

Course Change Request

New Course Proposal

Date Submitted: 11/05/18 3:23 pm

Viewing: **FRSC 101 : Principles of Forensic Science**

Last edit: 11/05/18 3:23 pm

Changes proposed by: afalsett

Are you completing this form on someone else's behalf?

No

Effective Term: Fall 2019

Subject Code: FRSC - Forensic Science

Course Number: 101

Bundled Courses:

Equivalent Courses:

Catalog Title: Principles of Forensic Science

Banner Title: Principles of Forensic Science

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per week: 3

Repeatable: May only be taken once for credit (NR)
GRADUATE ONLY

Default Grade Mode: Undergraduate Regular

Recommended Prerequisite(s):

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(Course/Test Code	Min Grade/Score	Academic Level)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description:

The forensic sciences encompass the skills and expertise of individuals from a multitude of scientific disciplines to assist in the investigation of cases of legal significance. This course is designed to provide the student with a broad introduction to the methods and techniques utilized by today's forensic professionals. We will explore the application of the physical, medical, natural and engineering sciences to specialized

In Workflow

- FRSC Representative
- SC Curriculum Committee
- SC Associate Dean
- Assoc Provost-Undergraduate
- Registrar-Courses
- Banner

Approval Path

- 11/05/18 3:29 pm
Emily Rancourt (erancour):
Approved for FRSC Representative

legal contexts, investigation of a crime scene, the role of law enforcement crime labs, and other important issues relating to forensic investigations.

Justification:

Principles of Forensic Sciences fulfills the need of George Mason undergraduate students to explore the application of scientific methods to contemporary legal settings. The course allows students the opportunity to be exposed to forensic science methods and techniques, the role of science in the courtroom, ethical considerations over the use of science, and the relationship between science and policy. This course will be offered in the online environment to reach the broadest number of interested students who are looking for a Mason Core course that fits into their busy work, life, and school schedule.

Does this course cover material which crosses into another department? No

Learning Outcomes:

After completing this course, the student will understand how various scientific practices have evolved based on new evidence and understanding for application in legal proceedings. The student will understand through the materials presented in this course, the limitations of some forensic science applications and discover how through reexamination how some methods are finding acceptance. The student will recognize and be aware of the relationship between the natural sciences and the criminal justice system. The student will be able to recognize how DNA is used to include and exclude potential suspects and how also DNA is used to identify unknown individuals. The student will also understand how toxins are identified from various sources including blood, bile, and vitreous. Students will have an understanding of impression evidence, tool marks, and fingerprints. Finally, the student will understand and be able to evaluate the nature of scientific evidence and its formalized collection, preservation processes.

Attach Syllabus

[FRSC 101 Syllabus 2018 Falsetti.pdf](#)

Additional Attachments

[FRSC 101 Principles of Forensic Science Grading Rubric abf.pdf](#)
[FRSC 101 Learning Objectives Falsetti 2018.pdf](#)

Staffing:

Professor's Falsetti, Rancourt, Rule, and Knight, and Graduate Teaching Assistants.

Relationship to Existing Programs:

This course is specifically designed as a Mason Core Science without a laboratory component.

Relationship to Existing Courses:

This course presents the basic principles of forensic science methods and techniques that are designed for non-forensic science students.

Additional Comments:**Reviewer Comments**

Key: 16144

FRSC 101 –PRINCIPLES OF FORENSIC SCIENCE
This is a Mason Core Course

Course Description: The forensic sciences encompass the skills and expertise of individuals from a multitude of scientific disciplines to assist in the investigation of cases of legal significance. This course is designed to provide the student with a broad introduction to the methods and techniques utilized by today's forensic professionals. We will explore the application of the physical, medical, natural and engineering sciences to specialized legal contexts, investigation of a crime scene, the role of law enforcement crime labs, and other important issues relating to forensic investigations. Class lectures, assigned readings, and video presentations will be used to enhance the students' understanding of a broad spectrum of issues in modern forensic sciences.

Learning Outcomes: After completing this course, the student will understand how various scientific practices have evolved based on new evidence and understanding for application in legal proceedings. The student will understand through the materials presented in this course, the limitations of some forensic science applications and discover how through reexamination how some methods are finding acceptance. The student will recognize and be aware of the relationship between the natural sciences and the criminal justice system. The student will be able to recognize how DNA is used to include and exclude potential suspects and how also DNA is used to identify unknown individuals. The student will also understand how toxins are identified from various sources including blood, bile, and vitreous. Students will have an understanding of impression evidence, toolmarks and fingerprints. Finally, the student will understand and be able to evaluate the nature of scientific evidence and its formalized collection, preservation processes.

Assessments

PARTICIPATION (25% of grade): Everyone is expected to participate in the *practica*, discussion boards, hallway meetings.

