THE MAHATMA GANDHI UNIVERSITY

UNDERGRADUATE PROGRAMMES

(HONOURS) SYLLABUS

MGU-UGP (Honours)

(2024 Admission Onwards)

Faculty: Science

Expert Committee: Forensic Science

Subject: BSc (Hons) Forensic Science

Mahatma Gandhi University

Priyadarshini Hills

Kottayam – 686560, Kerala, India

MGU-UGP (HONOURS)

Syllabus

Contents

Sl.No. Title

PREFACE

The three year Degree Courses in Kerala have been converted to four year under graduate programme from the year 2024 by directions from the Higher Education Council of the state. The syllabus for the B.Sc Forensic Science has been prepared accordingly by the Expert Committee of the Forensic Science programme. This programme is a new course under the Mahatma Gandhi University. The syllabus prepared had undergone scrutiny and vetting by the members and external examiners. The final version of the syllabus and course parameter is being now submitted for implementation in the academic year 2024-2025.

Details of the members of Expert Committee in Forensic Science, Mahatma Gandhi University, Athirampuzha, Kottayam

Sl No.	Name & Designation	Contact Details
1.	Dr. Jameskutty B.K. Associate Professor of Forensic Medicine & Deputy Police Surgeon, Govt. Medical College, Kottayam (**Convenor**)	Associate Professor of Forensic Medicine & Deputy Police Surgeon, Govt. Medical College, Kottayam 9744683061 jameskuttybk@gmail.com
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9.	Sri. Biju D Joint Chemical Examiner Regional Chemical Examiner's Laboratory, Kozhikode	Joint Chemical Examiner Regional Chemical Examiner's Laboratory, Kozhikode 9447795442 bijudas1971@gmail.com

Expert Committee & External Experts

Panel of external experts for Scrutiny of the Syllabus for 4 year B.Sc Forensic Science Course of Mahatma Gandhi University, Kottayam

Name	Designation	Mobile Number
Dr. Sharija S	Prof. Of Forensic Medicine And Police Surgeon, Govt. T.D. Medical College Alappuzha	8547393074
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SYLLABUS INDEX

Name of the Major: **FORENSIC SCIENCE**

Semester: 1

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG1DSCFSC100	General Forensic Science	DSC A	4	5	3		2	
MG1MDCFSC100	General Chemistry	MDC	3	4	2		2	

L — Lecture, T — Tutorial, P — Practical/Practicum , O — Others

Semester: 2

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG2DSCFSC100	Law for Forensic Science	DSC A	4	5	3		2	
MG2MDCFSC100	General Biology	MDC	3	4	2		2	

Semester: 3

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG3DSCFSC200	Crime Scene Management	DSC A	4	5	3		2	
MG3DSCFSC201	Forensic Chemistry	DSC A	4	5	3		2	
MG3DSEFSC200	Instrumentation-Chemical	DSE	4	4	4		0	
MG3DSEFSC201	Questioned Document Examination	DSE	4	4	4		0	
MG3DSCFSC202	Fundamentals of Criminology	DSC B	4	5	3		2	
MG3VACFSC200	Constitution of India	VAC	3	3	3		0	

Semester: 4

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG4DSCFSC200	Biometrics and Impression Analysis	DSC A	4	5	3		2	
MG4DSCFSC201	Forensic Physics	DSC A	4	4	4		0	
MG4DSEFSC200	Forensic Serology	DSE	4	5	3		2	
MG4DSCFSC202	Forensic Biology	DSC C	4	5	3		2	
MG4VACFSC200	Special Laws	VAC	3	3	3		0	
MG4SECFSC200	Good Laboratory Practices	SEC	3	3	3		0	
MG4INTFSC200	Internship		2					

Semester: 5

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG5DSCFSC300	Forensic Ballistics	DSC A	4	5	3		2	
MG5DSCFSC301	Forensic Toxicology	DSC A	4	5	3		2	
MG5DSCFSC302	Instrumentation-Biochemical	DSC A	4	4	4		0	
MG5DSEFSC300	Forensic Medicine	DSE	4	4	4		0	
MG5DSEFSC301	DNA Analysis	DSE	4	4	4		0	
MG5SECFSC300	Research Methodology and Statistics	SEC	3	3	0	3	0	

Semester: 6

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG6DSCFSC300	Narcotic Drugs and Psychotropic Substances	DSC A	4	4	4		0	
MG6DSCFSC301	Forensic Anthropology	DSC A	4	4	4		0	
MG6DSEFSC300	Correctional Administration	DSE	4	4	4		0	
MG6DSEFSC301	Introduction to Digital Evidences	DSE	4	4	4		0	
MG6DSEFSC302	Fundamental Cyber Forensics	DSE	4	4	4		0	
MG6SECFSC300	Field Visits	SEC	3	6			6	
MG6VACFSC300	Anti-money laundering and KYC	VAC	3	3	3		0	

Semester: 7

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG7DCCFSC400	Forensic Psychology	DCC	4	4	4		0	
MG7DCCFSC401	Network Forensics	DCC	4	4	4		0	
MG7DCCFSC402	Mobile Forensics	DCC	4	5	3		2	
MG7DCEFSC400	Forensic Finance	DCE	4	4	4		0	
MG7DCEFSC401	Forensic Statistics	DCE	4	4	4		0	
MG7DCEFSC402	FUNDAMENTALS OF DUE DILIGENCE	DCE	4	4	4		0	

Semester: 8

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG8DCCFSC400	Advanced Forensic Chemistry	DCC	4	5	3		2	
MG8DCCFSC401	Advanced Forensic Psychology	DCC	4	5	3		2	
MG8DCEFSC400	Audio, Video and Speaker Identification	DCE	4	5	3		2	
MG8DCEFSC401	Interrogation Techniques	DCE	4	5	3		2	
MG8DCEFSC402	Advanced Document Examination	DCE	4	5	3		2	
MG8PRJFSC400	Project	PRJ	12					

SEMESTER-1

MGU-UGP (HONOURS)

Syllabus

	Mahatma Gandhi University Kottayam					
Programme	**BSc (Hons) Forensic Science**					
Course Name	**GENERAL FORENSIC SCIENCE**					
Type of Course	DSC A					
Course Code	**MG1DSCFSC100**					
Course Level	**100-199**					
Course Summary	General forensic science deals with the history, development, and governing principles of Forensic Science. This course also provides understanding of Government and Judicial Organizational set up functioning in this field.					
Semester	I	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the basics of Forensic Science	U	1,2
2	Get knowledge about different crime detection agencies of our country	U	1,2
3	Understand organizational setup of Forensic Science Laboratories, facilities provided and responsibilities of officials for presenting evidence in the court.	A	2
4	Get idea about role of law enforcement agencies, Judicial organizations, and correctional Institutions	E	7
5	Understand impact of criminal activities on society and the need for crime prevention	U	6,8

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction to Forensic Science**	**15**	
	1.1	**History and Development** Definition and Concepts, Scope and Development of Forensic Science in India, Crime, Social Aspects in society, Crime scenario in India, Need of Forensic Science in Criminal Investigation	4	01
	1.2	**Principles** Law of individuality, Principle of Exchange, Law of Progressive Change, Law of Comparison, Law of Probability, Law of Circumstantial facts, Law of Analysis.	3	01
	1.3	**Various Disciplines of Forensic Science (Definition and Application)** Forensic Chemistry, Forensic Physics, Forensic Biology, Forensic Toxicology, Forensic Ballistics, Forensic Photography, Forensic Psychology, Forensic Anthropology & Odontology, Forensic Questioned Documents, Impression Analysis, Digital Forensics, Forensic Entomology, Explosives, Serology including DNA typing	5	01
	1.4	**Crime Detection Agencies in India – General** Police, Medicolegal experts, Forensic Scientists, Judicial Officers, General Organization of State Police, Administrative hierarchy and the Ranges	3	02
2	**Forensic Science Laboratories**		**15**	
	2.1	**Organizational Setup** Organizational set up of Forensic Science Laboratories, Structure and Function of Central Forensic Science Laboratories, State and Regional Forensic Science Laboratories, Chemical Examination Laboratories, Mobile Forensic Science Laboratory Analysis, Directorate of Forensic Science Service	5	03
	2.2	**Facilities provided in Forensic Science Laboratories** Facilities for chemical, physical, biological, psychological, digital and cyber-crime detection and analysis	4	03
	2.3	**Forensic Scientist: Role and Responsibilities** Duties and Qualification of Forensic Scientist, Ethics in Forensic Science, Forensic Scientist at the Crime Scene, Crime scene Management, Presentation of Expert evidence, Evidence in the Court of Law, Report writing & Evidence Presentation, Components of Report and Report format (according to ISO/IEC 17025:2017)	6	03
3	**Criminal Justice System**		**15**	
	3.1	**Prosecution and Judicial Organizations** Supreme Court, High Court, Lower Courts, and their powers	6	04

	3.2	**Correctional Institutions** Prisons, Juvenile shelter homes, open prisons, Role of Forensic Experts in Prison	6	04
	3.3	Role of Media in investigation of crime	3	04
4	**Laboratory Experiments**		**30**	
	4.1	Crime and its sociological impact in -a brief study	6	05
	4.2	Study the history of crime cases from forensic Science perspective.	6	05
	4.3	Write report on different types of crime cases	6	05
	4.4	Study types and functions of different types of Police stations	6	02
	4.5	Examine the hierarchical set up of different forensic science establishments and suggest improvements	6	03
5		**Teacher specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** i) Short answer type questions: Answer any 10 questions out of 12 (10x2=20) ii) Short essay type questions: answer any 5 questions out of 7 (5x4=20) iii) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks**

	i) Laboratory Evaluation (20 marks) ii) Record (5 marks) iii) Viva (10 marks)

References

1 Eckert, W.G., & Wright, R.K., (1997) . Introduction to Forensic Sciences, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton.
2 Nanda, B.B., & Tiwari, R.K., (2001). Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi.
3 Bhasin, M.K., & Nath, S., (2002). Role of Forensic Science in the New Millennium, University of Delhi, Delhi.
4 Saferstein, R., (2004). Criminalistics, 8th Edition, Prentice Hall, New Jersey .
5 James, S.H.,& Nordby, J. J.,(2005). Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton.
6 Fischer, B.,& Tilstone W.,(2009). Criminalistics- The Foundation of Forensic Science, Elsevier Publication, UK.
7 Tilstone, W.J., Hastrup, M.L., & Hald, C.,(2013). Fisher's Techniques of Crime Scene Investigation, CRC Press, Boca Raton.
8 Suzanne, B., (2010). Encyclopaedia of Forensic Science , Viva Books Pvt. Ltd.
9 Dutelle, Aric W., (2014). Jones and Bartlette Learning Crime Scene Investigation.
10 Sharma, B.R., (2016). Forensic Science in Criminal Investigation & Trail, Central Law Agency , Allahabad.
11 Saferstein, R., (2017). Criminalistics- An Introduction To Forensic Science , Prentice Hall Inc. USA.

	Mahatma Gandhi University **Kottayam**
Programme	
Course Name	**GENERAL CHEMISTRY**
Type of Course	MDC
Course Code	**MG1MDCFSC100**
Course Level	**100-199**
Course Summary	This course aims to empower students with basic knowledge in chemistry and basic analytical methods in the laboratory. Students will be exposed to the basic principles underlying the preparation and use of solutions. They are familiarised with the naming system and classification of organic compounds.

