

**Department of Justice Studies
FS 162
Forensic Science Applications
Spring 2023**

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| Instructor | Mark Barash |
| Contact Information | Email: mark.barash@sjsu.edu Phone: 408-924-5513 |
| Office Location and Hours | HB 216 or Zoom: https://sjsu.zoom.us/j/6339297996 . Drop in: Thr 3-6pm |
| Canvas Course Website | https://sjsu.instructure.com/courses/1557963 Login using your Tower ID Card and Password → Courses → FS 162 |
| Lecture/Practical Days/Time | Monday 12pm-1:45pm (Lec); 2:00pm-3:45pm (Act), HB 207 |
| Prerequisites | Prerequisites FS 11/FS 12, JS or FS Major/Minor, Upper Division Standing. |
| FS Library Liaison | Nyle Monday – nyle.monday@sjsu.edu |
| FS Lib Guide | http://libguides.sjsu.edu/content.php?pid=57768&sid=2450175 |
| FS Program Website | SJSU Justice Studies Department Bachelor of Forensic Science Program |

Course Description

Forensic Science Applications (FS 162) provides a more in-depth review of the foundations established in Survey of Forensic Sciences (FS 11) with emphasis placed on the course’s general laboratory component involving simulation of real-life forensic situations. It involves the basic application of scientific principles to various forensic science (FS) sub-disciplines, specifically focusing on the scientific investigation, evaluation, and interpretation of physical evidence (i.e. human remains, decomposition in natural environments, biological and chemical evidence, etc.) using various identification and comparison techniques. Student participation involves field and laboratory exercises that explore health and safety, basic laboratory instrumentation, microscopy, trace evidence (soil, glass, hair and paint analyses), questioned documents, forensic taphonomy, human identification, bite mark analysis, and presumptive testing. Additional topics will include court testimony, quality assurance and ethics.

Disclaimer: *This class is intended for mature students and may cover graphic content, such as criminal cases, discussions, and/or topics. Most of the material presented will NOT be censored. Under NO CIRCUMSTANCES are students permitted to take photos of the lecture slides and/or photos. Failure to comply with these guidelines may result in academic penalty.*

Outlines will be provided or made accessible via Canvas for each lecture pertaining to the topic that will be discussed.

Note: FS 162 is *required* for the successful completion of the FS biology and chemistry majors, as well as the FS minor. It is *recommended* for JS majors who are interested in understanding the relevance of forensic science to various law enforcement investigations and legal proceedings. However, it is open to any student with a general interest in the subject.

Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

- **CLO 1** Explain the Scientific Method; the Locard Exchange Principle; class and individual characteristics of evidence; identification, individualization and comparison techniques; probative value and probability, as well as other important terms; the history and importance of DNA fingerprinting, the principles of DNA profiling and inheritance, and to apply this knowledge to a realistic field/laboratory exercise.
- **CLO 2** Execute field and laboratory experiments safely, while acquiring basic laboratory knowledge, skills and techniques required for proper handling of forensic evidence and scientific instruments.
- **CLO 3** Classify evidence according to their physical and/or chemical properties and use appropriate analytical techniques for pattern identification, glass reconstruction, trace evidence analyses, human and bite mark identification, entomology, serology, and questioned documents.
- **CLO 4** Analyze and critically evaluate forensic error, as well as the ethical issues in forensic science.

Assignments

1. **Exams (30%):** There will be two midterms (20%) and one final (10%) exam. The format will include questions such as multiple choice, fill-in, short essay and diagrams. (CLO1, CLO3, CLO4)
2. **Chapter Review Questions and Quizzes (30%):** there will be chapter review questions (20%) and periodic quizzes (10%) at the end of each week/topic. (CLO1, CLO3)
3. **Immersive Simulations, Practical Exercises and Reports (35%):** Immersive simulations (5%) and lab practicals (30%) will cover subject areas dealing with Locard's Exchange Principle, Hair & Soil, Physical Fit, Questioned Documents, Stab Lab, Human ID, Presumptive Tests for Blood & Semen, Pattern Evidence, and Anthropometry (LO1). Lab reports will be written according to standard scientific reports and consist of individually written and group submitted documents (CLO2, CLO3, CLO4).
4. **Discussion Board (5%):** Students will respond substantively to discussion prompts and to classmates on various forensic science-related topics. (CLO 1-4).

All assignments are graded based on adherence to directions, thoroughness, thoughtfulness, clarity, and logic.

Required Texts and Materials

Bell, S. (2019). *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 5th Edition, CRC Press. The textbook is available for free from the MLK library.

