

# FORENSIC SCIENCE (FRNSC)

## FRNSC 532: Drug Chemistry and Toxicology

3 Credits

Chemical and toxicological properties of therapeutic and non-therapeutic drugs and the analytical and instrumental methods of their identification and quantification.

## FRNSC 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently.

## FRNSC 801: Criminalistics III

4 Credits

Advanced CSI investigation, criminalistics, and scene reconstruction with mock courtroom testimony. FRNSC 801 Criminalistics III (4) Classroom discussions will expand on the analysis of commonly encountered evidence to demonstrate its usefulness in real-crime investigation. Students will be given problems to research for which there will be real-life examples in either the literature or in court records. Using a problem solving technique, students will research and examine actual analytical data, interpret it and then testify to it in mock court situations. After researching actual cases, students will demonstrate their ability to critically analyze crime scenes. Scenes will be mocked up at the university crime scene house, Spruce Cottage, selected because of their complexity. Students will analyze evidence obtained after processing a crime scene. The students' laboratory analysis will encompass a variety of physical evidence types that will test a student's ability to select an analytical scheme that makes sense in the context of the current case. Integral in this process is the understanding of the operation of criminalistics laboratories and how it relates to the quality assurance function of the laboratory. The course is an 800-level forensics course required for the Master of Professional Studies in Forensic Science, and is the capstone course for completion of the degree.

**Prerequisite:** FRNSC410 , FRNSC411 , FRNSC413 , FRNSC415W and FRNSC821 or FRNSC831

## FRNSC 821: Forensic Molecular Biology II

4 Credits

Advanced concepts and application of molecular biology techniques to the analysis of biological evidence collected at crime scenes. FRNSC 821 Forensic Molecular Biology II (4) Classroom discussions will expand on the application of forensic DNA analysis using all market types (STR, Y-STR, and mtDNA), including interpretation of complex profiles and mixtures, advanced understanding of instrument operation, and presentation of DNA results in the courtroom. Students will be introduced to technologies that could be applied in forensic laboratories in the near future (e.g., SNP's, micro-capillary arrays, microchips), and will gain an advanced understanding of how forensic DNA laboratories operate and are managed; i.e., quality assurance programs, facility security, proficiency testing programs, basic budgetary and financial issues, and other areas of interest. The laboratory exercises will reflect classroom discussions and students will be expected to prepare courtroom ready materials (data, documents, and demonstrations). The students will

be responsible for setting up and running the laboratory in a similar manner to how a real crime laboratory is run. Many of the classroom discussions will be problem solving exercises designed to emphasize specific applications of laboratory analysis. At the end of the course, students will have mastered advanced screening techniques and the three major forensic DNA methods for analyzing biological evidence. Additionally, they will be prepared to work in a forensic DNA crime laboratory, understanding quality assurance, accreditation, and other areas of importance. In the laboratory, students will have analyzed difficult sample types, interpreted complex DNA profiles, and prepared the evidence for advanced levels of courtroom testimony. The proposed course is relevant to any student in the forensic sciences who has an interest in obtaining employment in a local, state or federal law enforcement agency and/or crime laboratory facility. This is an 800-level forensics course that will be required for students in the Master of Professional Studies (MPS) in Forensic Science degree program who are interested in forensic biology.

**Prerequisite:** FRNSC421W

## FRNSC 831: Forensic Chemistry II

4 Credits

This is a classroom and laboratory-based course designed as a practical course to provide the students with advanced skills and understanding to perform forensic chemical analysis. The focus of the course will be on Chemical processes for extraction of target chemicals from different matrices, advanced chromatographic theory, optimization of HPLC, LC/MS and GC/MS methods, and Instrument design, maintenance, and troubleshooting. We will end with a section on NMR analysis. The course will rely heavily on the students' knowledge and skills that have been learned or acquired during their studies in prerequisite course work. The prerequisite knowledge includes, but is not limited to algebra, calculus, general chemistry, organic chemistry, analytical chemistry, basic statistics, spectroscopy theory, chromatography theory, proper evidence handling practice, and good writing skills. The learning objectives and outcomes are primarily focused on preparing the students to be capable and competent scientists with sufficient knowledge to work with HPLC, GC/MS, IR, and LC/MS. The student will also become familiar with extraction theory and techniques used in identification and characterization of chemical substances. The student will gain experience and understanding in effective analysis and interpretation of data and observations and will gain critical thinking skills for determining significance of data as forensic evidence.

**Prerequisite:** FRNSC 427W and FRNSC 415W

## FRNSC 841: Forensic Seminar Series

1 Credits

Classroom presentations and discussions will focus on different aspects of forensic science as found in current journal articles, casework studies, and current research projects. In this course the student will be exposed to reviewing various forms of technical literature (Manuscript Categories), and then give a discussion of the purpose of each. The students will research the various categories and read articles/manuscripts, assess, critique and present a paper relative to articles pertaining to their research. The students will then research the various categories and read articles/manuscripts, assess, critique and present a paper with no relation to their research. At the end of the course, students will have

gained an understanding or better understanding of a number of different forensic science concepts.

FRNSC 861: Ethics in Forensic Science

1 Credits

Classroom presentations and discussions will focus on integrity, ethical behavior, ethics standards and different examples of ethics violations and misconduct in the forensic science community. In this way, the students will be introduced to the imperative and sensitive issues surrounding professional integrity and ethics. At the end of the course, students will have gained an understanding or better understanding of professional integrity and ethical behavior in relation to forensic science.

FRNSC 894: Research Projects in Forensic Science

1-12 Credits/Maximum of 12

Supervised student research projects identified on an individual or small-group basis.