Semester	I	Credits		3	Total Hours	
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		2		1		60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the various basic analytical methods in chemistry	U	1,2,4,8
2	Apply volumetric and gravimetric techniques quantitative analysis	A	1, 2
3	Understand the organic naming methods, purification, detection and estimation of elements inorganic chemistry.	U	1,2,3,6
4	Problem solving skill in chemistry	A	1,2,4,8
5	Study the properties of periodic table, acids and bases,Equillibrium	E	1,2,3,6,8

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	MODULE	COURSE DESCRIPTION	HOURS	CO No
1	**1**	**Basic concepts in Chemistry**	**15**	
	1.1	International system of units-7 Basic units. Temperature scales, degree celsius, degree Fahrenheit, kelvin scales. Scientific notation, uncertainty, significant figures.	5	1
	1.2	Atomic mass, Molecular mass, Formula mass, mole, Number of moles, molar volume, Avogadro number, Molecular formula, Stoichiometric calculations and limiting reagent.	5	1
	1.3	Solutions-Mass percent, volume percent, mass by volume percent, mole fraction, Molarity, molality, Normality	3	4
	1.4	Volumetric analysis, Acidimetry, Alkalimetry, Permanganometry, Iodimetry, Iodometry, Principle of Gravimetry.	2	2
	2	**Organic Chemistry**	15	5
2	2.1	Organic chemistry-Classification, Naming, Functional groups, Isomerism, Structural and Stereo isomerism.	3	3
	2.2	Purification of Organic compounds, Crystallography, Sublimation, Distillation- Fractional distillation, Steamdistillation, Distillation under reduced pressure, Solvent extraction ,Chromatography	5	3
	2.3	Detection of elements in organic chemistry-Detection of C,H,N,halogens,S,P,	5	3
	2.4	Estimation of elemnets,C,H,N,halogens,S,P	2	3
3	**3**	**Practicals**	**30**	

	3.1	Determine the concentration of acids and alkalies	6	1
	3.2	Determine the concentration of thiosulphate using permanganometry.	6	2
	3.3	Detect the presence of Elements	6	1
	3.4	Separate the solute from aqueous solution using solvent extraction	6	1
	3.5	Separation using Thin layer chromatography.	6	1
4		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit**
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 35 Marks** i) Short answer type questions: Answer any 10 questions out of 12 (10x1=10) ii) Short essay type questions: answer any 3 questions out of 5 (3x5=15) iii) Essay type questions: Answer any I question out of 2 (1x10=10) **Practical: 35Marks** i) Laboratory Evaluation (25 marks)

	ii) Record (10 marks)

References

1. Comprehensive Chemistry.Dr.N.K.Verma.
2. NCERT text book for Clas 11and 12,NCERT,New Delhi.
3. Modern ABCof Chemistry S P Jauhar
4. Comprehensive Inorganic Chemistry,J D Lee

SEMESTER-2

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**LAW FOR FORENSIC SCIENCE**					
Type of Course	**DSC A**					
Course Code	**MG2DSCFSC100**					
Course Level	**100-199**					
Course Summary	Understand the Constitution ,Criminal Major & Minor Acts and the Acts governing to Social Legislations					
Semester	II	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the hierarchy of courts	U	1,2
2	Understand the Indian Constitution	U	1,2
3	Understand the Laws prevailing in the criminal Justice systems	U, An	1,2,6
4	Understand the Types and gravity of offences	An, E	1,2,6
5	Various Acts pertaining to Socio-Economic and Environmental Crimes	U, An, E	1,2,6,7

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

Module	Units	Course description	Hrs	CO No.

1		**Introduction to Legal Systems**	**20**	
	1.1	**Indian Courts:** Constitution of courts- Hierarchy of Courts and their Powers- Lok Ayukts and Juvenile Courts	3	1
	1.2	**Constitution of India** Preamble-Fundamental Rights-Article 20,21,22-Fundamental duties-Directive Principles of State Policy-Executive, Legislature and Judiciary - Tribunals, Election, Special Provision related certain classes, Emergency provisions and Schedules,	7	2
	1.3	**Legal aspects of Crime** Definition :Sin, Vices, Tort-History of criminal law-Nature and scope of criminal laws-Definition of crime-Fundamental elements of crime-stages of crime: Intention, preparation, attempt, commission-Theories :Deterrent, retributive, preventive, expiatory and reformative-Doctrine of Actus Reus and Mens Rea	4	3
	1.4	**Introduction to criminal Justice system** Introduction to criminal justice in India: Police, Prosecution, Judiciary and Correctional departments-Co-operation and coordination among the various sub- systems of the Criminal Justice System - Fundamental concepts-Rule of law-Concept of practice-Fair trial.	2	3
	1.5	**Indian Penal Code:(BNS)** Important provisions of Indian Penal Code-Offences against property- Theft, Robbery and Dacoity .Crimes against the persons -Culpable Homicide, Murder, Rape, Hurt. Crimes against public Tranquility- Riot, Unlawful assembly—Extent and operation of Indian Penal Code	4	3
2		**Criminal Procedure Code and Indian Evidence Act**	**15**	
	2.1	**Types of Offences in General** Cognizable and non-cognizable- Bailable and non-bailable	2	4
	2.2	**Procedure related to CrPC –Bharatiya Nagarika Suraksha Samhita** Complaint-Inquiry—FIS-FIR-Investigation-Arrest-Bail-Search-seizure-Prosecutor-Defence counsel-Summary Trials-Section 260(2)-Judgements in abridged forms-Section 355.Relevant sections.	5	3
		Indian Evidence Act – Bharatiya Sakshya Bill Evidence-Meaning-principles and concept of relevancy and admissibility-Confessions and Dying	5	3

	2.3	declaration-Presumption of fact and law-Burden of proof-Examinations-Chief, Cross and Re-examination		
	2.4	**Forensic Expert** Definition and related laws & Issues, Expert Witness, Indian Evidence Act-Section 45, (CrPC. 291-295)	1	3
	2.5	**Chemico- legal and Medico- legal rules**	1	3
	2.6	**Sentences** Sentences which the court of Chief Judicial Magistrate may pass. Maximum sentences which other courts may pass	1	4
3.		**Acts pertaining to Socio-Economic and Environmental Crimes**	**10**	**5**
	3.1	Narcotic Drugs and Psychotropic Substances ACT, Arms Act, Explosive Substances Act, POCSO Act-In Brief	5	5
	3.2	Prevention of Food Adulteration Act, Wildlife Protection Act, I.T Act, Environment Protection Act, Right to Information Act-In Brief	5	5
4.		**Practicals**	**30**	
	4.1	Court complaint Procedure	4	1
	4.2	RTI letter drafting	4	5
	4.3	Preparation of FIR to charge sheet	6	3
	4.4	To cite example of a case in which the opinion of an expert was called for under section 45 of the Indian Evidence Act.	8	3
	4.5	Preparation of the chart of classification of offences under IPC	4	3
	4.6	Prepare a Public Interest litigation	4	1
5		**Teacher Specific Content**		

COURSE CONTENT

Content for classroom transaction (Units)

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit
Assessment Types	**MODE OF ASSESSMENT** **B. Continuous Comprehensive Assessment (CCA)**

	Theory-25 marks Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** iv) Short answer type questions: Answer any 10 questions out of 12 (10x2=20) v) Short essay type questions: answer any 5 questions out of 7 (5x4=20) vi) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** iv) Laboratory Evaluation (20 marks) v) Record (5 marks) vi) Viva (10 marks)

References

1. Bronstein, D. A., (1999).Law for the Expert Witness,CRC Press, Boca Raton
2. Vipa. P. Sarthi.,(2006). Law of Evidence, 6th Edition, Eastern book Co, Lucknowj
3. Pillia, A.S.,(1983). Criminal Law, 6th Edition, N.M Tripathi Pvt Ltd, Mumbai
4. Nigam, R.C.,(1965). Law of Crimes in India, Volume I, Asia Publishing House, New Delhi
5. Monir, M (Chief Justice).,(2002).Law of Evidence,6th Edition, Universal Law Publishing Co. Pvt.Ltd, New Delhi
6 Pande, G.S .(2002). Constitution of India ,8th Edition,Allahabad,Allahabad Law Agency
7. Edelston, C. D.,& Wicks, R.I. (1977). An introduction to Criminal Justice,New York, Gregg Division, Mc Graw Hill

SUGGESTED READINGS

1. Constitution of India
2. Indian Penal Code

	Mahatma Gandhi University **Kottayam**					
Programme						
Course Name	**GENERAL BIOLOGY**					
Type of Course	MDC					
Course Code	**MG2MDCFSC100**					
Course Level	**100-199**					
Course Summary	General biology introduces biological science providing knowledge about biodiversity, ecosystem, cell structure and its function and basics of human anatomy and physiology. It also introduces biomolecules and genetics.					
Semester	II	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		2		1		60
Pre-requisites if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand biology as a science, biodiversity, and classification, ecology, and environment.	U	1,2
2	Get knowledge about Cell, Cell structure, functions like metabolism, respiration, idea about enzymes.	U	1,2
3	Gives basic knowledge of human organ systems and its functions including basics of biomolecules	U	1,2
4	Get an idea of genetics and heredity	U	1,2
5	Gives practical knowledge of microscope use and its applications,	A, An, S	1,2,10

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction to General Biology**	**15**	
	1.1	**Ecosystem** Ecology and Environment components; productivity and decomposition; energy flow; pyramids of number, biomass, energy	04	01
		Cells		
	1.2	Cell Structure, Parts and Function, Cell Membrane, Passive and Active Trasport Mechanism Prokaryotic vs eukaryotic cells, Eukaryotic cell organelle, Animal vs. Plant Cells	02	02
	1.3	**Cell Energy, Metabolism, Enzymes** ATP, Anabolic and Catabolic Reactions, Thermodynamics, Endergonic and Exergonic Reactions, Enzymes—Characteristics, Chemical and physical properties, classification, action	04	02
	1.4	**Cellular Respiration, Photosynthesis** Basics of Aerobic and anaerobic respiration (Glycolysis), Transfer reactions, Kreb's cycle, Electron transfer Chain and chemiosmosis, Fermentation Photosynthesis—Requirements, Light Reaction, Dark Reaction	05	02
		Basics of Human Anatomy and Physiology	**15**	
	2.1	**Organ Systems- structure and Function** Basic knowledge of _ The Skeletal System, The Muscular System, The Sensory System, The Digestive System, The Circulatory System, The Respiratory System, The Nervous System, The Excretory System, The Endocrine System, The Reproductive System	10	03

2	2.2	**Biomolecules** Definition, Structure, function, and importance, Proteins, Carbohydrates, Lipids, Nucleic Acids	02	03
	2.3	**Genetic Materials** Gene, Chromosome, Cell division, Mitosis, Meiosis, Mendel's Laws, Theory of inheritance	03	04
3	**Laboratory Experiments**		**30**	
	3.1	Study the parts of a microscope- eye piece and objective lens, mirror, stage, coarse and fine adjustment knobs	10	05
	3.2	Differentiate plants, animals and human cells	10	05
	3.3	Study of Blood grouping	10	05
4		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit**
Assessment Types	**MODE OF ASSESSMENT** **C. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 35 Marks** iv) Short answer type questions: Answer any 10 questions out of 12 (10x1=10) v) Short essay type questions: answer any 3 questions out of 5 (3x5=15)

	vi) Essay type questions: Answer any I question out of 2 (1x10=10) **Practical: 35Marks** iii) Laboratory Evaluation (25 marks) iv) Record (10 marks)

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SEMESTER-3

MGU-UGP (HONOURS)

