



Marshall University Syllabus Master of Science in Forensic Science

Course

FSC 623 Forensic Analytical Chemistry Laboratory

Course Description

This laboratory practicum will develop skills needed in the forensic analysis of physical evidence using modern analytical chemistry methods and instrumentation. This laboratory provides direct application of concepts introduced in FSC 622. It is part of the core curriculum within the Forensic Science Graduate Program.

Credits

1 graduate credit hour

Prerequisites

FSC 622 – Forensic Analytical Chemistry (Lecture)

Term/Year

Spring 2025

Class Meeting Days/Times

Wednesdays 9:30 – 11:50 AM

Location

Forensic Science Center Annex Chemistry Laboratory 221

Academic Calendar

For beginning, ending, and add/drop dates, see the [Marshall University Academic Calendar](https://www.marshall.edu/academic-calendar/) (URL: <https://www.marshall.edu/academic-calendar/>).

Instructors

Dr. Lauren Waugh

Dr. Kim Kunkler

Instructor's Contact Information

Dr. Lauren Waugh:

- Office: WW 200EE
- Office Hours: Mondays, Tuesdays, & Thursdays 10 AM – 12 PM
- Office Phone: 304-691-8940
- Marshall Email: richards18@marshall.edu
- Personal Cell: 412-445-7690

Dr. Kim Kunkler:

- Office: Forensic Science Center Annex Room A225
- Office Hours: Mondays 11:00 AM – 12:00 PM; Tuesdays 9:00 – 11:00 AM; Wednesdays 1:00 – 3:00 PM; and by appointment.
- Office Phone: 304-733-7864

- Marshall Email: kunkler@marshall.edu
- Personal Cell: 217-891-3273 (please use wisely)

Health and Safety Information

All members of the Marshall University community are expected to observe all applicable health and safety protocols. This includes general health and safety protocols as well as specific protocols that might emerge in response to community and campus health conditions.

This course is intended to be a hands-on laboratory course. If university health and safety protocols require this course to transition to virtual learning, the laboratory activities, assignments, and due dates are subject to change.

Campus Carry Policy

University Policy, UPGA-12 (Campus Carry Policy) derives its authority from West Virginia State law, including the Campus Self-defense Act (W. Va. Code § 18B-4-5b). It pertains to the exercise of Concealed Carry on Marshall University's campus, except in designated areas, by individuals with a valid permit to Conceal Carry.

Individuals who choose to Conceal Carry are responsible for knowing and understanding all applicable federal, state, and local laws and Marshall University Board of Governors Rules, University Policies, and Administrative Procedures. University Policy, UPGA-12 applies to areas of campus and buildings that are directly under the possession or control of Marshall University.

Concealed handguns are not observable to others and must be holstered and concealed on the body of the permit holder or in a personal carrier, such as a backpack, purse, or other bag that remains under the exclusive and uninterrupted control of the permit holder. This includes wearing the personal carrier with a strap, carrying or holding the personal carrier, or setting the personal carrier next to or within your immediate reach at all times. If your participation in class activities impedes your ability to maintain constant control of your handgun, please make alternate arrangements prior to coming to class.

Required and/or Recommended Texts and Materials

Required Texts and Materials

There is no required text. All course materials will be provided via Teams or e-mail.

Recommended/Optional Texts and Materials

Lecture materials and course notes from FSC 622.

Bell, Suzanne. *Forensic Chemistry*, Third Edition. CRC Press, 2022. This text can be used to review and supplement FSC 622 lecture topics addressed during the laboratory assignments.

Excerpts from relevant ASTM standards will be referenced and made available for student use and study during this course.

Course Student Learning Outcomes

The table below shows the following relationships: How each student learning outcome will be practiced and assessed in the course.

Course student learning outcomes	How students will practice each outcome in this course	How student achievement of each outcome will be assessed in this course
Students will demonstrate the ability to operate modern analytical instrumentation (e.g. GC-MS, FTIR).	Hands-on work	In-lab activities, pre-lab and post-lab assignments
Students will evaluate and interpret chromatographic and spectroscopic data.	Hands-on work	In-lab activities, pre-lab and post-lab assignments
Students will apply statistical analyses to laboratory data.	Hands-on work	In-lab activities, pre-lab and post-lab assignments
Students will demonstrate the ability to recognize Cannabis plant material and perform chemical color tests for the presence of tetrahydrocannabinol (THC) and cannabidiol (CBD).	Hands-on work	In-lab activities, pre-lab and post-lab assignments
Students will demonstrate the ability to prepare, analyze, and quantitate samples for the presence of controlled substances and related compounds.	Hands-on work	In-lab activities, pre-lab and post-lab assignments
Students will demonstrate the ability to prepare and analyze a beverage sample for the presence of adulterants.	Hands-on work	In-lab activities, pre-lab and post-lab assignments
Students will demonstrate the ability to prepare and analyze samples for the presence of ignitable liquids.	Hands-on work	In-lab activities, pre-lab and post-lab assignments
Students will demonstrate the ability to prepare and analyze urine samples for the presence of controlled substances, or their metabolites, and related compounds.	Hands-on work	In-lab activities, pre-lab and post-lab assignments
Students will review relevant published, consensus-based standards related to forensic analytical chemistry.	Individual study	Pre-lab and post-lab assignments
Students will articulate the strengths and weaknesses of various techniques used in forensic analytical chemistry.	Group discussions	Pre-lab and post-lab assignments
Students will apply quality assurance and quality control practices related to forensic analytical chemistry.	Hands-on work	In-lab participation checks; post-lab assignments
Students will prepare appropriate responses for court testimony questions related to forensic analytical chemistry.	Group discussions	Pre-lab and post-lab assignments
Students will demonstrate ability to record notes contemporaneously and with sufficient detail so that another individual of similar training and experience could understand and evaluate the work performed, independently interpret the data, and form an opinion.	Hands-on work	Lab notebook checks

