



MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS

SIGNATURE COURSE

Name of the College	Kuriakose Gregorios College, Pampady					
Faculty/ Discipline	Chemistry					
Programme	BSc (Hons) Chemistry					
Course Coordinator	Dr THOMAS BABY					
Contributors	Dr VINITHA VARKEY					
Course Name	FUNDAMENTALS OF FORENSIC SCIENCE					
Type of Course	DSE					
Specialization title	Forensic Chemistry					
Course Code	MG3DSECHEA06					
Course Level	200					
Course Summary	This course provides a comprehensive introduction to Forensic Science, exploring its history, scope, principles, and development, with special emphasis on its evolution from ancient to modern practices and its growth in India. It examines the various branches of forensic science, highlighting the central role of chemistry in crime investigation, evidence analysis, and the intersection of science with law enforcement					
Semester	3	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any						

Course Outcomes (CO)

Number of COs		4	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the history, scope, and branches of forensic science, and explain the role and significance of chemistry in crime investigation, including the chemist's role in analyzing and interpreting physical and chemical evidence	U	PO1, PO2, PO3
2	Understand the concepts, classifications, and elements of crime, evaluate various investigative methods, and recognize the roles, responsibilities, and professional qualities required of an investigating officer within legal and ethical frameworks	U	PO2, PO3, PO6
3	Analyze the biohazards and assess associated health risks with appropriate safety and preventive measures; and describe the objectives, stages, and best practices of crime scene management, including protection of the scene and avoidance of common investigative errors	An	PO1, PO2, PO6

Number of COs		4	
CO No.	Expected Course Outcome	Learning Domains *	PO No
4	Understand the concept, objectives, and procedural steps of chain of custody, recognize its importance in preserving evidence integrity, and analyze real case studies to apply proper custody protocols	A	PO1, PO2, PO3

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	3	-	-	-	-	-	-	-
CO 2	-	3	3	-	-	3	-	-	-	-
CO 3	3	3	-	-	-	3	-	-	-	-
CO 4	3	3	3	-	-	-	-	-	-	-

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Introduction to Forensic Science and significance of chemistry in forensics			
	1.1	History, Scope and Definition of forensic science- Forensic Science objectives and principles. Early beginning, medieval to modern era.	5	["1"]
	1.2	Branches of Forensic Science, role of different branches. Emerging and specialized branches	5	["1"]
	1.3	Role of chemistry in forensic investigations and crime scene protocol- Chemist's role in identifying, analyzing and interpreting physical and chemical evidences	5	["1"]
2	Investigation of Crimes			
	2.1	Introduction and definition of crime investigation. Definition of crime as per Indian penal code and global legal systems. Essential elements of a crime and classification of crime	5	["2"]
	2.2	Methods of investigation. Basic methods of investigation. Modern investigative techniques. Legal and ethical aspects	5	["2"]
	2.3	Role, quality and guidelines for investigating officer. Primary role and responsibilities. Professional and personal qualities of investigating officer. Guidelines for investigating officer. Challenges faced by investigating officer	5	["2"]
3	Introduction to scene of crime			
	3.1	Crime Scene- definition, objectives, classification and importance	5	["3"]
	3.2	Biohazards at crime scene- Definition and common biohazards at crime scene. Categories of biohazard risk. Health risk to investigators. Safety precautions and preventive measures	5	["3"]
	3.3	Crime scene management- Objectives and stages of crime scene management. Importance of protection of the crime scene. Common errors in crime scene management	5	["3"]

Module	Units	Course Description	Hrs	CO No.
4		Introduction to chain of custody and crime scene documentation		
	4.1	Chain of custody- Definition, objectives and importance of chain of custody. Components and steps involved in chain of custody	6	["4"]
	4.2	Crime scene documentation-photography, videography, sketching and audiotaping	7	["4"]
	4.3	Purpose of crime scene documentation	2	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Classroom procedure (mode of transaction) ● Interactive instruction (chalk& board method, multimedia presentation) ● Group discussion ● Peer teaching ● Experimental demonstrations ● Practical training
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Assessment Types	MODE OF ASSESSMENT Mode of Assessment: Theory
	A. Continuous Comprehensive Assessment (CCA) • Theory - 30 Marks Assignments/MCQ/Class test/Viva
	B. End Semester Evaluation (ESE) • Theory - 70 Marks Assessment Methods – End Semester examination Duration of Examination - 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B , C Answer Type: ◦ PART - A ◦ Short answer - (5 out of 7) - 5 × 4 = 20 ◦ PART - B ◦ Short Essays - (5 out of 7) - 5 × 7 = 35 ◦ PART - C ◦ Essays - (1 out of 2) - 1 × 15 = 15

