course is intended for students who wish to conduct research in Forensic Science, and specifically those who would like to complete a thesis project for their master's degree. Topics of discussion and assignments will include finding a project, writing the proposal, conducting a literature review, designing an experiment, writing different parts of the thesis, and presenting scientific findings in a public forum. Pace's guidelines for a thesis in Forensic Science will be referenced. Students may also read current literature and summarize the results along with presenting preliminary results from their own projects. Trends in research within different areas of Forensic Science will be discussed.
Course Rotation: Fall;NY

FOR 799 Thesis (4 credits)
This course is intended for students who wish to conduct research in Forensic Science, and specifically those who would like to complete a thesis project for their master's degree. Topics of discussion an assignments will include finding a project, writing the proposal, conducting a literature review, designing an experiment, writing different parts of the thesis, and presenting different scientific findings in a public forum. Pace's guidelines for a thesis in Forensic Science will be referenced. Students may also read current literature and summarize the results along with presenting preliminary results from their own projects. Trends in research within different areas of Forensic Science will be discussed.
Course Rotation: NY;Spring