Syllabus

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**CRIME SCENE MANAGEMENT**					
Type of Course	**DSC A**					
Course Code	**MG3DSCFSC200**					
Course Level	**200-299**					
Course Summary	Crime scene is the source of all evidences for a forensic scientist. This course is designed to develop the skill of systematic analysis of scene of crime and preservation of evidences.					
Semester	III	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the various types of crime scenes.	K	6
2	Get proficiency is documenting crime scenes.	A	4
3	Develop the skill to photograph the crime scene for future reference.	A	4
4	Evaluate the evidence collected and pack them in the most suitable way.	E	3
5	Acquire the skills to perform the crime scene management.	A	4

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Overview of crime scene**	**12**	
	1.1	Definition of crime and crime scene - Types of crime scenes: Primary, Secondary, Indoor, and Outdoor - Concept of evidence; evidence classification: direct, circumstantial, physical, biological, corroborative, conclusive, trace, and testimonial	5	1
	1.2	- Locard's principle of exchange - Elements of crime scene: Information from victim, witness, crime scene, suspects, databases, and records - Agencies involved in crime scene management: Police, Medico-legal experts, Judicial officers	4	2
	1.3	- Actions of the first responding officer - Objectives, documentation, officer safety, emergency care - Secure and control, release scene to appropriate authorities	3	2
2		**Search patterns**	**13**	
	2.1	Documenting Crime Scenes - Crime scene photography and videography - Crime scene notes	5	3
	2.2	Crime Scene Search Patterns - Definition and objectives of search	4	4

		- Search patterns: Strip method, grid method, zone/quadrant method, spiral method (inward and outward), Point-to-point method, wheel method - Crime scene sketching: Indoor and outdoor, triangulation method, baseline method, polar coordinate method		
	2.3	Advanced Search Techniques - Utilizing technology in crime scene searches - Application of forensic tools in locating evidence - Challenges and limitations in crime scene searches	4	5
3		**Documentation**	**20**	
	3.1	- Location and scene photography - Long-range, mid-range, and short-range photographs - Importance of scale and use of L scale	3	3,4
	3.2	Collection, Preservation and packing of Physical Evidence - General considerations in evidence collection - Evidences: fingerprints, impressions (tyreprints, footprints, lipprints), hair and fiber, trace evidences (glass, soil, paint), firearms and toolmarks - Biological evidences (blood, bloodstain patterns, body fluids, tissue), explosive materials, questioned documents.	4	3,4
	3.3	Crime Scene Reconstruction - Introduction, importance, nature, and principles - Recognition, identification, individualization, and reconstruction. - Packing and sealing of evidences - Preparation of questionnaires for evidence submission - Importance and maintenance of the chain of custody	4	3,4

	3.4	**Protocols** Legal Protocols and Investigative Stages - Stages of investigation: data collection, analysis, hypothesis formulation, testing, theory formation - Integrating forensic evidence into the investigative process - Collaboration between forensic experts and investigators	4	3,4
	3.5	- Preparation of questionnaires for evidence submission - Importance and maintenance of the chain of custody - Ensuring integrity and admissibility of evidence in court	2	1,3
	3.6	Specialized Evidence Handling - Handling and preserving delicate or easily contaminated evidence - Techniques for preserving digital and electronic evidence - Emerging technologies in evidence preservation - Cases of special consideration: arson, mass disasters	3	1,3
4		**Practicals**	**30**	5
	4.1	1. To prepare a report on evaluation of crime scene. 2. Photography of crime scene. 3. Searching and listing of evidences at crime scene. 4. Sketching of Crime scene by triangulation method. 5. Sketching of Crime scene by baseline method. 6. Evidence collection, packaging, sealing and labeling.		
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit
Assessment Types	**MODE OF ASSESSMENT** **D. Continuous Comprehensive Assessment (CCA)**

	Theory-25 marks Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** vii) Short answer type questions: Answer any 10 questions out of 12 (10x2=20) viii) Short essay type questions: answer any 5 questions out of 7 (5x4=20) ix) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** vii) Laboratory Evaluation (20 marks) viii) Record (5 marks) ix) Viva (10 marks)

REFERENCES

TEXT BOOKS

- Directorate of Forensic Science Services. (2020). Standard Operating Procedure for Crime Scene Investigation. Ministry of Home Affairs, Government of India.

REFERENCE BOOKS

- "Techniques of Crime Scene Investigation", Barry. A. J. Fisher, David .R.Fisher, Eighth
- Forensic Science in criminal investigation and trials, B.R. Sharma 6th edition.
- "An Introduction To Forensic Scientific and Investigative Techniques", Stuart.H.James and Jon. J. Nordby, Third Edition, CRC Press, 2007

	Mahatma Gandhi University **Kottayam**					
Programme	**BSc (Hons) Forensic Science**					
Course Name	**FORENSIC CHEMISTRY**					
Type of Course	DSC A					
Course Code	**MG3DSCFSC201**					
Course Level	**200-299**					
Course Summary	Forensic Chemistry deals with Forensic analysis of various chemical evidence. The course includes features, collection methods, analysing techniques of chemical samples					
Semester	III	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the fundamentals of forensic chemistry and work stages of a forensic chemist, types of forensic exhibits and importance of forensic investigation.	U, An	1,2
2	Understand the sample preparation method and familiarise tests for identification of unknown materials.	U, An	1,2
3	Study the corrosive chemicals and other industrial products by chemical tests and instrumental techniques	An	1,2
4	Understand the chemistry of fire, examination of burnt material, adulteration of petroleum products, detection methods, and basics of Explosives	U, An	1,2

5	Give knowledge of cement and related test, properties of hydrocarbon oil, engine and lubricating oil, and explosion process of some explosives.	U, E	1,2,6
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	**Introduction to Forensic Chemistry**		**15**	
	1.1	**Focuses on Forensic Chemistry** What is Forensic Chemistry – Definition, Job profile of a forensic chemist Golden rules in practice of Forensic Chemistry	04	01
	1.2	**Work Stages of Forensic Chemist** Collection or reception of the specimen. The actual examination. The communication of the results of the examination. Court Appearance.	04	01
	1.3	**Cases or Exhibits** Definition and Their importance in forensic investigation: Inflammables, Petrol, Kerosene, Diesel, Alcohol, Thinner, Solvents, Oils and Fats, Gold and Other chelating materials in crime exhibits, Lubricating oils, greases, Explosives.	07	01
2	**Sample Preparation and Identification of unknown materials**		**15**	
	2.1	**Sample preparation Techniques and Tests** Steam distillation, Solvent Extraction, Solid phase Extraction PreliMinory screening: presumptive test (colour and spot test) – Confirmatory tests Inorganic analysis of Cations and Anions- Examination procedures	04	02

		involving standard methods and Trace elements found in a crime scene, Elemental Analysis		
	2.2	**Liquors (Alcoholic beverages):** Types of alcohols, country made liquor, illicit liquor, denatured spirits, Indian made foreign alcoholic and non-alcoholic beverages. Congeners in alcoholic beverages, Laws and penalties as per Excise Act. Iodoform test for Ethyl alcohol, microscopic examination of Iodoform crystals, Chromotropic acid test for methyl alcohol Laboratory methods of determination alcoholic strength in in the given sample of Beverage -Specific Gravity method.	06	02
	2.3	**Chemicals Used in Trap Cases** Phenolphthalein, anthracene, sodium carbonate and calcium Hydroxide Acid –Alkali Test for Phenolphthalein, Thin layer chromatography test for anthracene, Flame tests, Barium chloride test for carbonate	05	02
3	**Corrosive Chemicals, Oils and Fats and Other Industrial Products**		**15**	
	3.1	**Industrial Products-** Types of paint and Composition Benzidine Test and Rhodamine Test for gold Dyes: Scope & Significance of dyes in crime investigation, analysis of ink by TLC and UV visible spectrophotometry	03	03
	Fire and arson, Petroleum Products and Explosives			
	3.2	***Fire and Arson*** Light and Flame, Chemistry of fire. Conditions for fire. Location of point of ignition,	02	04

		Examination of Burnt material for the presence of inflammables.		
	3.3	***Petroleum Products*** Distillation and fractionation of petroleum. Commercial uses of different petroleum fractions, Petroleum products: types, by products, uses, comparison, Adulteration of petroleum Products, Analysis of trace of petroleum products in forensic exhibits Thin Layer Chromatographic Methods for the detection of Petrol, Kerosene and Diesel	05	04
	3.4	***Explosives*** Definition of Explosives, Definition as per Indian Explosive Acts. Chemistry of Explosive, Classification of explosives – low explosives and high explosives. Homemade explosives. Military explosives. Blasting agents.	05	04
4	**Laboratory Experiments**		**30**	
	4.1	**Corrosive Chemicals, Oils and Fats- Tests for Detection** Hydrochloric acid, Sulphuric acid, and Nitric acid and Alkalis in crime exhibits of acid/alkali throwing cases. Litmus paper Test Diphenylamine Reagent Test, Ferrous Sulphate Test, Brucine Test for Nitrate Barium Chloride test for Sulphate, Silver Nitrate test for chloride Oils and Fats Specific gravity, Refractive Index, Detection of Rancidity in edible oil- Kries Test, Acid Value- Saponification Value Iodine Value	10	03,05
	4.2	Composition of Portland Cement, Types of Cement, and other building Materials,	4	05

		Tests for cement Analysis-heating test and performance test		
	4.3	TLC method for detection of mineral oil contamination in edible oil	3	05
	4.4	Commercial classification of hydrocarbon solvents, describe density/relative density (Specific Gravity) refractive index, flash point, distillation range and aniline point	4	05
	4.5	Brief Engine Lubricating oil, Types, Total Base Number, Viscosity, Classification of Greases, Dop Point	5	05
	4.6	TNT, PETN and RDX. - Explain Explosion process	4	05
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, Seminar, Field visit
Assessment Types	**MODE OF ASSESSMENT** **E. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** x) Short answer type questions: Answer any 10 questions out of 12 (10x2=20) xi) Short essay type questions: answer any 5 questions out of 7 (5x4=20)

	xii) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** x) Laboratory Evaluation (20 marks) xi) Record (5 marks) xii) Viva (10 marks)

References

1. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and
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	Mahatma Gandhi University **Kottayam**					
Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**INSTRUMENTATION-CHEMICAL**					
Type of Course	DSE					
Course Code	**MG3DSEFSC200**					
Course Level	**200-299**					
Course Summary	This course is designed to provide an overview of the various analytical instruments used in Forensic Laboratory, especially in chemistry division. It covers topics of spectroscopy and chromatography as important tools for forensic analysis.					
Semester	III	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Learn principle and working of spectroscopic instruments like UV and IR	U	1,2
2	Understand application of NMR and mass spectroscopy in forensic analysis.	A	1,2
3	Understand different types of chromatographic techniques and possibilities	An	1,2
4	Introduce the role of instruments like GC and GC-MS in forensic analysis	U	1,2
5	Learn to separate and detect an unknown compound	S	1,2