Additional materials will be posted on Canvas. It is the student's responsibility to check the website for new postings.

Grading Scale for All Assignments

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| A plus | 97-100 |
| A | 94-96.9 |
| A minus | 90-93.9 |
| B plus | 87-89.9 |
| B | 84-86.9 |
| B minus | 80-83.9 |
| C plus | 77-79.9 |
| C | 74-76.9 |
| C minus | 70-73.9 |
| D plus | 67-69.9 |
| D | 64-66.9 |
| D minus | 60-63.9 |
| F | <60 |

All assignments are graded based on adherence to directions, thoroughness, thoughtfulness, clarity, and logic.

Note: A grade of C or better is required for all Justice Studies major and minor coursework, and desirable for students enrolled in the Forensic Science majors and/or minor.

Extra Credit

Extra credit opportunities may be available throughout the semester and will be used to augment the final grade up to 5%. The specific extra credit Opportunities will be announced by the instructor during the semester.

Class Protocol and Policies

Please note, late assignments will lose 10% for every calendar day that they are late, including weekend days and holidays, unless the instructor is provided with documented extenuating circumstances. Lab make-ups will generally not be possible due to complexity and cost associated with setting up a lab. If you have a genuine problem, please contact me at your earliest convenience and I will gladly do my best to help you. If you are in any doubt about the requirements of an assignment, or due dates/times, please re-read the assignment and/or schedule. If your question is still unanswered, contact the instructor for clarification.

Student Resources

Forensic Science Student Group (FSS)

Forensic Science Students is a campus group open to all students interested in forensic science. The group meets biweekly during the semester and offers friendship, forensic science-related activities, networking opportunities, and mentorship. Members of the FSS participate and assist at conferences, CSI camps, guest speaking events, and other extra-curricular activities. FSS Peer Mentors assist forensic science students in navigating the major, understanding requirements and prerequisites, and making wise choices in their college careers. Mentors may also offer limited tutoring, and facilitate educational and professional opportunities. Contact sjsu.fss@gmail.com for more information, or to get an application for membership.

Student Technology Resources

Computer labs for student use are available in the Academic Success Center located on the 1st floor of [Clark Hall](#) and on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library (see [Student Computing Services](#) and equipment available on hand). A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include digital and VHS camcorders, VHS and Beta video players, 16 mm, slide, overhead, DVD, CD, and audiotape players, sound systems, wireless microphones, projection screens and monitors (see Information Technology's [Equipment Loaning](#) page).

Peer Connections

The Peer Connections main office is located in Room 600 in the Student Services Center. It provides assistance to students in the development of their full academic potential and motivates them to become self-directed learners. The center provides support services, such as skill assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. <https://www.sjsu.edu/peerconnections/index.php>

ACCESS (Academic Counseling Center for Excellence in the Social Sciences)

The Academic Counseling Center for Excellence in the Social Sciences (ACCESS) provides advising for undergraduate students majoring or wanting to major in programs offered in CoSS Departments. The center provides support services, such as advising for freshman, general education, and probation; planning for academic success and graduation; tutoring; and career counseling. The main office is located in Clark Hall, room CH 240. Typically, all CoSS students and students who would like to be in CoSS are invited to stop by the Center for general education advising, help with changing majors, academic policy related questions, meeting with peer advisors, and/or attending various regularly scheduled presentations and workshops. However, due to COVID-19 restrictions, office hours are

limited to virtual meetings (Monday to Thursdays 9:00am - 4:00pm) until further notice. Contact information: 408.924.5363 Website: <https://www.sjsu.edu/access/>

SJSU Writing Center

The SJSU Writing Center located in Room 126 in Clark Hall offers a variety of resources to help students become better writers, including one-on-one tutoring sessions and numerous writing workshops. All services are free for SJSU students. <http://www.sjsu.edu/writingcenter/>

Academic Integrity

The University Academic Integrity Policy S07-2 at <http://www.sjsu.edu/senate/docs/S07-2.pdf> requires you to be honest in all your academic course work. **Instances of academic dishonesty will not be tolerated.** Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. As such, cheating and plagiarism will result in a failing grade and sanctions by the University. Additional information is available at the Student Conduct and Ethical Development website at <http://www.sjsu.edu/studentconduct/>.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

Justice Studies Reading and Writing Philosophy

The Department of Justice Studies is committed to scholarly excellence. Therefore, the Department promotes academic, critical, and creative engagement with language (i.e., reading and writing) throughout its curriculum. A sustained and intensive exploration of language prepares students to think critically and to act meaningfully in interrelated areas of their lives—personal, professional, economic, social, political, ethical, and cultural. Graduates of the Department of Justice Studies leave San José State University prepared to enter a range of careers and for advanced study in a variety of fields; they are prepared to more effectively identify and ameliorate injustice in their personal, professional and civic lives. Indeed, the impact of literacy is evident not only within the span of a specific course, semester, or academic program but also over the span of a lifetime.