References

- 1. B.S. Nabar - "Forensic Science in Crime Investigation" (Asia Law House, latest edition)
- 2. K.P. Singh & S. Chaturvedi - "Forensic Science and Criminology"
- 3. R.C. Sharma - "Forensic Science in Criminal Investigation and Trials" (Universal Law Publishing)
- 4. Sharma, B.R. - "Forensic Science in Criminal Investigation and Trials" (LexisNexis)
- 5. Eoghan Casey - "Digital Evidence and Computer Crime" (Elsevier, 4th Ed.)
- 6. James, S.H., & Nordby, J.J. - "Forensic Science: An Introduction to Scientific and Investigative Techniques" (CRC Press, 5th Ed.)
- 7. B.L. Agarwal - "Forensic Science: Theory & Application" (Central Law Publications)
- 8. Forensic Science-The basics, Kathy Mirakovits and Jay A Siegel
- 9. Forensic Chemistry, K Mathew, Discovery
- 10. Forensic Chemistry Fundamentals, Michael Grossman, De Gruyter
- 11. Forensic Chemistry, A Lucas, Hardpress
- 12. Forensic Chemistry Hand book, Lawrence Koblinski, Wiley
- 13. Forensic Science: The basics, Siegel, Jay A and Kathy Mirakovits
- 14. Fundamentals of Forensic science- Houck and Siegel, Academic Press
- 15. Criminalistics: An introduction to Forensic Science- Richard Saferstein, Pearson

Affidavit

- We, Kuriakose Gregorios College, Pampady and Dr THOMAS BABY, retain the copyright of this syllabus and expressly prohibit its distribution in complete form to any institution outside our own.

- We, Kuriakose Gregorios College, Pampady, agree to appoint a new course coordinator for the proposed Forensic Chemistry in the event of the unavailability of the currently nominated coordinator. This appointment will ensure the continued coordination of course delivery, assessments, and all related academic responsibilities necessary for the successful implementation of the specialization, for as long as the college offers this programme.
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SIGNATURE COURSE

Name of the College	Kuriakose Gregorios College, Pampady					
Faculty/ Discipline	Chemistry					
Programme	BSc (Hons) Chemistry					
Course Coordinator	Dr THOMAS BABY					
Contributors	Dr VINITHA VARKEY					
Course Name	FUNDAMENTALS OF FORENSIC ANALYSIS					
Type of Course	DSE					
Specialization title	Forensic Chemistry					
Course Code	MG4DSECEHA06					
Course Level	200					
Course Summary	This course explores the types and nature of forensic evidences, including physical, toxicological, and electronic forms, emphasizing their identification, collection, preservation, and analytical significance in criminal investigations. It introduces students to scientific and analytical methods used in forensic chemistry, covering sampling techniques, sample handling, and both classical and instrumental analytical tools. The course also highlights the application of forensic analysis in real-world case studies, such as trace evidence examination, counterfeit detection, and evaluation of precious materials					
Semester	4	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any						

Course Outcomes (CO)

Number of COs		4	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Able to identify, classify, collect, preserve, and analyse physical, toxicological, and electronic evidences using appropriate forensic chemistry principles and analytical techniques for accurate crime investigation	U	PO1, PO2, PO3
2	Able to apply scientific methods in forensic analysis through proper sampling, preparation, classification, labelling, preservation, and transportation of analytical samples for accurate and reliable forensic examination	A	PO1, PO2, PO3
3	Understand and apply qualitative and quantitative analytical tools, including classical, instrumental, spectroscopic, chromatographic, mass spectrometric, and electroanalytical methods, for effective forensic examination and on-site testing	U, A	PO1, PO2, PO3

Number of COs		4	
CO No.	Expected Course Outcome	Learning Domains *	PO No
4	Analyse and interpret tracks, traces, and material evidence such as footprints, tyre marks, currency, coins, and jewellery using forensic analytical techniques and case-based applications to detect authenticity and counterfeiting	An	PO1, PO2, PO3