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	**Spectroscopy-I**		**15**	
	1.1	General Physical Concepts: Concept of electromagnetic radiation, Interaction between matter and radiation – absorption, emission, reflection, refraction and scattering, type of radiation (classification with frequency and wavelength), Basics of Fluorescence, Phosphorescence and Chemiluminescence spectrometry	03	01
	1.2	**Ultraviolet and Visible-visible (UV-vis) Molecular Spectroscopy**: **Molecular Spectro-Analytical Methods, Uv Spectrophotometry and Colorimetry** Introduction, theory: molecular energy levels, types of molecular transitions, Lambert-Beer's Law and limitations, types of sources, monochromators and detectors, Instrumentation of single beam and double beam instrument, Fundamental laws of spectrophotometry, Instrumentation and techniques, Analytical Protocols, Standard Operating Procedure (SOP), Forensic applications	07	01
	1.3	**IR Spectroscopy:** Infrared Spectroscopy: Introduction, Review of IR spectroscopy, Dispersive and Non-dispersive IR spectrophotometers, Fourier Transform Infrared Spectroscopy (FTIR), Instrumentation and Techniques, Standard Operating Procedure (SOP), sample handling techniques. interpretation of Infrared (IR) spectra. **Raman Spectroscopy**: Principle, Instrumentation, and forensic applications	05	01
2	**Spectroscopy-II**		**15**	
	2.1	**Nuclear Magnetic Resonance (NMR):** Basic Principle, Properties of Nuclei, Width of Absorption Lines, Chemical shifts, Spin-spin coupling, Instrumentation, Analytical Protocols and Forensic applications. **Atomic absorption Spectroscopy (AAS)** Introduction, Basic principles, atomic absorption, atomisation process, Theory, Instrumentation and Techniques, types of flames- fuel/ oxidant combinations, and forensic applications	05	02

	2.2	**Mass Spectroscopy** **Mass Spectroscopy**: Basic Principle, Theory, and Instrumentations Techniques: Resolution, resolving power and Mass Accuracy, Vacuum systems, Ionization types, Mass analyzers (Transmission Quadrupole, Quadrupole Ion trap, Time of Flight & Double Focusing), Scanning modes, (SIM and Full SCAN), Tandem Mass Spectrometry and MALDI-TOF. Detectors- faraday cup, electron multiplier, Scintillation counter. Interpretation of Mass spectrograph. Applications of mass spectrometry in forensic science.	10	02
3	**Chromatography**		**15**	
	3.1	**Thin Layer Chromatography**: Chromatography: General principles of chromatography, Theory of chromatography; instrumentation and applications of Paper chromatography, Thin Layer Chromatography (TLC). Column chromatography: Principle, process of elution through a column, chromatogram, band broadening, capacity factor, selectivity factor, Column efficiency, number of plates, plate height, column resolution. Basic Principle, Setup, Different Solvent System, Detection Reagent, Rf value, visualization, and Forensic applications of TLC **High Performance Thin Layer Chromatography (HPTLC)** Principle, Theory and Instrumentation, visualization, Qualitative and Quantitative concepts, and Forensic applications	08	03
	3.2	**High Performance Liquid Chromatography (HPLC):** Principle, Theory, Instrumentation, Column, Detectors, mobile phase, isocratic and gradient elution, pumps, injection systems, normal phase and reverse phase chromatography, Sample preparation, interpretation of spectra, Forensic applications	04	03
	3.3	**Liquid Chromatography Mass Spectrometry (LC-MS)** Basic Principle, Instrumentation and Forensic applications	03	03
4.	**Gas Chromatography (GC)**		**15**	
	4.1	**Introduction to Gas Chromatography (GC):** Principles, Theory, Instrumentations, carrier gases, different type of injection systems, Columns, Detectors, Sample preparation, Isothermal mode, temperature-programming mode interpretation of spectra, Forensic applications	10	04

	4.2	**Gas Chromatography- Mass Spectrometry (GC-MS)** Basic Principle, Instrumentation and Forensic applications	05	04
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	B. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

References

1. Jaiswal, A. K.(2014).Handbook of Forensic Analytical Toxicology, Tabin Millo, Jaypee Brothers, Medical Publishers, New Delhi.
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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Forensic Science**					
Course Name	**QUESTIONED DOCUMENT EXAMINATION**					
Type of Course	DSE					
Course Code	**MG3DSEFSC201**					
Course Level	**200-299**					
Course Summary	This course aims to empower students with knowledge in forensic examination of documents and report writing. It also enable the student in report writing presenting in the court.					
Semester	III	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the importance of examining questioned documents in crime cases.	U	1,2
2	Describe the tools required for examination of questioned documents.	A, E	1,2
3	Understand the significance of variations in hand writing samples.	A, An, S	1,2
4	Describe the importance of detecting frauds and forgeries by analysing questioned documents	U, An	1,2,6
5	Develop skills to examine charred documents in crime cases.and report writing.	U, A, An, S	1,2,6S

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	**1**	**INTRODUCTION**	**12**	
	1.1	Definition, introduction and history of questioned documents. Document expert- Qualification, Responsibilities, duties and qualities and challenges. Various types of documents and classification.	8	1
	1.2	PreliMinory examination of Documents Care and handling of questioned documents. Exemplars and its types. Introduction to different types of papers and examination	4	3
2	**2**	**Systematic Examination of Questioned Documents.**	**15**	
	2.1	Handwriting Examination – Introduction and physiological Development, Natural Variations, characteristics of handwriting-class and individual characteristics, comparison principle. Factors influencing handwriting; postures, emotions, writing instruments, physical conditions. Signature characteristics and examination.	10	3
	2.2	Mechanical impressions (Printers, typewriters, seals and rubberstamp impressions) examination	5	3
3	**3**	**Forgery**	**18**	
	3.1	Forgery and its types. Disguised writing and its examination. Anonymous writing examination Sequence of strokes in examination of questioned handwriting and signatures.	10	4
	3.2	Introduction and analysis of charred documents and secret writings. Examination of alterations of documents(Addition, deletion, Obliteration, substitution) Security documents and their	8	5

		examinations(Currency, passports, bond papers, stamp papers)		
4	**4**	**Tools and techniques for document examination**	**15**	
	4.1	Basic tools and techniques (Light sources, Stereomicroscope, ESDA, VSC, Photomicrograph, Chromatography: paper chromatography, TLC . Types of ink and Writing instruments their examinations (Fountain pen, ball point pen, gel pen, pencil etc.)	12	2
	4.2	Moot court and case laws. Report Writing and its importance	3	5
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **C. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	D. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

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1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton (1992).
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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FUNDAMENTALS OF CRIMINOLOGY**					
Type of Course	**DSC B**					
Course Code	**MG3DSCFSC202**					
Course Level	**200-299**					
Course Summary	Digital Forensics is a science of finding evidence from digital media like a computer, mobile phone, server, or network and the process of preservation, identification, extraction and documentation of computer evidence which can be used by the court of law.					
Semester	**III**	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the basic concepts of crime and criminology in relation to other disciplines.	U	5
2	Understand the basic reasons of crimes put forth by various experts	U	5
3	Acquire knowledge of the contrasting schools of explanations that have emerged in relation to explaining criminal behavior and crime causation.	U	5
4	Develop skills to work in collaboration with criminal justice system.	S	2,6

5	Compare various theories of crime with the dynamics of the current society.	C	6
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction**	**15**	
	1.1	Definition of Crime, Elements of Crime, Difference between Crime, Sin	5	1
	1.2	Vice and Tort, Meaning of Deviance and Delinquency, Nature and Scope of Criminology	5	1
	1.3	Criminology and its relations with other disciplines.	5	1
2		**Schools of Criminology**	**12**	
	2.1	Pre-classical (Demonological School), Classical, Neo-Classical	6	2
	2.2	Positive, Cartographic, Biological and Constitutional Schools.	6	2
3		**Theories of Crime – I**	**9**	
	3.1	Differential Association theory, Conflict theory, Containment theory, Subculture theory	3	3
	3.2	Labelling theory, Imitation theory, Neutralization theory, Anomie theory	3	3
	3.3	Social-bond theory, Routine Activities theory, Multiple Factor Approach to Crime Causation.	3	3
		Theories of Crime – II	**9**	
	3.4	Biological Theories – Atavism, Twin Study, Adoption Study, XYY Chromosomes	3	5
	3.5	Theories of personality – Freud, Murray and Catell. Theories of learning – Pavlov, Skinner, Thorndike,Kohler and Bandura.	3	5
	3.6	Shelton Body Type Theory. Theories of Motivation – Maslow, Hersberg,Atkinson, McClelland etc	3	3

4		**Criminal Justice System (practicum)**	**30**	
	4.1	Criminal Justice System: Concept, development and purpose, Accusatorial and Inquisitorial system of Criminal Justice System, field Visit	15	4
	4.2	Role of legislature, Law making procedure, Role of Police, Judiciary and Prison system in Criminal Justice System in India. Visit to Jail, Make report on cases.	15	4
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	B. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCES

TEXT BOOK

1. Paranjape, N.V., (2002). *Criminology and Penology.* Central Law Publications, Allahabad.

REFERENCE BOOKS

Arranged Reference Books:

- Allen, Harry E., Friday, Paul C., Roebuck, Julian B., & Sagarin, Edward (1981). *Crime and punishment: An introduction to criminology.* Free Press: New York.

- Ahmed Siddique, (1993). *Criminology, Problems and Perspectives, III Edn.* Eastern Book House, Lucknow.
- Edwin H. Sutherland and Donald R. Cressey (1974). *Principles of Criminology.* Lippincott, Philadelphia.
- Larry J. Siegel. (2015). *Criminology.*
- Chockalingam, K. (1997). *'Kuttraviyal' (Criminology) in Tamil.* Parvathi Publications, Chennai

	Mahatma Gandhi University **Kottayam**

Programme						
Course Name	**CONSTITUTION OF INDIA**					
Type of Course	VAC					
Course Code	**MG3VACFSC200**					
Course Level	**200-299**					
Course Summary	Indian Constitution is the fundamental law of the land. This course is designed to provide an overview of the legal setup on which our country is been built.					
Semester	III	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3				45
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the concept of the constitution.	U	6,10
2	Get a basic overview of the history and structure of Indian constitution.	U	6,7,10
3	Familiarise with the concept of fundamental rights.	K	6,7,10
4	Understand the importance of DPSP and duties.	U	6,7,10
5	Understand the way in which federalism is practiced in India.	U	6,7,10

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

COURSE CONTENT
Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction**	**9**	**1**
	1.1	Overview of the Indian Constitution, Historical background and making of the Constitution, Preamble of the Constitution	9	
2		**Fundamental Rights and DPSP**	**9**	**4**
	2.1	Explanation of Fundamental Rights, Directive Principles of State Policy and their significance, Fundamental Duties	9	
		Structure of Government	**9**	**3,5**
3	3.1	Union Government: President, Prime Minister, Council of Ministers, Parliament State Government: Governor, Chief Minister, Council of Ministers, State Legislature	9	
		Judiciary	**9**	3,4,5
	3.2	Structure of the Judiciary: Supreme Court, High Courts, Subordinate Courts, Independence of the Judiciary, Judicial review and its importance	9	
		Amendments and Basic Structure	**9**	3,4,5
	3.3	Procedure for amending the Constitution, Basic structure doctrine and its evolution, Landmark amendments and their impact	9	
4		**Teacher Specific Content**		

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit

Assessment Types	**Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any I question out of 2 (1x10=10)

REFERENCES

TEXT BOOKS

- Laxmikanth, L. (2013). Indian Polity. McGraw Hill Education (India) Private Limited.

