



University of Kerala

Discipline	CHEMISTRY				
Course Code	UK4DSECHE205				
Course Title	FORENSIC CHEMISTRY II				
Type of Course	DSE				
Semester	4				
Academic Level	200-299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 hours	-	2 hours	5
Pre-requisites	1. Basic knowledge on Criminology and Forensic Science 2. Understanding of legal provisions related to Forensic Science, Forensic Laboratories its roles and functions 3. UK3DSECHE205 (preferable)				
Course Summary	Recent Trends in Forensic Science, Techniques and Technologies, Crime scene: Types, Management, Role of police, Forensic Photography, Forensic Videography, Sketching				

Detailed Syllabus:

Module	Unit	Content	Hrs
		FORENSIC CHEMISTRY II	75
I		FORENSIC SCIENCE, TECHNIQUES AND TECHNOLOGY	9
	1	Techniques and Technologies (Finger Print Technology, Face Recognition, IRIS, Retina Geometry, Hand Geometry, Speaker Recognition, Signature Verification).	3
	2	Biometrics in Personal Identification: Introduction, Basic concepts of Biometric Authentication, Role in person Identification.	3
	3	Bioterrorism: Definition, Concepts of Biosecurity and microbial forensics, Weapons of mass destruction (WMD).	3
II		CRIME SCENE AND MANAGEMENT	9
	4	Introduction, Importance, Types of crime scenes.	1
	5	Securing the Scene: Procedure and Precautions- Searching Methods: Types and Applications.	2
	6	Recording the Scene: Forensic Photography, Forensic Videography, Sketching, Types and Procedure, Note Making.	3



	7	Collection, Preservation and Packaging: Various Methods of Collection, Preservation and Packaging for different evidence.	3
III	FORENSIC PHOTOGRAPHY AND TECHNOLOGY		9
	8	Photography: Basic Principles and Techniques, Exposing, Developing and Printing.	3
	9	Modern Developments in Photography, Digital Photography.	3
	10	Videography/High speed Videography, Crime Scene and Laboratory Photography.	2
	11	Role of Biosensors, Portable Devices for Crime Investigation.	1
IV	FORENSIC CHEMISTRY: COMMON TECHNIQUES		18
	12	Qualitative: Definition, common qualitative tests in forensic chemistry: Drugs and Narcotics- colour Test, Poisons and Toxins- spot test (Mention the test and reagent used).	3
	13	Fire and explosives-ink and dyes, glass or paint, blood and body fluid test and soil samples (Mention the test and reagent used).	3
	14	Quantitative Techniques: Spectroscopy, Electromagnetic Radiation, Phenomena of Emission, Absorption, Reflection, Introduction to UV-visible and fluorescence spectroscopy, Beer and Lambert's law.	4
	15	Different types of electronic transitions, Auxochrome, chromophore, Absorption and intensity shift. Application of UV-Visible spectroscopy in forensic science.	4
	16	Introduction, Principle of IR spectroscopy, vibrational frequency, number of fundamental vibrations, selection rules, factors influencing vibrational frequency, finger print region. Application of IR spectroscopy in forensic science.	4
V	PRACTICALS:		30
	1. Preparation of buffer solution ($\text{CH}_3\text{COONa}/\text{CH}_3\text{COOH}$ and $\text{NH}_4\text{Cl}/\text{NH}_4\text{OH}$) 2. Determination of pH of various solutions 3. Determination of hardness of water 4. Dichromatic titrations 5. Estimation of Methanol 6. Preparation of TLC and identification samples.		

Reference

1. Saferstein; *Criminalistics- An Introduction of Forensic Science*, Prentice Hall Inc, USA, 2007.
2. Barry, A.J. Fisher; *Techniques of Crime Scene Investigation*, 7th Ed, CRC Press, New York, 2003.
3. Mordby, J. & Reckoning, D; *The Art of Forensic Detection*, CRC Press New York, 2003.
4. G.R. Chatwal; *Analytical Spectroscopy* 2nd Edn, Himalaya Publishing House New



Delhi, 2002.

5. Robertson and Vignaux; *Interpreting Evidence*, John Wiley, New York, 1995.
6. H.L. Blitzer and J. Jacobia; *Forensic Digital Imaging and Photography*, Academic Press, London, 2002
7. David R. Redsicker; *The Practical Methodology of Forensic Photography*- 2nd Ed. CRC Press, New York, 2001.
8. R. E. Jacobson, S. F. Ray, G. G. Attridge; *The Manual of Photography- Photographic and Digital Imaging*, N.R. Oxford
9. Y. R. Sharma, *Organic spectroscopy, Principles and Chemical Applications*, S. Chand Publications.

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO 1	Define the recent trends in Forensic Science, Techniques and Technology.	An	PSO-3
CO 2	Explain the crime scene and evidences, sample preservation and recording.	An	PSO-4
CO 3	Evaluate digital imaging workflows, including storage, metadata management, tamper detection, and enhancement techniques.	E	PSO-5
CO 4	Design a comprehensive qualitative analysis scheme for forensic samples—drug residues, poisons, toxins, explosives, inks, dyes, paint, glass, blood, body fluids, and soils—by selecting and organizing suitable colour/spot tests and reagents.	C	PSO-3
CO 5	Design a comprehensive qualitative analysis scheme for forensic samples—drug residues, poisons, toxins, explosives, inks, dyes, paint, glass, blood, body fluids, and soils—by selecting and organizing suitable colour/spot tests and reagents.	C	PSO-3,5

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: FORENSIC CHEMISTRY II

Credits: 3:0:1 (Lecture:Tutorial:Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
1	CO-1	PSO-3	An	C	L	
2	CO-2	PSO-4		F, C	L	



			An			
3	CO-3	PSO-5	E	F, C, P	L	
4	CO-4	PSO-3	C	F, C, P	L	
5	CO-5	PSO-3,5	C	F, C, P, M	L/T	P

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs:

	PS O1	PS O2	PS O3	PS O4	PS O5	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	-	-	-	-	-	2	-	-	-	-	-	-	-
CO 2	-	-	-	-	-	2	-	-	-	-	-	-	-
CO 3	-	-	-	-	-	-	2	-	-	-	-	-	-
CO 4	-	-	-	-	-	-	-	-	-	-	-	-	3
CO 5	-	-	-	-	-	-	-	-	3	-	-	-	-

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics:

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓			✓
CO 4		✓		✓
CO 5		✓		✓

