



Lahore University of Management Sciences

Introduction to Forensic Science

Summer term-I (Monday, June 14 – Friday, July 9)

Instructor	Muhammad Zaheer
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TA Office Hours	TBD
Course URL (if any)	

Course Basics				
Credit Hours	03			
Lecture(s)	Nbr of Lec(s) Per Week	5	Duration	110 min
Recitation/Lab (per week)	Nbr of Lec(s) Per Week		Duration	
Tutorial (per week)	Nbr of Lec(s) Per Week		Duration	

Course Distribution	
Core	
Elective	Elective
Open for Student Category	SBASSE, SAHSOL, MGSHSS, SDSB
Close for Student Category	

COURSE DESCRIPTION
<p>The famous character of Sherlock Holmes by Sir Arthur Conan Doyle and TV shows such as Crime Scene Investigation (CSI) demonstrate the use of science by forensic scientists or criminalists to solve criminal cases. However, how forensic science really work?</p> <p>The course aims to discuss the scientific principles and techniques behind the work of forensic scientists. It will utilize case studies (from Pakistan and abroad) to shed light on the forensic Lab's role and the Criminalist/forensic scientist in solving crimes.</p> <p>The course will answer questions such as: How did forensic science evolve? How a crime scene is secured, and physical evidence collected, dispatched, stored, and analyzed? How can we use blood stains and patterns to differentiate natural death from murder? How can we collect and develop fingerprints from paper, glass, and metal? How long has someone been dead? What if they have been dead for a long time? Is DNA chemistry so powerful? How can we tell if a fire incident was natural or some fire accelerant was used? How drugs and poisons are analyzed? Can a little piece of a carpet fluff, or a single hair, convict someone? How did J. F. Kennedy die? How did the forensic laboratory helped solve Zainab's murder?</p> <p>This introductory course aims to make the subject of forensic science clear and comprehensible to a wide variety of students from diverse academic backgrounds. It introduces various aspects of the forensic laboratory and the forensic sciences used in collecting, preserving, and analyzing physical evidence from the crime scene.</p>

COURSE PREREQUISITE(S)
None



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COURSE OBJECTIVES

	<ol style="list-style-type: none">1. Review the interdisciplinary nature of forensic science and specify the vital roles of chemistry, biology, computers, physics, genetics, and medicine in crime analysis.2. Apply chemical, biological, nuclear, spectroscopic, and computer analyses to scientific physical evidence for elucidation
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Learning Outcomes

	<p>At the end of the course, the students will be able to:</p> <ul style="list-style-type: none">• Describe methods of analyzing and identifying fluids, hairs, and fibers as to human, animal, and artificial origins and cite related cases of crime solution.• Apply DNA structure and sequence analysis for criminal identification• Learn about instrumentation and techniques of evidence analysis applied to gunshots, bullets, shotshells, gunshot residue, fires and explosions, drugs, poisons, alcohol, and toxic chemicals• Match chemical and physical tests to analyze evidence data from metals, paint, glass, and crystalline materials, paper, and clothing.• Discuss the types of chemical, biological and nuclear hazards posed by terrorists and methods used to detect and neutralize their efforts.• Differentiate between "scientific evidence" and "expertise evidence" in forensics.• Evaluate and explain various career options and educational preparations in forensic science, chemistry, law enforcement, and court-related professions.
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Grading Breakup and Policy

Case study reports and presentation: 25% (2 case studies, one before and the other after the midterm)
Quiz(s): 25 % (5 Quizzes in total)
Class participation and attendance: 15%
Final Examination: 35%

Examination Detail

Midterm Exam	Yes/No: Yes
	Combine Separate: Combine
	Duration: 120 min
	Preferred Date: June 26
	Exam Specifications: Closed book, Scheduled on LMS, Fixed-time, Two attempts allowed



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Final Exam	Yes/No: Yes Combine Separate: Combined Duration: 120 min Exam Specifications: Comprehensive, Closed book, Scheduled on LMS, Fixed-time, Two attempts allowed

COURSE OVERVIEW			
Week/ Lecture/ Module	Topics	Recommended Readings	Objectives/ Application
Lecture #1	Welcome to class, Review syllabus and course requirements. Scope of forensic science, A brief history of forensics, The crime lab, Functions of the forensic scientist	Chapter 1 (page 4-24)	CLO:1
Lecture #2	Crime scene investigation, Collecting and packaging physical Evidence, Types and significance of physical evidence	Chapter 2 (page 32-51) Chapter 3 (page 62-69)	CLO:1&2
Lecture #3-4	Lecture 3: Blood (types, characterization, forensic analysis), Bloodstain pattern analysis Lecture 4: Activity: Preparation of fake blood, bloodstain pattern and stain analysis	Chapter 4 (page 80-97) Chapter 15 (374-386)	CLO:1
Lecture #4	Death investigation (manner, cause and time of death)	Chapter 5 (page 104-123)	CLO:1&2
Lecture #5	Finger prints (principle, classification, methods of detection and preservation) Forensic biometrics Activity: Dusting, lifting and developing fingerprints	Chapter 6 (page 130-149) Chapter 7 (page 154-165)	CLO:1&2
Lecture #6	Matter (nature, properties), light (theory of light) and glass (forensic analysis)	Chapter 10 (page 224-245)	CLO:1
Lecture #7	The microscope (basics and types),	Chapter 8 (page 170-183)	CLO:1
Lecture #8	Forensic analysis of hair and fibers Activity: Hair and fiber analysis	Chapter 11 (page 252-272)	CLO:2
Lecture #9	Firearm (bullet, gunpowder residue, collection and preservation of fire arm evidence), tool marks and other impressions	Chapter 9 (page 188-217)	CLO:2
Midterm Examination			
Lecture #10	Drugs (types, control laws, collection/preservation/analysis) Activity: Analysis of over-the-counter drugs	Chapter 12 (page 280-313)	CLO:2
Lecture #11	Forensic toxicology (analysis of poisons, alcohol, law)	Chapter 13 (page 320-342)	CLO:2
Lecture #12	Forensic analysis of metals, paints and soil	Chapter 14 (page 348-370)	CLO:1&2
Lecture #13-14	DNA (structure and analysis) Activity: DNA extraction and analysis	Chapter 16 (page 398-421)	CLO:1&2
Lecture #15	Fire (chemistry, collection and analysis of evidence) and explosion (types, collection and	Chapter 17 (page 428-454)	CLO:1&2



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	analysis)		
Lecture # 16	Document examination (handwriting and ink analysis) Activity: classroom analysis of ink and handwriting	Chapter 18 (page 460-474)	CLO:1&2
Lecture # 17	Computer forensics (computer basics, analysis of electronic data)	Chapter 19 (478-500)	CLO:1&2
Lecture # 18	Mobile device forensics	Chapter 20 (page 506-517)	CLO:1&2
Final exam			

Textbook(s)/Supplementary Readings

Textbook

Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*, 12th Edition, Pearson.

Supplementary Readings

White, P.C. *Crime Scene to Court: The essentials of Forensic Science*, 2nd Edition, Royal Society of Chemistry.