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	3	-	-	-	-	-	-	-
CO 2	3	3	3	-	-	-	-	-	-	-
CO 3	3	3	3	-	-	-	-	-	-	-
CO 4	3	3	3	-	-	-	-	-	-	-

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Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Types and Nature of Evidences			
	1.1	Evidences: testimonial, physical and trace evidences	3	["1"]
	1.2	Physical evidences-Definition and nature of physical evidences. Types of physical evidences. Role of physical evidence in crime investigation	7	["1"]
	1.3	Electronic evidences-Sources and types of electronic evidences. Digital crime scene management. Handling and preservation of electronic evidences. Cybercrime and forensic investigation	5	["1"]
2	Scientific Methods in Forensic Analysis			
	2.1	Introduction to analytical samples- Preparation of analytical samples. Classification of analytical methods	5	["2"]
	2.2	Sampling and sample handling- Types and classification of samples. Techniques of sampling	5	["2"]
	2.3	Sample labelling, preservation and transport	5	["2"]
3	Analytical tools in forensic science			
	3.1	Qualitative and quantitative methods- Classical and Instrumental methods	5	["3"]
	3.2	Field tests and on-site testing-Principles and categories.	5	["3"]
	3.3	Instrumentation methods -fundamentals- Spectroscopic and chromatographic techniques - Elementary idea only	5	["3"]

Module	Units	Course Description	Hrs	CO No.
4		Tracks, Traces and Application Case Studies		
	4.1	Small tracks and police dogs, footprints, walking pattern or tyre marks	5	["4"]
	4.2	Checking silver line watermark in currency notes, alloy analysis using AAS to detect counterfeit coins	5	["4"]
	4.3	Detection of gold purity in 22 carat ornaments-detecting gold plated jewels and authenticity of diamond	5	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture-based approach, interactive discussions, laboratory sessions, flipped classroom, peer teaching and collaborative learning
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Assessment Types	MODE OF ASSESSMENT Mode of Assessment: Theory
	A. Continuous Comprehensive Assessment (CCA) • Theory - 30 Marks Assignments/MCQ/Class test/Viva
	B. End Semester Evaluation (ESE) • Theory - 70 Marks Assessment Methods – End Semester examination Duration of Examination - 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B , C Answer Type: ◦ PART - A ◦ Short answer - (5 out of 7) - 5 × 4 = 20 ◦ PART - B ◦ Short Essays - (5 out of 7) - 5 × 7 = 35 ◦ PART - C ◦ Essays - (1 out of 2) - 1 × 15 = 15

References

- 1. Richard Saferstein – Criminalistics: An Introduction to Forensic Science (Pearson, 13th Ed.)
- 2. R.C. Sharma – Forensic Science in Criminal Investigation and Trials (Universal Law Publishing)
- 3. V.V. Pillay – Modern Medical Toxicology (Jaypee Brothers)
- 4. B.K. Sharma – Forensic Chemistry and Toxicology (Krishna Prakashan Media)
- 5. Kumkum K. & R.K. Tewari – Forensic Chemistry: Principles and Applications
- 6. Nelson, Phillips & Stuart – Guide to Computer Forensics and Investigations (Cengage Learning)
- 7. P. W. Singer & Allan Friedman – Cybersecurity and Cyberwar: What Everyone Needs to Know
- 8. R.K. Tewari & J.M. Biradar – Forensic Science and Criminal Investigation
- 9. B.K. Sharma – Instrumental Methods of Chemical Analysis
- 10. Kumkum K. & Tewari – Forensic Chemistry: Principles and Applications
- 11. James S. Watson – Introduction to Forensic Chemistry (CRC Press)
- 12. Henry C. Lee & Timothy Palmbach – Henry Lee's Crime Scene Handbook
- 13. B.K. Sharma – Forensic Chemistry and Toxicology
- 14. Wills & Castleman – Practical Forensic Microscopy: A Laboratory Manual, Wiley
- 15. Practical aspects of Forensic chemistry, Dr Anil Kumar Teotia

