

# Forensic Science

Lecture 11-12:30 Tu/Th, GMCS327

Instructor:

Kathleen McNamara (Please call me Kathy, I do not require any formal titles)

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Office hours-email for appt, many times possible

**TEXTBOOK:** Criminalistics 12<sup>th</sup> ed. By Richard Saferstein,

**Immediate Access Course:** Some or all of the required materials for this class are provided in digital format within Canvas. The materials are available by the first day of classes and are free through the add/drop date. The SDSU add/drop deadline is Jan 30 11:59 p.m. PDT and you must opt out of immediate access before that deadline. Unless you opt out of Immediate Access by 11:59 p.m. PDT on the add/drop date, your SDSU student account will be charged the special reduced price for use of the materials for the remainder of the semester. Please visit [www.shopaztecs.com/immediateaccess](http://www.shopaztecs.com/immediateaccess) for additional information about Immediate Access pricing, digital subscription duration, print add-ons, opting out and other frequently asked questions.

Additional course documents will be on Canvas, these will include readings on current events in the science and forensic community, as well as some recorded lectures and powerpoint slides

## Course description:

This is a general education course for upper division students, and may not be used towards chemistry major. No specific prior science knowledge is needed, but you should have completed the lower division science requirement

This course will examine how chemistry and science is present in our everyday lives, and how it can be used to solve specific problems or questions. The focus will be on scientific literacy in the context of forensics. We will learn about the scientific method, basic chemistry, how radioactivity is used to date potentially forged objects, and the many areas of the forensic laboratory that use science to answer questions of law.

**Questions are welcomed**, no one will ever be embarrassed or made to feel bad for asking questions,

Course objectives- At the end of this class students should be able to:

1. Question how the media (particularly television) presents scientific techniques.
2. Differentiate the components of the atom and how changes in them allow scientific measurements.
3. Describe the scientific method and recognize types of, and changes in, chemical compounds.
4. Know the types of examinations commonly performed in a forensic lab, and explain the scientific basis behind them.
5. Explain the difference between class and individual characteristics in evidence.
6. Recognize the types of examinations scientists perform in authentication of artwork, and articulate the basic scientific principles behind the exams.
7. Understand how associated specialty fields of pathology, toxicology, and entomology contribute to the analysis of a crime scene.
8. Summarize the ways that DNA is used to determine genetic identity.
9. Explain criminal justice concepts that apply to analysis of samples in the crime lab.
10. Be able to explain how people of color or those with lower socioeconomic status are subject to greater bias in policing and forensic errors

**Student disability statement:**

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619)594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services. Your cooperation is appreciated.

**Academic dishonesty:**

Plagiarism in written materials submitted will result in a score of zero and potential referral to center for student rights and responsibilities. Cheating on exams by copying answers is likewise prohibited. I expect that all work will be original and your own.

**Absences**

- If you plan to be absent for a religious observance or holiday, notify me by the end of the second week of classes.
- If you are absent more than five days due to illness or injury, you may contact Student Health Services for help in communicating your absence.
- If you miss class because you have been diagnosed with or are required to quarantine due to exposure to COVID-19, contact [vpsafrontdesk@sdsu.edu](mailto:vpsafrontdesk@sdsu.edu) to notify the university.

**LAND ACKNOWLEDGMENT**

For millennia, the Kumeyaay people have been a part of this land. This land has nourished, healed, protected and embraced them for many generations in a relationship of balance and harmony. As members of the San Diego State University community, we acknowledge this legacy. We promote this balance and harmony. We find inspiration from this land, the land of the Kumeyaay.

### Exams and grading:

Final grades will be based on 2 exams worth 100 points each, class participation of 100 pts, a writing assignment worth 50 points, and projects worth a total of 50 points, for a total of 400 points. Grades are based on a percentage of the total points achieved, and will be assigned according to the following ranges:

90-100%=A, 80-89%=B, 70-79%=C, 60-69%=D, below 60%=F

The lower 2% of each range is a minus, the highest 2% of each range is a plus.

### Exam:

Questions will be multiple choice and true/false as well as short answer. The final will be cumulative, but will emphasize the last part of the semester. Exam questions will be drawn from the lectures, as well as assigned reading material and videos shown in class.

## Class participation:

I will

- a) post articles on Canvas along with discussion questions on those articles. I expect you to come to class prepared, read the articles in advance, have thoughts to contribute on the discussion topics.
- b) Ask questions of you to answer during the lectures. These will be based on the powerpoint lectures

## WRITING ASSIGNMENT

The university mandates that upper division GE courses must have a writing component; therefore you will need to write a 2-page paper, our topic is how science has been used to solve a problem or answer a question. The title of the paper should be the chosen question or problem that science can answer. (Examples: How can Forensic anthropology identify a body? How does a microwave work?) The paper should identify and describe topic or problem and give a complete description of the technique(s) used in the solution. You should consult at least 3 sources for this paper, and include references. The paper should be single spaced, 12-point font and two full pages long not including references or titles/names. (Two full pages of text) It is worth 50 points: 25 points will be given for quality of scientific explanation including a clear identification of the question the science can answer, and 25 points for writing accomplishment-spelling, grammar, correct sentence structure and coherent paragraphs, etc. It is due at the beginning of class on Th Apr. 25, but it may be turned in earlier. There will be a penalty of 5 points for each class period the paper is late.