Course Requirements/Due Dates

In general, the Program only has one instrument of each type; therefore, you will work in pairs or small groups during this course. Although the group will collect data together, you will be responsible for being an active participant in the lab work, maintaining your own lab notebook, and preparing your own, individual pre-lab and post-lab assignments.

Pre-lab assignments are due at the beginning of your laboratory period. You will not be permitted to begin laboratory work until your pre-lab assignment has been turned in.

In-lab participation is determined by instructor observation and is evaluated based on your adherence to safety precautions, use of proper laboratory techniques, efficiency, cleanliness, interest/curiosity, and teamwork.

Lab notebook checks will be performed by the instructor at random during the laboratory period. You are expected to record your notes contemporaneously and with sufficient detail so that a classmate could understand and evaluate the work performed, independently interpret the data, and form an opinion. Your lab notebook may be either hardcopy (using a stitch-bound/"composition" type notebook) or electronic (using your own device and software); the choice is yours.

In general, post-lab assignments are due two weeks following the bulk of the work of the laboratory. Specific due dates and instructions for the post-lab assignments will be provided with the lab instructions.

Grading Policy

Your grade will be determined based on your performance on the following:

- 11 pre-lab assignments valued at 10 points each (10.7% of total score)
- 12 in-lab participation checks valued at 5 points each (5.8% of total score)
- 12 lab notebook checks valued at 5 points each (5.8% of total score)
- 8 post-lab assignments valued at 100 points each (77.7% of total score)

Note that there are 1030 total possible points during the course.

Grading Scale:

- A = 927 to 1030 points
- B = 824 to 926 points
- C = 721 to 823 points
- D = 618 to 720 points
- F = 0 to 617 points

Partial Credit Policy: Partial credit amounts to both give and take; students can earn partial credit for the correct portions of an answer, but they can also lose partial credit for adding incorrect or misleading information to an otherwise fully correct answer.

Late Grading Policy: A 10% deduction will be taken from an assignment for every day it is late.

Attendance/Participation Policy

Attendance is Mandatory: Students enrolled in the Forensic Science Program are expected to attend all classes, laboratories, seminars, internship sessions, and presentations offered by guest speakers. Should you need to miss class due to an excused absence or other situation governed by the official health or safety policy,

appropriate accommodation will be provided.

Excused Absences: Both notification and formal documentation are required for Excused Absences. No exams, labs, or other formal exercises will be made up without an Excused Absence. With an Excused Absence, the student may be asked to conduct a lab assignment BEFORE the scheduled date.

Unexcused Absences: Any unexcused absence in which a student misses a graded activity or assignment identified in this syllabus may result in a zero for the activity or assignment.

Punctuality: On-time arrival is expected of all students. A point deduction of 10 points will be made if a lack of punctuality is persistent (more than 3 times during the semester).

Generative Artificial Intelligence (AI) Use Policy

Students are allowed to use Generative AI in some ways but are prohibited from using it in other ways. Keep in mind that any content produced by generative AI can “hallucinate” (produce false information), so students are responsible for ensuring the accuracy of any AI-generated content. For information on citing AI, please see [MU Library’s AI citation website](https://libguides.marshall.edu/plagiarism-AI/cite) (URL: <https://libguides.marshall.edu/plagiarism-AI/cite>). Students should not use generative AI in any way that would violate the [Student Code of Conduct](https://www.marshall.edu/student-conduct/) (URL: <https://www.marshall.edu/student-conduct/>).

Students are permitted to use generative AI in the following ways:

- **Brainstorming:** You may use generative AI to stimulate creativity, generate ideas, or brainstorm topics for papers, presentations, and discussions. The generated content must serve as a stepping stone, not a final product.
- **Citation Assistance:** AI tools can be used to manage, format, and organize citations and references, promoting adherence to academic writing standards and specific style guides required for individual assignments.
- **Grammar and Style Checking:** AI-powered writing enhancement tools may be used to help with spelling, grammar, syntax, and stylistic errors.
- **Concept Understanding:** Generative AI can be used to explain or simulate concepts taught in class, aiding in a deeper understanding.
- **Research Assistance:** AI can be used to conduct initial literature searches, compile citation data, and summarize articles, books, or papers. It should not replace traditional background research methods but rather enhance them.