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Name of the College	Kuriakose Gregorios College, Pampady					
Faculty/ Discipline	Chemistry					
Programme	BSc (Hons) Chemistry					
Course Coordinator	Dr THOMAS BABY					
Contributors	Dr VINITHA VARKEY					
Course Name	FORENSIC ANALYSIS-I					
Type of Course	DSE					
Specialization title	Forensic Chemistry					
Course Code	MG5DSECHEA06					
Course Level	300					
Course Summary	This course provides an overview of key instrumental and analytical techniques in forensic chemistry, including spectrophotometry, microscopy, and thermal analysis, essential for material and evidence examination. It also covers forensic toxicology, drug analysis, and trace evidence analysis, focusing on the identification, collection, and interpretation of poisons, drugs, and microteaches like hair, fibers, glass, paint, and soil in forensic investigations					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any						

Course Outcomes (CO)

Number of COs		4	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand and apply advanced instrumental techniques—including spectrophotometry, microscopy, and thermal analysis—for the qualitative and quantitative examination of forensic chemical evidence	U, A	PO1, PO2, PO3
2	Classify various types of poisons, understand their effects and mechanisms, and apply appropriate analytical techniques for the collection, handling, and analysis of toxicological samples in forensic investigations	U, A	PO1, PO2, PO3
3	Classify various drugs, perform their collection, preservation, and analytical examination using screening and confirmatory methods, and interpret toxicological findings from biological samples in forensic investigations	U, A	PO1, PO2, PO3
4	Identify, collect, preserve, and analyse trace evidences such as hair, fibers, glass, paints, and soil to establish their forensic relevance and support criminal investigations	U, An	PO1, PO2, PO3

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	3	-	-	-	-	-	-	-
CO 2	3	3	3	-	-	-	-	-	-	-
CO 3	3	3	3	-	-	-	-	-	-	-
CO 4	3	3	3	-	-	-	-	-	-	-

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Advanced instrumentation			
	1.1	Spectrophotometry- UV-Vis, IR, AAS and Mass Spectroscopy	5	["1"]
	1.2	Microscopic techniques- Introduction and basic principles. Types of microscopic techniques- Optical, electron, transmission, Fluorescence and atomic force microscopy	7	["1"]
	1.3	Thermal Analysis- Introduction and principles. Instrumentation. TGA, DSC and DTA	3	["1"]
2	Forensic Toxicology			
	2.1	Forensic toxicology- Introduction and definition	3	["2"]
	2.2	Classification of poisons and their effects- Classification based on origin, chemical nature, mode of action and target organ. Toxicological evidences- Introduction to forensic toxicology. Nature and classification of poisons. Collection, preservation and handling of toxicological samples. Extraction and isolation of toxic substances. Analytical techniques in toxicology	7	["2"]
	2.3	Analytical samples and poison analysis- Types of analytical samples. Sample collection and handling. Principles, analytical techniques and challenges in poison analysis	5	["2"]
3	Analysis of Drugs			
	3.1	Classification of drugs- Based on source, pharmacological action, legal status and chemical structure	5	["3"]
	3.2	Analysis of drugs- Sample collection, preservation, storage and preparation. Screening and confirmatory methods in analysis. Quantitative analysis	5	["3"]
	3.3	Drugs in the body and forensic toxicology- Biological samples in forensic toxicology. Types of toxicological cases	5	["3"]
4	Trace Evidence Analysis			
	4.1	Hair and Fibers: classification, examination and analysis	4	["4"]
	4.2	Glass and Paints- Forensic relevance. Types, collection and analysis	4	["4"]
	4.3	Soil analysis- Relevance. Collection, preservation and analysis	7	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture (chalk & board, PowerPoint presentation, flipped classroom) Group Discussion - thought problems; mind mapping Peer interaction Demonstration using simulations / models
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Assessment Types	MODE OF ASSESSMENT Mode of Assessment: Theory
	A. Continuous Comprehensive Assessment (CCA) • Theory - 30 Marks Quiz, Assignment, Problem based test - Open book, Written exam
	B. End Semester Evaluation (ESE) • Theory - 70 Marks Assessment Methods - End Semester examination Duration of Examination - 2.00 Hrs Pattern of examination for Theory - Non-MCQ Different parts of written examination - Part - A , B , C , D Answer Type: <ul style="list-style-type: none"> ◦ PART - A ◦ MCQ - (10 out of 10) - $10 \times 1 = 10$ ◦ PART - B ◦ Short answer - (8 out of 10) - $8 \times 3 = 24$ ◦ PART - C ◦ Short Essays - (3 out of 5) - $3 \times 7 = 21$ ◦ PART - D ◦ Essays - (1 out of 2) - $1 \times 15 = 15$