Please note points will be deducted for excessive paragraph spacing, name/title sections, etc. 2 pages are usually around 1200 words, but this is only a guideline as it will vary with word length.

The magazines Scientific American or Discover may contain useful ideas, and the web sites <http://www.livescience.com/> and <http://science.physorg.com/> often have intriguing articles.

Some ideas recently in the news-

Is The Innocence Project; freeing the unfairly convicted with DNA testing?

Can Laboratory analysis Find arson residues in burned buildings?

Can forensic engineering be used to explain a building collapse?

How is ultraviolet light used to provide safer drinking water?

How can DNA analysis be used to trace ancestry?

What methods can be used to fight climate change?

## PROJECT ASSIGNMENTS: Choose 50 pts

1. A poster illustrating a scientific concept discussed in class. Find an interesting aspect of Forensic science and complete a poster board and present it to the class. You will give a 2-3 minute presentation of your work on the due date. Past projects have included fingerprints, soil geology comparisons, maggot development, comparison of fired bullets and cartridges from guns, toxicology testing kits, accident reconstruction, forensic biology, etc. A large variety is possible. You **MUST** let Kathy know you choose this by 4/20 so we have sufficient time set aside. **50 points.**
2. Find a newspaper or magazine article dealing with chemistry, forensics, or scientific progress. (you may download from the internet but it **MUST** have a date of 2020 or later on it). Write a 2 paragraph summary of the article (at least 10 sentences) covering how it related to the class and what new information you learned from reading it. Staple the article to the paragraph and turn in together. **25 points**
3. Choose one- **25 points**
  - A) Examine a television show that uses science and scientific theory principles to convey a point to the audience. Mythbusters is an excellent example of a show which does this regularly. Answer questions on the worksheet

**OR**

  - B) Watch an episode of CSI, Bones, or other fictional show that presents scientific possibilities. Find 10 mistakes, list and detail how the information is incorrect and explain what improvements you would make in how the information is presented.

FERPA privacy rules will be respected in this class.

The lecture schedule below is approximate, but exam dates will not change, plan accordingly!

# LECTURE SCHEDULE

Th 1/18	Introduction to Forensic Science,
T 1/23	Scientific method
Th 1/25	Crime scenes
T 1/30	Physical evidence, class vs. individual characteristics
Th 2/1	Physical evidence continued
T 2/6	Bloodstain pattern analysis
Th 2/8	Pathology and entomology- How did they die -how long have they been there?
T 2/13	Pathology and entomology continued
Th 2/15	Fingerprints
T 2/20	Fingerprints continued
Th 2/22	Microscopy
T 2/27	Firearms and tool marks
Th 2/29	Matter, light, and glass
T 3/5	Matter, light, and glass
Th 3/7	Physical and chemical properties
T 3/12	<b>Exam 1</b>
Th 3/14	Hairs and fibers
T 3/19	Hairs and fibers
Th 3/21	Drugs
T 3/26	Toxicology
Th 3/28	Toxicology
Spring Break	
T 4/9	Metals, paint, soil- trace evidence
Th 4/11	Serology
T 4/16	DNA
Th 4/18	DNA
T 4/23	Arson investigation <b>Poster project with 2-3 minute presentations due today at beginning of class and Article / TV show project due today at beginning of class</b>
Th 4/25	Arson continued <b>Paper due today, at <u>beginning</u> of class</b>

T 4/30            Radiocarbon dating  
Th 5/2            **Crime Scene-** collect the evidence, send to the lab

**Final is Tuesday May 7 from 10:30 am-12:30 pm (note- this is earlier than class time)**

## Essential Student Information:

Your [SDSU email address](#) will be used for all course-related communications.

- The [Student Conduct Code](#) prohibits conduct disruptive to instruction, including academic dishonesty and the unauthorized recording, dissemination, or publication (including on websites or social media) of lectures or other course materials.
- The [Family Educational Rights and Privacy Act](#) (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. I will not post grades or leave graded assignments in public places. Students will be notified at the time of an assignment if copies of student work will be retained beyond the end of the semester or used as examples for future students or the wider public.
- As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I am required to share information regarding sexual violence on SDSU's campus with the [Title IX](#) coordinator, Gail Mendez (619-594-6464), who will contact you to let you know about support services at SDSU and possibilities for holding accountable the person who harmed you. If you do not want the Title IX Officer notified, you can speak confidentially SDSU's Sexual Violence Victim Advocate (619-594-0210) or Counseling and Psychological Services (619-594-5220, [psycserv@sdsu.edu](mailto:psycserv@sdsu.edu)).
- Class rosters are provided to the instructor with the student's legal name. Please let me know if you would prefer an alternate name and/or gender pronoun.
- Need help finding an advisor, tutor, counselor, emergency economic assistance, or other support? Contact the [SDSU Student Success Help Desk](#) Monday through Friday, 9:00 AM to 4:30 PM.
- For technical or computing assistance, contact the [Library Computing Hub](#).