SEMESTER-4

MGU-UGP (HONOURS)

Syllabus

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Forensic Science**					
Course Name	**BIOMETRICS AND IMPRESSION ANALYSIS**					
Type of Course	DSC A					
Course Code	**MG4DSCFSC200**					
Course Level	**200-299**					
Course Summary	This course aims to empower students with knowledge in finger print and other impression analysis. Understand the importance of biometric analysis forensic analysis. Students are expertised to the analytical skill in finger print and other impression analysis.					
Semester	IV	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the fundamental principles on which the science of fingerprinting is based.	U	1,2
2	Describe the method of classifying fingerprints.	A, E	1,2,6
3	Describe the physical and chemical techniques of developing fingerprints for crime scene evidence.	A, S	1,2,10
4	Understands the significance of foot, palm, ear and lip prints.	U, A, An	1,2
5	Understand report writing in biometric analysis.	E, S	1,2,4

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction**	**5**	
	1.1	History and Development, Legal Definition of Fingerprint Expert • Types of Fingerprint- Latent, Patent and Plastic. • Classification of Fingerprint Patterns – Henry Classification:- Primary, Secondary, Sub- Secondary, Key and Final	5	1
2		**Fingerprint Development Methods**	**15**	
	2.1	Crime Scene Observation Techniques – Development, Lifting and Preservation of Latent prints on different surfaces: -Physical Methods– Black Powder, Fluorescent Powders, Magnetic Powder, etc. C Chemical Methods – Iodine Fuming method, Ninhydrin method, Silver Nitrate method, Cyanoacrylate Method, etc.	8	3
	2.2	Application of Computer in Fingerprint Examination- AFIS, Digital Imaging, Photography of Impressions on transparent surface and Non-Transparent Surface, Lighting Techniques and Filters.	4	3
	2.3	Recording and Examination of Fingerprints on living and Dead body.	3	
3		**Foot Impression**	**25**	
	3.1	Foot Impressions:- Introduction, Types:- Human, Wild Animals(Pug Marks), Significance, Identification, Development and Comparison. ● Footwear Impressions: Introduction, Significance, Types- Surface and Sunken, Location and Collection of footwear impression. ● Gait pattern Analysis,	7	4
	3.2	Case Laws .Casting Methods, collection of test standards, Examination and Comparison	5	5
	3.4	**Other Impressions** Tyre impression-Introduction, parts of tyre, types of impressions; sunken and surface, lifting and development techniques: casting ink method	6	4
	3.4	Lip Prints; Introduction, Types and classification, development techniques, significance of lip prints and their preservation..	4	4

	3.5	Palm prints; Importance, Identification, Preservation and comparison	3	4
4		**PRACTICALS**	30	
4		1. Lifting of fingerprints by cello tape method 2. To identify different fingerprint patterns. 3. To develop latent finger Prints with black powder method 4.To develop latent finger Prints with fluorescent powder method 5. To develop latent finger Prints with magnetic powder method. 6. To develop latent finger Prints with fuming methods. 7. To develop latent finger Prints with silver nitrate method. 8. To develop latent finger Prints with cyanoacrylate method. 9.Report preparation and Presentation in Courts		
5	**Teacher specific Content**			

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, Seminar, Field visit
Assessment Types	**MODE OF ASSESSMENT** **F. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record

	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** Laboratory Evaluation (20 marks) Record (5 marks) Viva (10 marks)

References

1. Saferstein Richard, "An Introduction to Forensic Science", Criminalistics. Fifth Edition. J. A., Sukoo, R. J, and Knupfer (2000),
2. 2.Henry C. Lee and R. E.Gaensslen, "Advances in Fingerprint Technology", Second Edition. 3.D.A. Ashbaugh (2000), Quantitative-Qualitative Friction Ridge Analysis, CRC Press, BocaRaton.
3. 4.C. Champod, C. Lennard (2004), P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton.
4. Lee and Gaensleen's, Advances in Fingerprint Technology, 3rd Edition, R.S. • Ramotowski (2013), CRC Press, Boca Raton.

	Mahatma Gandhi University Kottayam
Programme	**BSc (Hons) Forensic Science**
Course Name	**FORENSIC PHYSICS**
Type of Course	DSC A
Course Code	**MG4DSCFSC201**
Course Level	**200-299**
Course Summary	This course aims to empower students with knowledge that extends beyond traditional boundaries, fostering critical thinking and informed decision-making in personal and professional spheres. Students will be exposed to the basic principles underlying the principles of physics in forensic analysis.

Semester	IV	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the importance of glass, paint, fibres, soil as physical evidences	U,A	1,2
2	Explain the sample collection, packaging and preserving of different types of evidence at crime scenes.	E, S	1,2,6
3	Explain the importance of building materials	U, E	1,2
4	Understand the modern tools and techniques for analysis of speech and audio recording	U, A, An	1,2,10
5	Understand the techniques of voice identification in forensic field	U,A, S	1,2,10

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	**1**	**Introduction to Forensic Physics**	**9**	**1**
	1.1	Nature, collection, preservation & forwarding of physical evidence for scientific examinations	9	2
2	**2**	**Glass and Soil**	**24**	**1**
	2.1	Types of glass and their composition-Forensic examination of glass fractures; Determination of direction of impact: concentric fracture, cone fracture, radial fracture, rib marks, hackle marks, backward fragmentation; Examination of glass: colour, fluorescence, physical matching, density comparison, refractive index, elemental analysis, Interpretation of glass evidence; -Case studies related to glass	12	1
		Soil		
	2.2	Soil Formation and types of soil; Composition and colour of soil-Forensic examination of soil: particle size distribution, turbidity test-microscopic examination, density gradient analysis, ignition loss, differential thermal analysis, elemental analysis-Interpretation of soil evidence; Case studies	12	1
	3	**Building Materials**	**12**	
3	3.1	Building Materials- Types of cement and their composition, Determination of adulterants, Analysis of Bitumen and road material, Analysis of cement mortar and cement concrete. Forensic examination of electrical appliances/installations. Road Accidents- Examination of scene, Filaments examination, Examination of skid marks,	12	3
4	**4**	**Voice/Tape Authentication**	**15**	
	4.1	Introduction to human Voice, Nature of voice and production of speech, perception of voice and speech,	5	5

		speech signal processing & pattern recognition basic factor of sound in speech acoustic characteristics of speech signal, Voice as Evidence: Collection of evidence, Quality of evidence, type of evidence, speaker variability and simulation, Transmission and channel distortion, admissibility. Fourier analysis, frequency & time domain representation of speech signal, analogue to digital signal and conversion, fast Fourier transform, quantization, digitization and speech enhancement, analysis of audio & video signal for authenticity.		
	4.2	Introduction to the technique of pattern recognition and comparison. Speaker recognition and types of speaker recognition, procedures and methods, feature extraction, Future comparison. Speaker recognition by Listening (SRL), speaker recognition by visual comparison of 33 spectrograms (SRS), Automatic speaker recognition (ASR), Interpretation of results.	5	5
	4.3	Recent Development of Computerized Speech Laboratory, Legal Aspects. Speaker profiling, Intelligibility Enhancement of audio recording, Transcription and analysis of disputed utterances, Authenticity and integrity examination of audio recordings.	5	4
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **C. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	D. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

References

1. Forensic Examination of Fibres, Second Edition - Kindle Edition - Kindle eBook (Apr. 16, 2007) by Ichael Grieve.

2. Sharma, B.R. : Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.

3. Forensic Digital Imaging and Photography – (2001) by Herbert L. Blitzer and Jack Jacobia

4. Kirk (2000) Vehicular Accident investigation and reconstruction.

5. Saferstein (1976) Forensic Science Handbook, Vol I, II & III, Prentice Hall Inc. USA.

6. Saferstein (2000) Criminalistics, Prentice Hall Inc. USA

	Mahatma Gandhi University **Kottayam**
Programme	**BSc (Hons) FORENSIC SCIENCE**
Course Name	**FORENSIC SEROLOGY**
Type of Course	**DSE**
Course Code	**MG4DSEFSC200**
Course Level	**200-299**
Course Summary	To provide a basic knowledge about the importance of body fluids in crime investigations

Semester	IV	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	To understand the significance of serological evidence	U	1,2
2	Identification of body fluids	A, An, S	1,2,6
3	Forensic importance of blood stain patterns	A, An, S	1,2,6
4	Characterization of body fluids	A, S	1,2,6,10
5	The usefulness of genetic markers in Paternity disputes	An, E	1,2

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Blood-Composition & Identification**	**15**	
	1.1	**Introduction** Basic concepts-antigen, antibodies, Affinity, Antigen -antibody binding reactions-primary and secondary. Introduction to Tools and techniques involving analysis of serology.	2	1
	1.2	**Blood Analysis** Composition and functions -Collection and preservation of blood evidence –Distinction between human and non-human blood-Human blood groups : General Principles-, theory of their inheritance, Blood group determination from fresh blood, titer, rauleaux formation and Bombay blood group. Forensic characterization of blood stain, Stain Pattern of Blood. Blood enzymes and proteins.	5	2
	1.3	**Bloodstain Pattern Analysis** Bloodstain characteristics. Impact bloodstain pattern-cast –off bloodstain patterns-Projected bloodstain patterns-Contact bloodstain patterns-Blood drying times-Documentation of bloodstain pattern evidence-Crime scene reconstruction with the aid of bloodstain pattern analysis.	4	3
	1.4	**Tests for Identification and characterization** Presumptive and Confirmatory tests-Physical examination-Phenolphthalein test(Kastle-Mayer Test)-Takayama test- Spectrophotometric estimation-Determination of species of origin -Cross over Electrophoresis -Typing from dried blood stains-Absorption elution technique.-Interpretation of results.	4	4
2		**Semen -Composition & Identification**	**15**	
	2.1	**Forensic significance** Composition - Functions- morphology of spermatozoa –collection of evidence-preservation	03	1
	2.2	**Tests for identification** Presumptive and confirmatory tests-Physical examination-Acid phosphatase test-Florence test-	04	2

		Barberio's test- Microscopic examination for the presence of spermatozoa		

	2.3	**Other techniques for identification** -P30 test, Identification of seminal vesicles-Specific antigen-cross-over electrophoresis	3	4
		Importance of other body fluids in crime investigation Other Body fluids		
	2.4	**Introduction** –Collection-Preservation Types-Saliva-Sweat-Urine-Milk-Vaginal secretions-faecal matter	5	1
3		**Polymorphism**	**15**	
	3.1	**Basics -** Protein and Enzymes, Iso-enzymes-Polymorphism	4	1
	3.2	**Polymorphic Enzymes**: Phosphoglucomutase-Esterase D and Erythrocyte Acid Phosphatase and its forensic significance	5	1
	3.3	**Polymorphic Proteins**: Haemoglobin, Transferrin and Albumin, HLA typing and its forensic significance	6	1
4		**Laboratory Experiments**	**30**	
	4.1	Identify the origin of blood in the given material object using cross-over electrophoresis technique	5	2
	4.2	Identify the presence of semen in the given sample	4	2
	4.3	To identify the given stain as Urine	6	2
	4.4	To identify the given stain as Saliva	6	2
	4.5	**Tests for identification** Lugol's iodine test- SAP/VAP Electrophoresis – Uffelmann's test- Urea nitrate crystal test- Creatinine test-Tests for Lactalbumin ,lactoglobulin and casein,- -Radial diffusion test for Amylase,Edelmann's test for bilirubin	9	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, Seminar, Field visit
Assessment Types	**MODE OF ASSESSMENT** **G. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** Laboratory Evaluation (20 marks) Record (5 marks) Viva (10 marks)

References

1. Saferstein, R ., (1993). Forensic science Hand Book,Vol.III,Prentic hall,New Jersey

2. Bevel, T ., & Gardner, R.M.,(2008). Bloodstain Pattern Analysis, 3rd Edition, CRC Press, Boca Raton

3. Thomas McClintock, J., (2014). Forensic Analysis of Biological Evidence: A Laboratory Guide for Serology ,CRC Press, Boca Raton