CRITIQUES (25% of grade): You are required to independently select a peer-reviewed journal article on the subject of your choice and critique the topic. In each critique, you should briefly summarize the hypotheses and goals of the study, explain the suggested methodological changes or implementation, and argue the efficacy of the approach and analysis. *Remember that constructive criticism involves weighing both the merits and shortcomings of an argument, including the validity of interpretations based on the evidence provided by the analyses performed.*

WEEKLY QUIZZES (50% of grade): In lieu of a final examination, you should be aware of the weekly quizzes. These are designed to evaluate your knowledge of the topics presented and will be given at the end of every week of the term.

Required Text: *Forensic Science: The Basics*, 3rd Edition, Jay Siegel & Kathy Mirakovits, 2015 CRC Press. ISBN 9781482223330.

COURSE OUTLINE

SCHEDULE

READING ASSIGNMENT

Week I. Introduction to Forensic Science & Science and the Court

History and Development of Forensic Science, The United States Forensic Science System, Admissibility of Evidence (Daubert & Frye), Expert Testimony Chpts. 1. &24.

Week II. Crime Scene Investigation & Nature of Evidence

Crime Scene as Recent History, Crime Scene Investigation Process, Classification of Evidence, Positive and Negative Controls Chpts. 2 &3.

Week III. Separating Complex Mixtures

Physical Separation of Mixtures, Solid-Phase Extractions Chpt. 4.

Week IV. Light & Matter

Chromatography, Light as a Wave: The Electromagnetic Spectrum, Properties of Waves, Energy of Light: The Photon, Interactions of Light Energy and Matter, Spectrophotometer, Ultraviolet/Visible Spectrophotometry, Infrared Spectrophotometry, Mass Spectrometry Chpts. 5.& 6.

Week V. Digital Evidence, Computer Forensics, and Investigation

Physical versus Virtual Crimes, Computer Crime, Criminal Law, Computer Crime Investigation, Wireless and Handheld Devices, Digital Cell Phone and Handheld Investigation, Computer Forensics, Legal Proceedings Chpt. 8.

Week VI. Forensic Engineering

Engineering Profession, Forensic Engineer, Forensic Engineering Case Studies, Accident Reconstruction Chpt. 9.

Week VII. Fingerprints and Other Impressions

Origin of Fingerprints, Anatomy of Fingerprints, Detection and Visualization of Fingerprints, Comparison of Fingerprints, Comparison of Single Fingerprints Automated Fingerprint Identification Systems (AFIS and IAFIS), Other Impressions: Footwear and Tire Treads Chpt. 10.

Week VIII. Firearms and Toolmarks

Firearms Identification, Anatomy of a Live Round (Cartridge)
Examination of Firearms Evidence, Digital Imaging Systems for Ammunition
Distance-of-Fire Determinations, Toolmarks Chpt. 12.

Week IX. Forensic Pathology

Investigation of Death: Coroners and Medical Examiners, Death Investigation Process,
Postmortem Interval (PMI): Time of Death, Mind Your Manners Chpt. 13

Week X. Anthropology and Odontology

Human Skeleton, Identification of Skeletal Remains, Individualization of Human
Skeleton, Forensic Odontology, Human Rights Investigations Chpt. 14.

Week XI. Forensic Entomology

PMI: The Life Cycle of the Blow Fly, Decomposition of a Body after Death
Factors that Affect PMI, Entomological Investigation. Chpt. 15.

Week XII. Serology

Blood, Analysis of Blood, Other Biological Fluids and Stains, Bloodstain Pattern
Analysis Chpt. 16.

Week XIII. DNA Typing

What Is DNA?, Collection and Preservation of DNA Evidence, History of DNA, Current
Method of DNA Typing: STRs, SNPs, Mitochondrial DNA, CODIS Chpt. 17.

Week XIV. Illicit Drugs & Forensic Toxicology

Illicit Drugs, Analysis of Illicit Drugs, Forensic Toxicology, Becoming a Forensic
Toxicologist, Principles of Pharmacology, Pharmacology and Toxicology of Ethyl,
Alcohol, Absorption of Ethanol, Drunk Driving Laws, Field Sobriety Testing,
Measurement of BAC Chpts. 19 &
20.

Week XV. Fires and Explosions

Investigation of a Fire, Role of Accelerants, Analysis of Fire Scene Evidence, Analysis of
Accelerants, Explosions, Investigation of Bombing Scenes Chpt. 23.

UNIVERSITY RESOURCES

GMU Honor Code:

Standards of academic integrity as set forth by the University are strictly observed and rigorously enforced in this class. The complete Honor Code is as follows: *To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: **Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.***

GMU Email: <http://masonlive.gmu.edu>

Each student is responsible for activating their GMU email account and checking their account on a regular basis for University and class announcements. **All masonlive accounts must be activated.**

GMU Police Policy: 703-993-2810

If you are currently employed with a law enforcement agency as a sworn officer and would like to carry a firearm on campus and into class, you must contact GMU Police Department as a courtesy.

GMU Students with Disabilities: <http://ods.gmu.edu>

If you are a student with a disability and you need academic accommodations, please contact the Office of Disability Resources at 703-993-2474. All academic accommodations must be arranged through that office, your instructor is not obligated to provide accommodations without documentation from ODS.

