

FORENSIC SCIENCE (GRADUATE GROUP)

Graduate Studies

Kent Pinkerton, Ph.D., Chairperson of the Group
Ruth Dickover, M.S. Ph.D., Director of the Program
Chris Garcia, M.S., Student Affairs Officer

Group Office

1909 Galileo Ct., Suite B, Davis, CA 95618; 530-747-3913; Forensic Science Graduate Group (<http://forensicscience.ucdavis.edu/>); Faculty (<http://forensicscience.ucdavis.edu/graduate-group/>)

- Forensic Science, Master of Science (<https://catalog.ucdavis.edu/departments-programs-degrees/forensic-science/forensic-science-ms/>)

Forensic Science (FOR)

FOR 200 – Fundamental Concepts in Forensic Science (3 units)

Course Description: Overview of Forensic Science. Problem definition, strategies for problem solving, analytical tools, and professional and ethical considerations.

Learning Activities: Lecture 2 hour(s), Fieldwork 0.25 hour(s), Lecture/Lab 0.25 hour(s), Seminar 0.50 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program.

Grade Mode: Letter.

FOR 201A – Forensic Science Fundamentals-A (3 units)

Course Description: Professional responsibilities and ethics, physical evidence concepts, drug chemistry and toxicology, controlled substances and analytical chemistry and instrumentation as practiced in the forensic sciences. First of three courses that, in part, covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

Prerequisite(s): Consent of instructor; enrolled in the Forensic Science Graduate Program.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Open to Forensic Science Graduate Program students only.

Grade Mode: Letter.

FOR 201B – Forensic Science Fundamentals-B (3 units)

Course Description: Forensic biology and DNA, microscopy and materials analysis and pattern evidence as practiced in the forensic sciences. Second in a series of three courses which covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

Prerequisite(s): Consent of instructor; enrolled in the Forensic Science Graduate Program.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Open to Forensic Science Graduate Program students only.

Grade Mode: Letter.

FOR 201C – Forensic Science Fundamentals-C (3 units)

Course Description: Arson and explosives, quality assurance and accreditation, the law and science interface and court testimony as practiced in the forensic sciences. Third in a series of three courses that covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

Prerequisite(s): Consent of instructor; enrolled in the Forensic Science Graduate Program.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

FOR 205 – Microscopy & Microanalytical Methods in Forensic Science (3 units)

Course Description: Introduction to optical and electron microscopy. Transmission, diffraction, reflection and absorption; polarized light and polarizing crystals; phase contrast. Radiography; image recording, SEM analysis of gunshot residues, paints, glass. EDS, XRF analysis, signal-to-noise ratios, minimum detectable levels and homogeneity.

Prerequisite(s): Consent of instructor.

Learning Activities: Lecture 2 hour(s), Laboratory 1 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program; a minimum, year each of the following chemistry, organic chemistry, calculus, & physics.

Grade Mode: Letter.

FOR 207 – Advanced Spectroscopy Methods in Forensic Science (3 units)

Course Description: Discuss, evaluate and interpret advanced molecular spectra/structure, Infrared Spectroscopy, such as chemical applications of spectroscopic methods, vibrational, rotational spectra; electronic spectra, photoelectron spectroscopy generated by various analytical instruments used in forensic science community.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Restricted to Forensic Science Graduate program or consent of instructor.

Grade Mode: Letter.

FOR 208 – Forensic Toxicology (3 units)

Course Description: Forensic toxicology as related to driving under the influence of drugs (DUID) investigations, detection, and evaluation through the use of standardized field sobriety tests and drug recognition protocols.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

FOR 209 – Forensic Alcohol (3 units)

Course Description: Analytical methods used in the determination and quantitation of ethanol in biological matrices commonly encountered in cases involving operating a motor vehicle.

Prerequisite(s): FOR 220 (can be concurrent); consent of instructor.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

FOR 210 – Personal Identification Methods In Forensic Science (3 units)

Course Description: Methods for identifying individuals from evidence collected at crime scenes, suspects or victims, crime scene examination and analytical methods used to support such investigations. Topics include forensic anthropology and odontology; latent prints; shoe prints; facial reconstruction/recognition; eyewitness identifications; biometric systems.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of instructor.

Grade Mode: Letter.

FOR 212 – Scientific Evidence & Courtroom Testimony (3 units)

Course Description: Explores the relationship between science and the criminal justice system. Admissibility of scientific testimony and documentary proof during the trial, concepts of relevancy, hearsay and opinion rule, examination of expert witnesses, impact of Kelley-Fry and Daubert decisions & court testimony.