4. Chowdhuri, S (1971). Forensic Biology, BPRD, New Delhi

5. Boorman, K.E ., Dodd, B.E.,& Lincoln, P.J (1988). Blood group Serology, 6th Edition, Edinburgh, Churchill Livingstone

6. Basin Et al. A Laboratory Manual for Human Blood Analysis,Kamla Raj Enterprises

Suggested readings

1. Advanced Forensic Biology and Serology

2. Batterman,S. C & Battermann, S. D (2000).Encyclopedia of Forensic Sciences, Volume 1,Sieggel, J. A., Saukko, P. J & Knupfer, G. C (Eds.),Academic Press, London

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Forensic Science**					
Course Name	**FORENSIC BIOLOGY**					
Type of Course	DSC C					
Course Code	**MG4DSCFSC202**					
Course Level	**200-299**					
Course Summary	This course aims to empower students with knowledge that extends beyond traditional boundaries, fostering critical thinking and informed decision-making in personal and professional spheres. Students will be exposed to the basic principles of Forensic Biology in Forensic analysis					
Semester	IV	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3			1	75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Explain the significance of biological and serological evidence.	U, An	1,2,3
2	Understand the forensic importance of hair evidence.	U, An, S	1,2,6
3	Explain the importance of biological fluids – blood, urine, semen, saliva, sweat and milk in crime investigations.	An, E, S	1,2,6
4	Understand the analysis of diatoms	An, S	1,2,10
5	Explain importance of forensic Bloodstain analysis.	An, S	1,2,10

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.	**1**	**Introduction to Forensic Biology**	**5**	
	1.1	Forensic biology: History and scope, divisions- Nature and importance of biological evidences.	5	1
2	**2**	**Forensic Serology**	**15**	
	2.1	Collection, preservation and packaging of biological evidences. Seminal Stains and other body fluids.	5	3
	2.2	Composition, functions and morphology of spermatozoa. Identification of seminal stains- Presumptive Tests-Acid Phosphatase Test, Barberios Test and Florence Crystal Test. Confirmatory Test -Sperm Detection.	7	3
	2.3	Body fluids: Forensic significance of other body fluids as Saliva, Sweat and faecal matters, their collection	3	3
		Blood Stains	**15**	
	2.4	Components of Blood .Identification of blood stains: Presumptive tests- Benzidine test, Phenolphthalein test, Leucomalachite test, TetraMethylbenzidine test and O-Toludine, Luminol test.Confirmatory tests- Haemochromogen test, Haematin test and Haemin test	8	5
	2.5	Bloodstain Pattern Analysis (BPA): Biological and physical properties of human blood, Droplet Directionality from bloodstain patterns, Determination of Point of Convergence and Point of Origin, Impact spatter and mechanisms, Importance and Legal aspects of BPA	7	5
3	**3**	**Hair , Fibres and Diatoms**	**10**	
	3.1	Structure of human hair: Inner and Outer morphology, biochemistry of hair and growth stages- Comparison of human and animal hair: medulla, Medullary index calculation, Cuticle examination- Fibre – Classification	5	2
	3.2	Natural, semi-synthetic and synthetic fibres and their properties- Structure analysis for different types of fibres and their Forensic significance	3	2
	3.3	Classification, Location, Structure, types, detection and identification of diatoms and Forensic Significance. In drowning cases.	2	4
		FORENSIC BIOLOGY- PRACTICALS.	**30**	**5**

4	4.1	1. Introduction to Microscope. 2.Microscopic examination of spermatozoa. 3.Microscopic examination of blood. 4.Microscopic examination of human hair. 5. Comparison of human and non human hair. 6. Analysis of fiber. 7. Microscopic examination of blood. 8. Analysis of diatoms.	15	

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, Seminar, Field visit
Assessment Types	**MODE OF ASSESSMENT** **H. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** Laboratory Evaluation (20 marks)

	Record (5 marks) Viva (10 marks)

References

1. Forensic Biology, S. Chowdhuri, BPRD, New Delhi (1971).
2. Forensic Science Handbook, R. Saferstein, Vol III, Prentice Hall, New Jersey (1993).
3. Criminalistics and Scientific Investigation, Peter B Piaza, Frederick Cunliffe.
4. Forensic Science in Wildlife Investigation, Taylor & Francis (2009)

	Mahatma Gandhi University **Kottayam**

Programme						
Course Name	**SPECIAL LAWS**					
Type of Course	VAC					
Course Code	**MG4VACFSC200**					
Course Level	**200-299**					
Course Summary	Special laws in India refer to legislation that addresses specific issues or communities, often differing from the general laws applicable to the entire population.					
Semester	IV	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3				45
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the historical context and evolution of special laws in India, including their significance in addressing social, economic, and cultural issues.	U	6,7,10
2	Analyze and evaluate key special laws related to women, tribes, civil laws, and other areas, including their objectives, provisions, and impact.	An	6,7,10

3	Apply knowledge of special laws to real-world scenarios, demonstrating an understanding of their practical implications and enforcement mechanisms	K	6,7,10
4	Critically assess the effectiveness and limitations of special laws in promoting justice, equality, and protection for vulnerable groups in Indian society.	E	6,7,10
5	Communicate effectively about special laws in India, both orally and in writing, demonstrating a clear understanding of legal concepts and principles.	S	6,7,10

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

COURSE CONTENT
Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1. Introduction	1.1	Overview of special laws in India, Need and significance of special laws,Evolution of special laws in India	5	1
2: Laws Related to Women and Tribes	2.1	The Protection of Women from Domestic Violence Act, 2005 The Dowry Prohibition Act, 1961, The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013	10	2
	2.2	The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 The Panchayats (Extension to Scheduled Areas) Act, 1996 The Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989	10	2
3. Civil Laws & Other Special Laws	3.1	The Hindu Succession (Amendment) Act, 2005 The Muslim Women (Protection of Rights on Divorce) Act, 1986 The Special Marriage Act, 1954	10	3

	3.2	The Juvenile Justice (Care and Protection of Children) Act, 2015 The Protection of Children from Sexual Offences (POCSO) Act, 2012 The Right to Information Act, 2005	10	4,5
4		**Teacher Specific Content**		

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit
Assessment Types	**Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any I question out of 2 (1x10=10)

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	Mahatma Gandhi University **Kottayam**					
Programme						
Course Name	**GOOD LABORATORY PRACTICES**					
Type of Course	SEC					
Course Code	**MG4SECFSC200**					
Course Level	**200-299**					
Course Summary	This course is designed to impart fundamental knowledge and concepts about various qualities to be maintained in a forensic science laboratory by implementing systematic procedures and protocols. It also conveys the knowledge necessary to understand issues related to different kinds of hazard, safety practice and management.					
Semester	IV	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3				45
Pre-requisites if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the need for good laboratory practices, organizations involved, including NABL.	U	1,2
2	Introduce quality management system, requirements, internal audit and health and safe requirements for risk and hazard management	A, S	6,8
3	Understand importance of technical knowledge, and role of instruments, and periodical training for improving quality of a laboratory.	E	1,2,3
4	Understand need of documentation, control of documents, maintaining instruments in calibrated status to minimise error.	E	1,2

5	Get practice to arrange a laboratory, maintenance of instruments, and empower ideas of mechanism and management against possible of hazards of laboratory	A	1,2,6,8
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction to Good Laboratory Practices**	**10**	
	1.1	**Scope of Good Laboratory Practices** Principles, History, Purpose, Regulations and Objective: Need of maintaining quality of Forensic laboratories	03	01
	1.2	**Organizations** Organizations involved in setting guidelines and maintaining quality system: National Accreditation Board for Testing and Calibration Laboratories (NABL), International Laboratory Accreditation Co-operation (ILAC), Asia Pacific Laboratory Accreditation Co-operation (APLAC). American Society of Crime Laboratory Directors (ASCLD), International Organization for Standardization (ISO), Bureau of Indian Standards (BIS)	02	01
	1.3	**NABL** National accreditation board for testing and calibration laboratories Definition of Accreditation, Benefits of Accreditation, **General Requirement for accreditation**: Management Requirement and Technical requirement for quality assurance, Assessment through audit, Corrective Action, Management Review Meeting. Importance of documentation.	05	01
		Quality Management System	**10**	
	1.4	**Introducing Quality Management System** Definition of Quality, Quality Manager, infrastructure, quality assurance programs, meeting the requirements of the test facilities-equipment, personnel	02	02

	1.5	**Management Requirements**: organizational, Personnel, document control, control of non-conforming testing, corrective and preventive actions. **Audit:** Internal Audits: Definition, Objectives, Planning of audit, Implementation of internal audits, Follow up of corrective action, Records and reports of internal audits, Management review meeting.	04	02
	1.5	**Health and Safety Requirements** General Rules/Protocols for Lab Safety measures, Precaution and Safety in handling of chemicals, Laboratory tools, Glassware, and instruments. safely practice in basic laboratory procedures like handling, analysis, and storage of, Chemical reagents, analytes, especially explosives. **Hazard and Risk Management** Methodology to provide safety against fire and explosion, air- based and chemical-based hazards. Protective cloths, First Aid Box, Eyewash, Fire Extinguisher. Emergency Exit	04	02
2	**Technical System**		**5**	
	2.1	**Technical Requirements**: Standard working procedure, measurements, standards and reference material, traceability, sampling, Proficiency Testing, cross checking of result, Reproducibility, and Review Program.	03	03
	2.2	**Instruments** Environment monitoring, calibration, and safe handling of instrumentation. Break down service, Annual maintenance	01	03
	2.3	**Training and Development** Inhouse and external training, improve level of awareness effectiveness	01	03
	Documentation and Reporting		**10**	
	2.4	**Documents** Quality Manual, Standard Operating procedures, Keeping data records, Result analysis and its interpretation. Audit report, Documents related to health and safety and Training. Control of documents. Customer feedback	06	04
	2.5	**Calibration** Calibration of all measurement equipment like pH meter, weighing balance, water bath, pipette, burette	02	04
	2.6	**Logbooks**	02	04

		Maintenance of logbook for instruments, Instruments Service Records		
3	**Laboratory Experiments (Demonstration)**		**10**	
	3.1	Label and arrange reagents, chemicals and Glassware and maintain Registers for each		05
	3.2	Make numbering and labelling for each equipment and Instruments and maintain logbook for each including service and AMC details.		05
	3.3	Self- protective measures against corrosive chemical, organic carcinogenic solvents. Control measures		05
	3.4	Safety precautions to be followed for Explosive analysis		02
	3.5	Types of fire extinguishers and working procedure of fire extinguishers available in your laboratory.		03
4		**Teacher Specific Content**		

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit
Assessment Types	**Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any I question out of 2 (1x10=10)

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1. Smith, J. (2021). Good Laboratory Practices Assessments.
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3. Lynne S. Garcia ;(2019). Clinical Laboratory Management.
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	Mahatma Gandhi University **Kottayam**					
Programme	**BSc (Hons) Forensic Science**					
Course Name	**Internship**					
Type of Course	INT					
Course Code	**MG4INTFSC200**					
Course Level	**200-299**					
Course Summary						
Semester	IV	Credits			2	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
Pre-requisites if any	NA					

SEMESTER-5

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FORENSIC BALLISTICS**					
Type of Course	DSC A					
Course Code	**MG5DSCFSC300**					
Course Level	**300**					
Course Summary	Forensic Ballistics deals with Forensic Analysis of evidences related to firearms. The course includes features, collection methods and analysis of ballistics evidences.					
Semester	v	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	To know the basic working of firearms and ammunition	U	5
2	Develop skills to handle firearms and ammunition.	U	5
3	To develop skills to investigate the various crimes in which firearms are involved	U	5
4	Learn the science of comparison of bullets and cartridge cases.	A	4