FS 162 Forensic Science Applications Spring 2023 Course Schedule

Bell = James, Nordby & Bell; Ch = Chapter; Canvas = check Canvas for readings; Ppt = PowerPoint.

Schedule is subject to change at the lecturer's discretion.

| Week | Date | Topics and Activities | | Reading |
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| 1 | 1/30/23 | Course overview, syllabus, form groups, lab report rubric. Brief history of forensic science, forensic laboratory structure, investigative personnel roles & responsibilities. | | Read syllabus, Explore Canvas site |
| 2 | 2/06/23 | Module I: Intro to forensic evidence - the scientific method, characteristics of science, scientists, and evidence (class vs. individual identification); types of evidence, analysis, databases; chain of custody, probative value of forensic evidence, probability. | Laboratory health and safety, fundamental lab techniques. Lab Safety Immersive Lab Simulation (at home) Lab 1: Observation Terminology Quiz (at home) Chapter 2 Review Questions (at home) *Lab reports are due on Friday of the same week #Chapter review questions are due on Sunday of the same week | Ch 2 |
| 3 | 2/13/23 | Module II: Trace evidence, Locard's Exchange Principle, primary and secondary transfer, physical fit, microscopy | Lab 2: Locard Exchange Principle lab (start) The Scientific Method ILS (at home) | Ch 17 |
| 4 | 2/20/23 | Module II: Trace evidence: soil, hair, fibers, paint | Lab 3: Trace evidence – morphological hair analysis/soil analysis Finish Locard Lab Microscopy ILS (at home) Terminology Quiz (at home) Chapter 17 Review Questions (at home) | Ch 17 |
| 5 | 2/27/23 | Module III: Biometrics and Human Identification Fingerprints | Midterm I Finish trace lab (if needed) Chapter 14 Review Questions (at home) | Ch 14 |
| 6 | 3/06/23 | Forensic Taphonomy | Lab 4: Bite marks Chapters 5&8 Review Questions (at home) | Ch 5 and 8 |
| 7 | 3/13/23 | Forensic Anthropometry, Odontology and Craniofacial reconstruction | Lab 5: Forensic Anthropology Chapter 7 Review Questions (at home) | Ch 7 |
| 8 | 3/20/23 | Lab 6: Craniofacial reconstruction workshop | | See Canvas |
| 9 | 3/27/23 | Spring Recess | | |

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| 10 | 4/03/23 | Forensic Serology | Lab 7: Presumptive tests for blood, semen & saliva Pipetting ILS (at home) Terminology Quiz (at home) Chapter 9 Review Questions (at home) | Ch 9 |
| 11 | 4/10/23 | Forensic Biology: DNA Profiling | Lab 8: DNA extraction & Separation of DNA fragments by gel electrophoresis Virtual PCR ILS (at home) Chapter 10 Review Questions (at home) | Ch 10 |
| 12 | 4/17/23 | Emerging forensic DNA technologies | Lab 8 (cont'ed) Lab 9: Mass disaster lab (complete at home) Midterm II | See Canvas |
| 13 | 4/24/23 | Module IV: Pattern Evidence Ballistics, Tool Marks, Wounds | Lab 10: Stab lab/Ballistics Chapter 15 Review Questions (at home) | Ch 15 |
| 14 | 5/01/23 | Module IV: Pattern Evidence Footwear and Tire Mark Impressions and Physical Fit | Lab 11: Footwear analysis/Physical fit lab Terminology Quiz (at home) Chapter 16 Review Questions (at home) | Ch 16 |
| 15 | 5/08/23 | Module V: Science in court Expert Testimony, Rules of Evidence, Quality Control and Assurances, Accreditation/Certification, Issues in FS (NAS Report, CSI Effect, evidence backlog, types and sources of error, etc.), Ethics and case studies. | Lab 12: Ethics Lab Terminology Quiz (at home) Chapter 1 Review Questions (at home) Discussion questions | Ch 1 See Canvas |
| 16 | 5/15/23 | Course summary and make up lab. Discussion questions are due. | | Study for Final |
| | Wed, May 17, 9:45 AM-12:00 PM | Final Exam | | Cumulative |