



**Course Name:** Forensic Science with Laboratory

**Course Number:** SCI\* E285/CJS\* E285/BIO\* E208

**Credits:** 4

**Catalog description:** An introduction to the principles of forensic science with an emphasis on logical and scientific thinking as it applies to biological and chemical physical evidence. The laboratory portion of this course develops knowledge and skills in laboratory safety, investigative techniques and the use of scientific methodologies including observation and measurement. Topics include: the analysis of DNA, fingerprints, hair and fiber, soil, bone; microscopy; chromatography; and toxicology. Students will develop proper techniques and procedures for maintaining crime scene integrity and evidence in the laboratory. This course is equivalent to BIO 208. Students can only receive credit for either BIO 208, SCI 285, CJS 285. 4 credits. 3 hours lecture and 3 hours laboratory.

**Prerequisite:** CJS 101 (For CJ majors only), BIO 105 or BIO 121 and Eligible for ENG 101 or ENG 101W

## **General Education Competencies Satisfied:**

**HCC General Education Requirement Designated Competency Attribute Code(s):**

SCKX      **Scientific Knowledge & Understanding**

**Additional CSCU General Education Requirements for CSCU Transfer Degree Programs:**

SCRX      **Scientific Reasoning**

**Embedded Competency(ies):**

*None.*

**Discipline-Specific Attribute Code(s):**

SCI      **Science elective**

## **Course objectives:**

### **General Education Goals and Outcomes:**

**Scientific Knowledge & Understanding:** Students will gain a broad base of scientific knowledge and methodologies in the natural sciences. This will enable them to develop scientific literacy, the knowledge and understanding of scientific concepts and processes essential for personal decision making and understanding scientific issues.



☒ **Scientific Reasoning (for CSCU Transfer Degree Programs):** Students will become familiar with science as a method of inquiry. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions.

### **Course Specific Objectives:**

1. Demonstrate and apply logical and scientific thinking through deductive reasoning and inductive reasoning
2. Demonstrate knowledge of basic chemical and biological principles and distinguish between physical and chemical properties of matter
3. Recognize and identify biological and chemical physical evidence and how to evaluate its appropriateness for purpose and validity of source
4. List the major systems in humans, with an emphasis on structure, function and impact on evidence analysis
5. Demonstrate knowledge of chain of custody and proper documentation procedures with the ability to differentiate between fact versus opinion and rejection of tainted evidence or flawed evidence due to broken chain of custody
6. View public cases, videos, pictures and reports to develop and discuss plausible conclusions through inductive reasoning
7. Recognize major contributions and major events that led to the growth and re-development of forensic science

### **Laboratory Specific Objectives:**

1. Practice appropriate precautions to enhance safety
2. Demonstrate proper use of the microscope and other standard laboratory equipment
3. Perform controlled biological and chemical tests to identify unknown biological molecules and interpret the finding using the scientific method
4. Recognize specific techniques and procedures for analyzing biological and chemical physical evidence
5. Demonstrate and describe proper techniques to minimize contamination and degradation of evidence during the collection process
6. Demonstrate field search techniques
7. Perform DNA isolation and explain the technology of polymerase chain reaction (PCR) as it applies to DNA typing
8. Perform Fingerprinting techniques including dusting, lifting and examination of Fingerprints
9. Identify blood types through ABO blood typing

### **Course Content:**

#### **LECTURE**

1. Safety in the laboratory and in the field



2. Methods and concepts of science, role of experiments in scientific knowledge
3. Historical and contemporary overviews of concepts, practices and career options in forensic science
4. Chemical and biological basis of human anatomy and physiology
5. Chemical and biological basis of evidence evaluation
6. Principles of inheritance as they apply to forensic science including DNA (nuclear DNA and Mitochondrial DNA), RNA, protein, restriction enzymes, mutations and cell division
7. Scientific analysis of biological and chemical physical evidence
8. Proper use of equipment and laboratory techniques
9. Review of ethical and legal implications in science as they relate to forensics

#### **HCC Safety Standard**

Instruction covering all safety rules and guidelines will be provided by the instructor during the first laboratory session. The safety features of the individual laboratory will also be highlighted by the instructor. Students are expected to read and understand the rules of the HCC Science Laboratory Student Safety Contract. The students will then sign this contract signifying that they have been instructed and understand the requirements for safety pertaining to their course. The student and instructor will each keep a copy of this contract. Students must come to the laboratory prepared for the laboratory activity. Students must abide by the safety rules and guidelines which may include wearing personal protection equipment. Failure to do so may result in removal from the laboratory by the instructor.

Date Course Created:

Date of Last Revision: 02/27/2017