References

- 1. Skoog, Holler & Crouch - Principles of Instrumental Analysis (Cengage, 7th Ed.)
- 2. Practical book Forensic Chemistry and Toxicology, Dr A K Jaiswal and Dr Nand Gopal Giri
- 3. B.K. Sharma - Instrumental Methods of Chemical Analysis (Goel Publishing House)
- 4. John D. Bancroft & Marilyn Gamble - Theory and Practice of Histological Techniques (Churchill Livingstone)
- 5. John D. Steele - Forensic Microscopy: A Laboratory Manual
- 6. Houck, M.M. - Trace Evidence Analysis: More Cases in Microscopy and Spectroscopy (CRC Press)
- 7. D.W. van Krevelen - Properties of Polymers (Elsevier)
- 8. K.K. Singh - Analytical Techniques in Forensic Science
- 9. V.V. Pillay - Modern Medical Toxicology (Jaypee Brothers, 5th Ed.)
- 10. Patnaik, P. - Handbook of Environmental and Forensic Chemistry (CRC Press)
- 11. Clarke's Analysis of Drugs and Poisons (Pharmaceutical Press, 4th Ed.)
- 12. B.K. Sharma - Forensic Chemistry and Toxicology
- 13. Saferstein, Richard - Criminalistics: An Introduction to Forensic Science (Pearson, 13th Ed.)
- 14. B.S. Nabar - Forensic Science in Crime Investigation
- 15. Forensic examination of Glass and Paint: Analysis and interpretation, Caddy and Brian
- 16. Forensic Medicine and Toxicology, Aggrawal
- 17. Forensic examination of fibers, Robertson and Jame R

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Faculty/ Discipline	Chemistry					
Programme	BSc (Hons) Chemistry					
Course Coordinator	Dr THOMAS BABY					
Contributors	Dr VINITHA VARKEY					
Course Name	FORENSIC ANALYSIS-II					
Type of Course	DSE					
Specialization title	Forensic Chemistry					
Course Code	MG6DSECHEA06					
Course Level	300					
Course Summary	This course provides an overview of key instrumental and analytical techniques in forensic chemistry, including spectrophotometry, microscopy, and thermal analysis, essential for material and evidence examination. It also covers forensic toxicology, drug analysis, and trace evidence analysis, focusing on the identification, collection, and interpretation of poisons, drugs, and microtraces like hair, fibers, glass, paint, and soil in forensic investigations					
Semester	6	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any						

Course Outcomes (CO)

Number of COs		4	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Analyse blood and body fluids using presumptive and confirmatory tests and apply the principles of DNA chemistry, including extraction, quantification, and PCR, for forensic identification and investigation	U, An	PO1, PO2, PO3
2	Investigate fire and explosion-related crimes by understanding fire chemistry, analysing fire and explosive debris, and detecting gunshot residues for forensic reconstruction	U, An	PO1, PO2, PO3
3	Apply forensic chemistry techniques to analyse forged documents, diagnose poisoning cases, and utilize DNA fingerprinting for tissue identification and detection of substances in forensic investigations	A, An	PO1, PO2, PO3
4	Understand and evaluate emerging trends, future directions, and technological advancements in forensic chemistry, including nanotechnology, biosensors, molecular techniques, and digital applications, while recognizing associated challenges and opportunities in the field	U, A	PO1, PO2, PO6