Learning Activities: Lecture 2 hour(s), Discussion 1 hour(s).

Enrollment Restriction(s): Restricted to graduate students enrolled in the MS Forensic Science program or by the consent of the instructor.

Grade Mode: Letter.

FOR 215 – Forensic Fire & Arson Investigation (3 units)

Course Description: Principles and techniques of scientific investigation of fires and related crimes; offer peer-reviewed protocols for processing fire and explosion scenes; discuss recognition, collection, analysis of physical evidence, and describe the scientific method for decision-making in fire/arson investigation.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. Forensic Science program or by consent of the Forensic Science Program Director.

Grade Mode: Letter.

FOR 218 – Technical Writing in Forensic Science (3 units)

Course Description: How to write clear, credible forensic science reports and scientific articles, that (a) serve the ends of the justice system, (b) meet their readers' varying needs and (c) reflect well on the author.

Prerequisite(s): Consent of the instructor required for all students not enrolled in the Forensic Science program.

Learning Activities: Lecture 2 hour(s), Extensive Writing/Discussion 1 hour(s).

Enrollment Restriction(s): Restricted to graduate standing in the Forensic Science program.

Grade Mode: Letter.

FOR 220 – Analysis of Toxicants (3 units)

Course Description: Principles of microanalysis of toxicants. Theoretical considerations regarding separation, detection and quantitative determination of toxicants using chemical and instrumental techniques.

Prerequisite(s): Coursework in organic chemistry.

Learning Activities: Lecture 3 hour(s).

Cross Listing: ETX 220.

Grade Mode: Letter.

FOR 221L – Forensic Science Analytical Instrumentation (2 units)

Course Description: Methodology and instruments used for the analysis of substances of interest in the discipline of Forensic Science. Practical experience with modern instrumental techniques & methodologies used in the advanced forensic science laboratory.

Learning Activities: Discussion/Laboratory 1 hour(s), Laboratory 3 hour(s).

Enrollment Restriction(s): Enrollment limited to students accepted in the Forensic Science Graduate program or subject to the approval of the instructor if the student has the appropriate chemistry, calculus and physics courses required of students in the graduate forensic science program.

Grade Mode: Letter.

FOR 240 – Homicide Crime Scene Investigation (3 units)

Course Description: Processing and evaluating complex homicide scenes. Functions and activities of police agencies. Recognition, documentation, identification, and collection of evidence. Event sequence reconstruction. Evidence collection, preservation, report writing. Courtroom presentation.

Learning Activities: Lecture 2 hour(s), Laboratory 3 hour(s).

Enrollment Restriction(s): Restricted to Forensic Science Masters Program Students; enrollment is limited to 15 students per class.

Grade Mode: Letter.

FOR 263 – Forensic Computer Science Investigations (3 units)

Course Description: Discuss the threats to the security of any kind of evidence that is captured, transmitted, or stored digitally and develop critical thinking and basic knowledge of computer forensic science issues in the evaluation of digital evidence.

Prerequisite(s): Consent of instructor; graduate student.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Restricted to students in the Forensic Science Graduate program unless approved by instructor.

Grade Mode: Letter.

FOR 268 – Statistics in Forensic Science (3 units)

Course Description: Statistics that are used by the forensic scientist, their limitations/applications in presenting evidential results in such areas as DNA-STR results, trace evidence correlation, fingerprint statistics, population sampling and the Bayes method.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of forensic program director.

Grade Mode: Letter.

FOR 276 – Population Genetics (3 units)

Course Description: Principles, theories, and models of population genetics as they apply to forensic science.

Prerequisite(s): FOR 280; FOR 281; or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Open only to majors in Forensic Science Program unless by consent of the Chair Forensic Science Graduate group.

Grade Mode: Letter.

FOR 277 – Forensic Genetics; Next Generation Techniques & Applications (3 units)

Course Description: Review organization/function of the human genome, recent developments, next generation sequencing techniques including the preparation of DNA samples, principles of the new generation sequencing assay formats and biochemical reactions. Includes quality control parameter, and bioinformatic approaches.

Prerequisite(s): Undergraduate courses in fundamental and applied principles of: genetics, biochemistry, and molecular biology, or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Restricted to Forensic Science Graduate students (GFOR) or consent of instructor.

Grade Mode: Letter.

FOR 278 – Molecular Techniques (3 units)

Course Description: Recombinant DNA technology and its applications.