Students are not permitted to use generative AI in coursework in the following ways:

- **Plagiarism:** Using AI-generated content as your original work without attribution. This includes essays, papers, presentations, and exam answers.
- **Data Manipulation:** Using AI tools to alter data or create misleading information.
- **Misrepresentation of Skills:** Using generative AI to complete tasks that are meant to assess your knowledge and skills.
- **Confidentiality Breach:** Using AI tools that might violate university policies or laws related to data privacy and confidentiality.

See individual assignment instructions for any additional details.

In addition to a proper citation, the student should include the following statement with any assignment where generative AI is used for assistance.

"I used generative AI platform [INSERT NAME OF PLATFORM, SUCH AS CHAT GPT] for assistance in the following ways on this assignment: [INSERT WAYS USED, such as brainstorming, citation assistance, grammar and style checking, concept understanding, and research assistance, etc]."

University Policies

By enrolling in this course, you agree to the University Policies. Please read the full text of each policy (listed below) by going to [MU Academic Affairs: University Policies](https://www.marshall.edu/academic-affairs/policies/). (URL: <https://www.marshall.edu/academic-affairs/policies/>)

- Academic Dishonesty Policy
- Academic Dismissal Policy
- Academic Forgiveness Policy
- Academic Probation and Suspension Policy
- Affirmative Action Policy
- Pre-Finals Week Policy
- D/F Repeat Rule
- Inclement Weather Policy
- Sexual Harassment Policy - Title IX prohibits the harassment of students based on sex, which includes pregnancy, childbirth, and related conditions. This includes that students will not be penalized for taking medically necessary leave related to pregnancy, childbirth, or related conditions. Marshall's Title IX Office may be contacted at TitleIX@marshall.edu
- Students with Disabilities (Policies and Procedures)
- University Computing Services Acceptable Use Policy

Zero Tolerance of Drug Abuse

This course involves samples that contain controlled substances. Misappropriation of controlled substances, including theft or personal use, will result in immediate failure of the course, suspension from the Program, and reporting to law enforcement and university administration. Be advised that you may be asked to submit to a random drug screening (urine and/or blood test) during this course.

Laboratory Safety

The laboratory activities are designed to be as safe as is practical. However, if you have a medical condition (e.g., asthma, pregnancy) that might be exacerbated or jeopardized by exposure to reagents or test substances, please confer with the Instructor in confidence as soon as possible so that alternative arrangements can be made.

You will be required to sign a safety orientation acknowledgment during your first lab period. Your signature on this document acknowledges (1) that you have read the "Safety & Annual Training" section of the *FSC Graduate Student Handbook*, (2) that you have taken the on-line lab safety courses required by FSC, (3) that you have reviewed the *Marshall University Environmental Health and Safety Manual* and will comply with its provisions, and (4) that your instructor has reviewed with you the following topics: general lab safety guidelines, fire alarm procedures, and the location and use of personal protective equipment (PPE), fire extinguishers, chemical spill kits, safety shower, and eye wash.

Proper Laboratory Attire

Personal protective equipment (PPE; e.g., safety glasses, chemical splash goggles, lab coats, gloves) will be available in a variety of sizes and must be worn as appropriate for the tasks being performed. For your safety, you will not be permitted to wear shorts or open-toed shoes in the lab. Tie back or confine long hair.

Course Schedule

While every effort will be made to adhere to the course schedule, the topics and order of laboratory activities are subject to change. The course schedule appears below.

Week	Date	Laboratory Activity	What's Due?
1	Jan 15	Introduction & Safety Orientation	Sign the Safety Orientation Acknowledgement during lab.
2	Jan 22	#1 GCMS Methods & Qualitative Analysis	Pre-Lab #1
3	Jan 29	#2-1 Fire Debris 1	Pre-Lab #2-1
4	Feb 5	#2-2 Fire Debris 2	Pre-Lab #2-2 / Post-Lab #1
5	Feb 12	#3 Pipetting & Statistics	Pre-Lab #3
6	Feb 19	2025 AAFS / NO LAB	
7	Feb 26	#4 Recognizing Cannabis	Pre-Lab #4 / Post-Lab #2
8	Mar 5	#5 Presumptive Testing of Drugs	Pre-Lab #5 / Post-Lab #3
9	Mar 12	#6 IR of Cocaine	Pre-Lab #6 / Post-Lab #4
	Mar 19	SPRING BREAK / NO LAB	
10	Mar 26	#7 GCMS Quantitative Analysis	Pre-Lab #7
11	Apr 2	#8-1 Urine Analysis 1	Pre-Lab #8-1 / Post-Lab #5/#6
12	Apr 9	#8-2 Urine Analysis 2	Pre-Lab #8-2 / Post-Lab #7
13	Apr 16	#9-1 Adulterated Beverage 1	Pre-Lab #9-1
14	Apr 23	#9-2 Adulterated Beverage 2	Pre-Lab #9-2 / Post-Lab #8
15	Apr 30	Flex Lab	Post-Lab #9
	May 7	FINALS WEEK /NO LAB	