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	3	-	-	-	-	-	-	-
CO 2	3	3	3	-	-	-	-	-	-	-
CO 3	3	3	3	-	-	-	-	-	-	-
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Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Forensic Serology and DNA Chemistry			
	1.1	Chemical nature of blood and body fluids	4	["1"]
	1.2	Presumptive and confirmatory tests for blood/ semen/saliva	5	["1"]
	1.3	Chemistry of DNA: extraction, quantification, PCR	6	["1"]
2	Arson investigation			
	2.1	Chemistry of fire and fire patterns	2	["2"]
	2.2	Analysis of fire debris	3	["2"]
	2.3	Gunshot residue analysis	2	["2"]
	2.4	Explosives: classification and analysis of debris	2	["2"]
	2.5	Confirmatory & Quantitative Methods: GC-MS (Gas Chromatography-Mass Spectrometry) C-MS/MS (Liquid Chromatography with Tandem Mass Spectrometry) ICP-MS (for metals like arsenic, lead, mercury) Headspace GC for volatiles (alcohols, solvents)	6	["2"]
3	Application Case Studies			
	3.1	Documents - different types of forged signatures simulated and traced forgeries - inherent signs of forgery methods - writing deliberately modified - uses of ultraviolet rays - comparison of typewritten letters	5	["3"]
	3.2	Poisoning Diagnosis in living and dead	5	["3"]
	3.3	DNA finger printing for tissue identification in dismembered bodies and detection of steroid consumption	5	["3"]

Module	Units	Course Description	Hrs	CO No.
4	Emerging Trends and Future Directions			
	4.1	Emerging trends in forensic chemistry (e.g., nanotechnology, biosensors)- Nanotechnology and material science in forensic applications. Forensic DNA and molecular advances. Digital and computational forensic chemistry	6	["4"]
	4.2	Future directions in forensic chemistry research and practice	6	["4"]
	4.3	Challenges and opportunities in forensic chemistry	3	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture (chalk & board, Power Point presentation) Group discussion Peer teaching Forensic Lab Visit Quiz Lab work
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Assessment Types	MODE OF ASSESSMENT Mode of Assessment: Theory
	A. Continuous Comprehensive Assessment (CCA) • Theory - 30 Marks Assignments/MCQ/Class test/Viva/Lab work/Quiz
	B. End Semester Evaluation (ESE) • Theory - 70 Marks Assessment Methods – End Semester examination Duration of Examination - 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B , C Answer Type: ◦ PART - A ◦ Short answer - (5 out of 6) - 5 × 4 = 20 ◦ PART - B ◦ Short Essays - (5 out of 7) - 5 × 7 = 35 ◦ PART - C ◦ Essays - (1 out of 2) - 1 × 15 = 15

References

- 1. James, Nordby & Bell – Forensic Science: An Introduction to Scientific and Investigative Techniques (CRC Press, 5th Ed.) 2. B.S. Nabar – Forensic Science in Crime Investigation (Asia Law House) 3. Houck & Siegel – Fundamentals of Forensic Science (Academic Press, 3rd Ed.) 4. Lee, Henry C. – Forensic DNA Typing Protocols and Applications 5. Stauffer, E. & Lentini, J.J. – Fire Debris Analysis (CRC Press) 6. B.K. Sharma – Forensic Chemistry and Toxicology 7. Blakey & Kilty – Forensic Investigation of Firearm Discharge Residues (Elsevier) 8. U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) – Explosives Handbook 9. Patnaik, P. – Handbook of Environmental and Forensic Chemistry (CRC Press) 10. Hilton, O. – Scientific Examination of Questioned Documents (CRC Press) 11. V.V. Pillay – Modern Medical Toxicology 12. Tewari, R.K. & Saxena, R. – Nanotechnology in Forensic Science (Springer, 2022) 13. Patnaik – Handbook of Environmental and Forensic Chemistry 14. Crime scene management-Scene specific method, Raunsutton and Kathe T 15. Analytical techniques in Forensic Science- K K Singh, Wiley 16. Principles of Instrumental analysis-Skoog, Holler and Crouch, Cengage 17. Advanced topics in Forensic DNA typing- John M Butler, Elsevier 18. Chemistry of pyrotechnics: Basic principles and theory- J A Conkling and C Mocella- Routledge

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- We, Kuriakose Gregorios College, Pampady, agree to appoint a new course coordinator for the proposed Forensic Chemistry in the event of the unavailability of the currently nominated coordinator. This appointment will ensure the continued coordination of course delivery, assessments, and all related academic responsibilities necessary for the successful implementation of the specialization, for as long as the college offers this programme.
- We, Kuriakose Gregorios College, Pampady and Dr THOMAS BABY, declare that no part of this signature course submitted here for approval has been taken from the course content developed by, or from any of the course titles prepared by, the BoS/expert committee in the same discipline under our University.

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