Prerequisite(s): Graduate standing or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Cross Listing: ETX 278.

Grade Mode: Letter.

FOR 280 – Forensic DNA Analysis (3 units)

Course Description: Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data.

Prerequisite(s): Coursework in genetics and molecular biology.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Graduate standing; consent of instructor required for all students not enrolled in the M.S. Forensics program.

Cross Listing: ETX 280.

Grade Mode: Letter.

FOR 281 – Principles & Practice of Forensic Serology & DNA Analysis (3 units)

Course Description: Comprehensive overview of forensic serology and DNA typing techniques and technologies. Strong emphasis on real-world applications, including preservation and tracking of biological evidence, detection and identification of bodily fluids, and methods to extract, quantify, and type human DNA.

Prerequisite(s): (FOR 278 or ETX 278) or (FOR 280 or ETX 280); and consent of instructor, or equivalent of FOR 280/ETX 280.

Learning Activities: Lecture 2 hour(s), Discussion/Laboratory 3 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of Forensic Science Program Director.

Cross Listing: ETX 281.

Grade Mode: Letter.

FOR 283 – Forensic Biology (3 units)

Course Description: Overview to the foundational concepts in forensic biology: chemistry and molecular biology of biological evidence, genetic basis of biological uniqueness, evolutionary basis of species differences, patterns and dynamics of evidence deterioration, and the legal/ professional considerations associated with biological evidence.

Learning Activities: Lecture 2 hour(s), Discussion 1 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science program or by consent of the Forensic Science Program Director.

Grade Mode: Letter.

FOR 284 – Non-Human Forensic DNA; Theory & Casework Application (2 units)

Course Description: Provides a comprehensive understanding of plant and animal forensic biology in terms of sample collection, preservation, analytical methods, and of the invaluable lines of inquiry these forensic evidence may permit.

Prerequisite(s): Consent of instructor required for all students not enrolled in the M.S. Forensics program; upper division Molecular Biology and Genetics or its equivalent.

Learning Activities: Lecture 2 hour(s).

Enrollment Restriction(s): Restricted to graduate standing.

Cross Listing: ETX 284.

Grade Mode: Letter.

FOR 289 – Survey in Forensic Science (3 units)

Course Description: Analytical methods in contemporary forensic science. Clandestine laboratories in California, crime scene management, examination and analysis of human hair, forensic ballistics/trajectory reconstruction, shoe/tire print impressions, serial number restoration, forensic aspects of alcohol impairment, bloodstain pattern interpretation, microscopy of building materials, biological aspect of forensic science.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program.

Repeat Credit: May be repeated when topic differs.

Grade Mode: Letter.

FOR 290 – Seminar in Forensic Science (1 unit)

Course Description: Students will be exposed to topical areas in Forensic Science by presentations conducted by expert guest speakers. The seminar will also serve as a medium whereby the exiting students will present the research conducted as part of their thesis requirement.

Learning Activities: Seminar 3 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program.

Repeat Credit: May be repeated when topic differs.

Grade Mode: Satisfactory/Unsatisfactory only.

FOR 290C – Graduate Research Conference in Forensic Science (1 unit)

Course Description: Individual and/or group conference on problems, progress and techniques in forensic science and research.

Learning Activities: Independent Study 1 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program.

Repeat Credit: May be repeated when topic differs.

Grade Mode: Satisfactory/Unsatisfactory only.

FOR 293 – Forensic Science Research Methodology (2 units)

Course Description: Introduction to identification, formulation, and solution of meaningful scientific problems encountered in the Forensic Science area including experimental design and/or theoretical analysis of new and prevailing techniques, theories and hypotheses. Students will present and defend their thesis research/journal article proposals.

Learning Activities: Lecture 1.50 hour(s), Extensive Writing/Discussion 0.50 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the Graduate Forensic Science program or by consent of the instructor.

Grade Mode: Satisfactory/Unsatisfactory only.

FOR 298 – Group Study in Forensic Science (1-5 units)

Course Description: Group study in Forensic Science.

Learning Activities: Independent Study 1-5 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program.

Repeat Credit: May be repeated when topic differs.

Grade Mode: Pass/No Pass only.

FOR 299 – Research in Forensic Science (1-12 units)

Course Description: Research in Forensic Science.

Prerequisite(s): Consent of instructor.

Learning Activities: Independent Study 1-12 hour(s).

Enrollment Restriction(s): Restricted to students enrolled in the M.S. in Forensic Science Program.

Repeat Credit: May be repeated.

Grade Mode: Pass/No Pass only.