Writing Center: <http://writingcenter.gmu.edu>

For general questions and comments please contact wcenter@gmu.edu or call:
703-993-1200 (Robinson Hall A114, Fairfax Campus)
703-993-1824 (Enterprise Hall 076, Fairfax Campus)

All appointments are made through the online scheduling system so please do not email or call to schedule appointments. If you would like to cancel an appointment you may do so via the online scheduler, simply select your appointment and click the "Cancel appointment" box at the bottom of the reservation form and then "save."

University Libraries: "Ask a Librarian" <http://library.gmu.edu/mudge/IM/IMRef.html>

Margaret Lam, Physical Sciences Liaison Librarian;

<http://infoguides.gmu.edu/forensics>

Fenwick Library, A244

703-993-2212

mlam3@gmu.edu

Counseling and Psychology Services (CAPS): (703) 993-2380; <http://caps.gmu.edu>

University Policies:

The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at <http://universitypolicy.gmu.edu/>. All members of the university community are responsible for knowing and following established policies.

Learning Objectives Natural Science without a Lab

- 1) Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding: a) evolves based on new evidence, b) differs from personal and cultural beliefs"

Each week the student will be introduced to how the theory and practice of biology, chemistry is applied to legal settings. The history of science applied in legal settings will be reviewed and the student will have an appreciation for the evolution of science from phrenology to SNP's and Y-STRs. Bias in forensic science is directly and openly discussed and students will examine how bias impacts everything from analysis to testimony. Weekly quizzes and Hallway Discussions are used to evaluate students understanding.

- 2) Recognize the scope and limits of science.

Review of landmark cases that guide how and what 'science' is admissible in court. Highlighted cases include: *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923) and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). Assessment will be made via the Weekly Quiz.

- 3) Recognize and articulate the relationship between the natural sciences and society and the application of science to societal challenges (e.g., health, conservation, sustainability, energy, natural disasters, etc.).

Students will recognize and be able to articulate the relationship between the natural sciences and society after exposure to topics such as medico-legal anthropological approaches to positive identification after a mass fatality event, or microbiomes applied to geo-location of unidentified persons, biological methods to assess the age of living victims, or even more general, forensic science evidence presented in the World Court to support war crimes. Assessment will be made via the Weekly Quiz and Hallway Discussions.

- 4) Evaluate scientific information (e.g., distinguish primary and secondary sources, assess credibility and validity of information).

Students will recognize and be able to articulate the relationship between the natural sciences and society through researching and preparing a written critique on an approved topic or method in a science applied to legal proceedings. See attached rubric. The assignment is worth 25 percent of the final grade.

**FRSC 101 Principles of Forensic Science
Critique Grading Rubric**

Components	Highly Competent	Competent	Satisfactory	Unsatisfactory
Identification of Premise and Supporting Points (Argument) <i>20 points</i>	<i>15-20 points</i> Includes accurate identification of article premise, significant points in support of the premise, and the significance of these to the course and/or field	<i>10-14 points</i> Includes accurate identification of article premise, importance to the course, significant points in support of the premise, and/or field, but one or more of them need improvement	<i>5-9 points</i> One of the following is missing or insufficiently analytical: accurate identification of article premise, importance to the course, significant points in support of the premise, and/or field	<i>0-4 points</i> More than one of the following are missing or insufficiently analytical: accurate identification of article premise, importance to the course, significant points in support of the premise, and/or field; those included need improvement
Application of Analysis <i>20 points</i>	<i>15- 20 points</i> Includes several analyses that relate the article to course content and real-life situations	<i>10-14 points</i> Includes some analyses that relate the article to course content and real-life situations	<i>5-9 points</i> Includes few analytical statements that relate the article to course content and real-life situations	<i>0-4 points</i> Includes general opinionated statements that are unrelated to the course content and real-life and/or are substantiated.
Critical Evaluation of premise and supporting points (argument) <i>30 points</i>	<i>15-20 points</i> Includes critical thinking that clearly states the student's informed and substantiated opinion, thorough evaluation of the article's premise, and supporting points	<i>10-14 points</i> Includes critical thinking that clearly states the student's opinion and some evaluation of the article's premise and/or arguments but overlooks some points	<i>5-9 points</i> Student's opinion of the article is stated, along with critical evaluation of the article's premise and/or argument, but some significant points are overlooked	<i>0-4 points</i> Student's opinion of the article is not clear; critical thinking is not evident

APA Formatting
10 points

9-10 points
Documents sources using APA formatting accurately and consistently

6-8 points
Documents sources using APA formatting with minor violations

3-5 points
Reflects incomplete knowledge of APA formatting.

0-2 points
Uses little to no correct APA formatting

Writing Mechanics
10 points

9-10 points
Writing is clear and concise. Sentence structure and grammar are excellent. Correct use of punctuation. No

6-8 points
Writing is mostly clear and concise. Sentence structure and grammar are strong and mostly correct. Few minor errors in punctuation and/or

3-5 points
Writing lacks clarity or conciseness. Minor problems with sentence structure and some grammatical

0-2 points
Writing lacks clarity and conciseness. Serious problems with sentence structure and grammar. Numerous major