5	Acquire skills to do perform chemical tests involved in ballistics analysis	A	4

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction to Ballistics**	**10**	
	1.1	Scope of forensic ballistics- History of firearms: lock mechanism of various firearms- Firearms: Classification: Based on riffling, action mechanism and loading	3	1
	1.2	Parts of firearms: Butt, chamber, magazine, firing mechanism and barrel. Concept of bore and calibre. Improvised, country made & imitative firearms.	4	1
	1.3	Features of the following firearms: 12 bore, INSAS, 0.315, revolver, pistol, carbine, AK 47, SLR.	3	2
		Internal and Intermediate Ballistics	**15**	
	1.4	Ammunition, Cartridge case, Primer, Propellant, Bullets, Pellets and Wads. Use of lead as bullet material	5	1
	1.5	Internal Ballistics: Definition, Chemical composition of primer and propellant (black powder, single base, double base, cordite). Ignition and burning of propellants. Degressive and progressive burning. Pressure developed inside the barrel.	5	3
	1.6	Theory of recoil. Intermediate Ballistics: Definition, effects on the motion of projectile by firearm, gas flow field near the muzzle, muzzle flash, muzzle blast and silencers.	5	3
2		**External and Terminal Ballistics**	**10**	
	2.1	External Ballistics: Definition, vacuum trajectory, Equations of motion of projectile, gyroscopic equilibrium of bullets, vacuum trajectory- calculation.	4	3

	2.2	Terminal Ballistics: Definition. Shock waves, shock waves within the body; Cavitations, temporary and permanent cavities. Ricochet and its forensic aspects.	3	3
	2.3	IBIS and NIBIS. Gun Shot Residues (GSR): formation, composition and positioning of GSR and collection.	3	5
3		**Evidentiary Clues**	**10**	
	3.1	Calculation of trigger pull Determination of range of firing for shotguns: Burning, scorching, blackening and Tattooing. Characteristics of contact shots. Evidentiary clues: Types, occurrence, collection and packing.	3	4
	3.2	Matching of crime & test Bullets and cartridge cases. Comparison microscope, Identification of bullets and their comparison. Factors affecting the formation of striations.	4	4
	3.3	Chemical Tests: Dermal Nitrate, Walker and modified Walker test, Gilroy test, Price test, Griess Test. Instrumental methods: AAS, SEM	3	5
4		**Practicals**	**30**	4,5
		1. Identification of parts of firearms 2. PreliMinory examination of various characteristics of fired bullets, shots and cases. 3. Chemical tests for powder residues and barrel wash. 4. Examination and comparison of fired and test bullets and cases. 5. Collection and packing of Gun Shot Residues. 6. Identification of bullet using holes physical and chemical examination.		
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, Seminar, Field visit
Assessment Types	**MODE OF ASSESSMENT** **I. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks**

	Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** Laboratory Evaluation (20 marks) Record (5 marks) (10 marks)

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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Forensic Science**					
Course Name	**FORENSIC TOXICOLOGY**					
Type of Course	DSC A					
Course Code	**MG5DSCFSC301**					
Course Level	**300-399**					
Course Summary	Toxicology is the study of the action of poisons in the body. Forensic Toxicology deals with the identification of cause of death based on the analysis of body samples for various poisons.					
Semester	V	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Learn different types of poisons based on chemical nature, types of poisoning, biological action of various poisons and chemico-legal examination rules to be followed in this area.	U	1,2
2	Understand method for extraction and isolation of poison including ethyl alcohol from biological sample	An	1,2
3	Provide understanding of how to detect various poisons using chemical and instrumental method.	A, An	1,2
4	Understand the importance of toxicologist in detecting poison, preparing report, presenting findings in court, and also deals with some miscellaneous poisons	A,S	2,6,8

5	Provide laboratory experience for detecting some poisons	A,S	1,2,10
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
2		**Introduction to Forensic Toxicology**	**15**	
	1.1	**Poisons** Definition, classification on the basis of their chemical properties and general method of isolation from tissues and other biological fluids with examples Gaseous Poison-Carbon monoxide, Volatile- Poison ethyl alcohol, Organic-Insecticides and Drugs, Inorganic- Acids and Alkalis, Metallic poison -Mercury, Plant Poison- Poisonous seeds, fruits, roots and mushrooms. Animal poisons. Snake venom. insect bites, Mechanical poison-glass powder, Food Poisons **Types of poisoning-** Accidental, suicidal and homicidal poisonings, Modes of administration, fatal dose and fatal period, antidotes. **Signs and symptoms of poisoning**, Physiological action, effect on vital functions - Affecting organ and cause of death for Cyanide poisoning, Carbon monoxide poisoning, Odollam poisoning	05	01
	1.2	**Collection and forwarding of toxicological exhibits in fatal and survival cases for Laboratory Testing** Kerala Chemico- Legal Examination Rules for: Collection, Preservatives for Viscera, Blood, Container, Packing, Labelling, Seal, Authentication of forwarding Officer, Forwarding Letter-specifying the number and nature of samples forwarded, Examination required. Verification in the Laboratory Stomach wash, Blood, Urine for Survival Cases Viscera, Blood, Urine, Cerebrospinal Fluid, Bone marrow (for Suspected drowning case) for Fatal cases	05	01

	1.3	**Introduction to Forensic Pharmacology** Forensic pharmacology: definition, Concepts of drug, Ingestion- Absorption, distribution, metabolism, Excretion - Other routes of elimination	05	01
		ISOLATION AND PURIFICATION OF POISONS	**10**	
	1.4	**Extraction methods** Steam distillation for volatile poisons, Extraction with organic solvents for nonvolatile organic poisons, liquid -liquid extraction of pesticides from viscera, Extraction of Drugs and Poisons of Plant Origin from Biological Matrices, Extraction of acid and basic drugs from viscera, blood, and urine, Extraction of Metallic Poison and mineral acids from viscera, Extraction of diatom from bone marrow- micro wave digestion method	04	02
	1.5	**Concentration of Analyte (Clean-up Procedures)** Application of chromatography and Electrophoretic techniques for the separation of poison and drugs, need for concentration	02	02
	1.6	**Ethyl Alcohol and Toxicity**. Analysis of Ethyl alcohol in beverages, liquors, biological fluids and breath Iodoform test, Alcohol and Road Traffic Accidents Breath analyser, Toxicity, Determination of Ethyl Alcohol in blood and urine, protein precipitation—Conway diffusion method, Modified Kozelka-Hine Method, Gas Chromatography, Blood alcohol Concentration impact on behaviour, Legal context to drinking and driving.	04	02
2	**Identification of Poisons**		**10**	
	2.1	**General Examination and Colour Tests** Smell, Appearance, Reaction (pH) Prussian Blue Test for Cyanide, Cadmium mercuric Chloride test, and ammonium molybdate test for Phosphide, Fujiwara test for Trichloro compounds, Tollen's reagent test for formic acid, Neutral ferric chloride test for acetic acid, Dithionite test for Paraquat/Diquat, Kellers test for Glycosides, Reinsch test for Heavy Metals, Test for anions of mineral acids, Tests for Poisonous cations	04	03

	2.2	**Thin layer Chromatography Tests- Solvent System, Detection Reagent, Rf Value** For: - insecticides -Organo phosphorous, Organo chloro, Carbamate and Pyrethroid insecticides, Fungicide, Herbicide, Odollam and Oleander glycosides, Alkaloids, Benzodiazepines, Phenothiazines, Barbiturates, and cannabinoids	03	03
	2.3	**Application of Instrumentation Methods-** UV, FTIR, HPLC, GC, GCMS- methods for detection of poisons and drugs (Principle and Theory) Spectrophotometric techniques for the quantification of poisons and drugs-	03	03
3	**Significance of Toxicological Findings**		**10**	
	3.1	**Role of the toxicologist** Toxicological analysis for toxins and Interpretation of the findings Presenting laboratory findings in the Report format, Format of Report Writing & Court Room Testimony, Limitations of methods and trouble shooting in toxicological examinations	04	04
	3.2	**Food Poisoning**: What is food poisoning, Food poisoning due to chemical and bacterial agents, Sign and symptoms of food poisoning, collection and preservation of evidence material, extraction and isolation, from food material, biological material, detection and identification by colour test and Instrumental techniques	04	04
	3.3	**Snake venom, Insect and Animal Toxins** Gel Diffusion Test Disposal of analysed samples.	02	04
4	**Laboratory Experiments**		**30**	
	4.1	To identify metallic poisons		05
	4.2	To identify mineral acid.		05
	4.3	To identify methyl alcohol		05
	4.4	Separate and identify the insecticide by TLC		02
	4.5	Identify the Zinc Phosphide (Rat poison}		03
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, Seminar, Field visit
Assessment Types	**MODE OF ASSESSMENT** **J. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** Laboratory Evaluation (20 marks) Record (5 marks) Viva (10 marks)

References

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	Mahatma Gandhi University **Kottayam**
Programme	**BSc (Hons) Forensic Science**
Course Name	**INSTRUMENTATION-BIOCHEMICAL**
Type of Course	DSC A
Course Code	**MG5DSCFSC302**
Course Level	**300-399**
Course Summary	The course covers the instrumental methods used in forensic examination. It is covering a wide topic of spectroscopy chromatography, microscopy, and bio-analytical techniques.

Semester	V	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the general separation methods used in biochemical field and get an idea of different types of buffers.	U, A	1,2
2	Learn about microscopes and their application in forensic field.	U, A	1,2
3	Learn basic concepts of various Spectroscopic instruments and their forensic applications.	A, An	1,2
4	Learn about bio-analytical methods and the techniques used in bio-analytical instruments.	A, An	1,2
5	Learn to develop a method to detect an unknown sample	S	2

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction to Bio-chemical Techniques**	**10**	
	1.1	**Introductory principles of separation Techniques** Separation techniques of Biomolecules- Methods of protein precipitation: Precipitation using inorganic salts (salting out) and organic solvents, Dialysis, Ultra filtration. Lyophilization Methods of tissue homogenization, Sonication	04	01
	1.2	**Centrifugation techniques** Basic Principles of centrifugation, basic rules of sedimentation, sedimentation coefficient, various types of centrifuges, different types of rotors, differential centrifugation, density gradient centrifugation, Ultracentrifugation	04	01
	1.3	**pH -Meter** Principle, Standardization of pH meter, preparation of buffers	02	01
2		**Microscopy & Spectroscopy**	**20**	
	2.1	**Microscopy** Theory and basic principles, Lens systems and its working. Abbe equation- Principle, ray diagrams, working, sample preparation, Forensic applications of following microscopes:- Simple, Compound, Comparison, Stereo-zoom, and Phase contrast microscope.	05	02
	2.2	**Advanced Microscopy** Electron Microscopy- Theory and basic principles of Electron Microscopy, Structure and Forensic applications of Infrared microscope, Polarized light microscope Fluorescence, microscope , Scanning Electron microscope (SEM), Transmission Electron Microscope (TEM), Atomic force microscope (AFM).	08	02
	2.3	**Atomic absorption Spectroscopy (AAS)** Introduction, Basic principles, atomic absorption,	07	03

		atomization process, Theory, Instrumentation and Techniques, types of flames- fuel/ oxidant combinations, and forensic applications, Flame photometry and its application		
3	**Immunoassays**		**15**	
	3.1	**Antigens and Antibodies** Antigen, Antibody, Basic principles of immunoassay, Enzyme immunoassays (EIA), Radio immunoassay (RIA) and Fluorescence immunoassay (FIA), Enzyme-Linked immunoassay (ELISA), Application of Immunoassay in Forensic biological science.	07	04
	3.2	**Electrophoresis-** Electrophoresis. Basic Principle of electrophoresis, Paper electrophoresis, Gel electrophoresis, discontinuous gel electrophoresis, PAGE, SDS-PAGE, Native gels, denaturing gels, agarose gel electrophoresis, buffer systems in electrophoresis, electrophoresis of proteins and nucleic acids, protein and nucleic acid blotting, detection and identification (staining procedures).	08	04
4	**Laboratory Experiments (Demonstration)**		**15**	
	4.1	Preparation of solutions: 1) Percentage solutions, 2) Molar solutions, 3) Normal solutions, 4) Concentrations in ppm	03	05
	4.2	Preparation of buffers, emulsions.	03	05
	4.3	To carry out thin layer chromatography of drug samples	03	05
	4.4	To identify the given samples using UV-Visible spectroscopy	03	02
	4.5	Radial immunodiffusion technique for detection of antigen like snake venom	03	03
5		**Teacher Specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **E. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	F. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.

Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FORENSIC MEDICINE**					
Type of Course	**DSE**					
Course Code	**MG5DSEFSC300**					
Course Level	**300-399**					
Course Summary	To provide a basic knowledge about the importance of body fluids in crime investigations					
Semester	V	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	The students should be able: To have a basic understanding of the discipline of Forensic Medicine, the legal procedures and courts.	U	1,2
2	To have a subtle knowledge of the medicolegal aspects of death and the forensic aspects of identification of an individual.	A	1,2
3	To know the procedure of a medicolegal autopsy, making note of the postmortem changes, time since death and cause and manner of death.	A, An	1,2,6

4	To know about various types of injuries including the weapons responsible; the vehicular injuries; and injuries and injuries by physical agents like heat, cold , electricity, radiation	A, An,S	1,2,6
5	To know about the deaths by asphyxia including sexual asphyxia with their postmortem findings, about the various aspects of infanticide and to know about different types of sexual offences	U,E	1,2,6
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

FORENSIC MEDICINE

Module	Units	Course Description	Hours	CO No
1	**1**	**What is Forensic Medicine?**	**12**	**1**
	1.1	Introduction to Forensic Medicine: Definition of Forensic Medicine, introduction to legal procedure. Inquest and its types; summons; witnesses and types of witness.	9	
	1.2	Medical evidence and the steps of recording medical evidence; dying declaration , medicolegal documents	3	
	1.3	**Death and its causes**	**12**	**2**
	1.4	Medicolegal aspects of Death: Definition of death, types of death, natural and unnatural deaths, causes of natural deaths, Types of unnatural deaths; Sudden unexpected death, suspended animation; Certification of death	4	
	1.5	The various perspectives of death: Modes of death: coma, syncope and asphyxia; moment of death , time since death and its legal significance .	3	
	1.6	Forensic aspects of identification: Identification of a person: living person and dead bodies	5	
2	**2**	**Medicolegal Autopsy**	**12**	**3**
	2.1	Procedure of autopsy; Autopsy, Forensic/ Police surgeon, objectives of autopsy, postmortem examination-external and internal.	4	
	2.2	Changes after death; Time since death, algor mortis ,rigor mortis, postmortem staining, signs of decomposition, modified forms of decomposition, mechanism of production of the postmortem changes	3	
	2.3	Assessment of cause and manner of death:	5	

		Considering different types of manner of death, tripod of life and its importance, Crime scene examination in relation to autopsy cases		
3	**3**	**Injuries**	**12**	**4**
	3.1	Basics of injury; Definition of injury, hurt, grievous hurt, classification of mechanical injuries- weapons, regional injuries, medicolegal aspects of injuries	4	
	3.2	Vehicular injuries; Transportation injuries,- road,rail,air,sea transport, pedestrian and occupant injuries	3	
	3.3	Death by physical agents; Thermal deaths, deaths by burns and scalds. Why should autopsy be conducted on a burnt body? Electrical injuries, differentiating features; death by lightning, postmortem appearance, radiation injuries	5	
4		**Asphyxial deaths, infanticide and sexual offences**	**12**	5
	4.1	Asphyxiation: Types of asphyxial death, basic anatomy of neck, definitions, postmortem findings, sexual asphyxia	3	
	4.2	Infant deaths: Infanticide definition, live birth, still birth, signs of intrauterine death.	3	
	4.3	Medicolegal aspects of infanticide: Viability of foetus, gestational age of foetus, Hasse's rule, hydrostatic test, importance of knowing gestational age	3	
	4.4	Sexual offences-types, collection of material evidence from accused and survivor	3	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **G. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	H. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks

	Essay (15 marks)	:1 out of 2	1x15= 15 marks

Suggested reading:

1. Text book of Forensic Medicine by P.V. Guharaj
2. Text book of Forensic Medicine by V.V.Pillai

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Forensic Science**					
Course Name	**DNA ANALYSIS**					
Type of Course	DSE					
Course Code	**MG5DSEFSC301**					
Course Level	**300-399**					
Course Summary	After the completion of this course the students will be able to understand about the human genetics,DNA Profiling and applications in paternity, maternity etc.in forensic sample analysis.					
Semester	V	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the basic principles of DNA analysis.	U	1,2
2	Explain the forensic significance of DNA typing	A, E	1,2,6
3	Understand the forensic importance of bloodstain patterns	A, E, S	1,2
4	Understand the usefulness of genetic markers in forensic investigations	U, A, E	1,2,10
5	Explain the role of DNA typing in parentage testing.	A, E, S	1,2,6

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	1	**Introduction to Human Genetics**	**12**	
	1.1	History, discovery, development in the findings. Definition, structure, properties and forensic importance-	4	1
	1.2	Human genetics- definition and explanations for Heredity, alleles, mutations and population genetics	4	1
	1.3	Molecular biology of DNA, variations in DNA, Biochemical aspects Genomics and medical genetics	4	1
2	2	**DNA Profiling**	**15**	
	2.1	Mitochondrial DNA- definition, structure, biochemical activity	4	2
	2.2	DNA Profiling: Introduction, definition, history and importance in the field of forensic science- Types of samples used for DNA analysis- Collection, packaging and preservation of blood, saliva, semen, sweat and hair. Case studies related to paternity and maternity disputes and child swapping. Paternity and maternity index: equation, derivation and calculation	5	2
	2.3	Application of DNA Profiling . Forensic Significance of DNA profiling: Applications in disputed paternity cases, child swapping- Missing person's identity- civil immigration, job disputes-	3	2
	2.4	Paternity and maternity index: equation, derivation and calculation	3	5
	3	**DNA typing Systems**	**18**	
	3.1	NA typing systems- Polymorphism, RFLP analysis, PCR amplifications, sequence polymorphism	7	2
3	3.2	Analysis and functioning of SNP and Y- STR- Evaluation of results, frequency estimate calculations, allele frequency determination- Interpretations of results	7	2
	3.3	Match probability- database, quality control, certification and accreditation	4	2
4	4	**Legal Perspective of DNA Profiling**	**15**	
	4.1	Legal perspectives- legal standards for admissibility of DNA profiling, procedural and ethical concerns-	5	3

	4.2	Status of development of DNA profiling in India and abroad- New and future technologies: DNA chips, SNPs and limitations of DNA profiling.	10	4
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **I. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	J. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

References

1. Saferstein, R. (1982) Science Handbook, Vol. I, II, & III, Prentice Hall New Jersey.
2. DNA Structure and functions by Richard R. Sinden; Academic Press, Inc. 1994.
3. DNA Profiling and DNA fingerprinting; Edited by Jorg T. Epplen and Thomas Lubjuhn; Birkhauser Verlag, Switzerland, 1999.
4. Forensic DNA Profiling Protocols edited by Patrick J. Lincoln and Jim Thomson; Humana Press, Inc. 1998.
5. Kirby: DNA Fingerprinting Technology.
6. Furley, M.A. & Harrington, J.J. (1991)
7. Forensic DNA Technology National Research Council (1992) : DNA Technology in Forensic Science, Washington DC National Academy Press.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**RESEARCH METHODOLOGY AND STATISTICS**					
Type of Course	SEC					
Course Code	**MG5SECFSC300**					
Course Level	**300-399**					
Course Summary	Develop foundational knowledge of qualitative and quantitative research methods, evaluation of research and applying statistical applications to relevant research data.					
Semester	V	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3				45
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Familiarize with basic of research and the research process.	U	1,2
2	Choose the appropriate research design and develop appropriate research hypothesis for a research project	A	1,2
3	Learn various data collection methods	An	1,2
4	Describe the appropriate statistical methods required for a particular research design	An	1,2,3
5	Choose the right statistical technique to be used with the research method	S	1,2,3

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
		Introduction to Research	**15**	
1.	1.1	Research: Definitions, Characteristics and Objective of research- Epistemology and ontology of research,	3	1
	1.2	Types of research: Descriptive vs. Analytical, Applied vs. Fundamental, Qualitative vs. Quantitative, Conceptual vs. Empirical, and other kinds of research.	3	1
	1.3	Research methods vs Research Methodology, Inductive and deductive research, Ethics in Criminal Justice Research.	3	1
	1.4	Formulation of the research problem, Research process,	3	2
	1.5	Overview of the stages in research (hypothesis formation to analysis and report writing),	3	2
2.		**Data collection**	**15**	
	2.1	Types of Data's, Modes of collection of primary data: Observation, Interviews, interview schedules, Questionnaires, Modes of collection of secondary data.	5	3
	2.2	Population and unit of analysis, Sampling Techniques: Definition, Criteria for selecting a sampling design, Types of sampling: Probability sampling and non-probability sampling, Types of probability sampling: simple random sampling, systematic sampling, stratified sampling, cluster sampling, area sampling and multi-stage sampling,	5	3
	2.3	Types of nonprobability sampling: purposive sampling, convenience sampling, judgment sampling and snowball sampling. Advantages of sampling, Requirements of a good sample.	5	3
		Introduction to Statistics	**15**	
3.	3.1	Variables; Discrete and Continuous, Independent and Dependent. Scales of measurement -Nominal, ordinal, Interval and ratio.	3	4

	3.2	Frequency for grouped and ungrouped data, Class Interval and Class width, Continuous and discontinuous data.	3	4
	3.3	Graphical representation of data, bar chart, pie-chart and histogram, Significance of statistics in forensic science	3	4
		Measures of Central Tendency		
	3.4	Measures of Central Tendency: Mean, Median and Mode-	3	5
	3.5	Measures of Dispersion: Range, quartile deviation, mean deviation and standard deviation and coefficient of variations.	3	5
4		**Teacher Specific content**		

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit
Assessment Types	**Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any I question out of 2 (1x10=10)

REFERENCES

TEXT BOOK

- Kothari, C. R. (1996). Research methodology: Methods & techniques (2nd ed.). New Delhi: Wiley Eastern.

REFERENCE BOOKS

- Agarwal, B. (2012). Basic statistics. Tunbridge Wells: Anshan.
- Argyrous, G. (2000). Statistics for social science research: With a guide to SPSS. London: SAGE.
- Gupta, S. P. (2008). Statistical methods. New Delhi: Sultan Chand & Sons.
- Leabo, D., & Smith, C. (1968). Basic statistics (3rd ed.). Homewood, Illinois: R. D. Irwin

SEMESTER-6

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Forensic Science**				
Course Name	**Narcotic Drugs and Psychotropic Substances**				
Type of Course	DSC A				
Course Code	**MG6DSCFSC300**				
Course Level	**300-399**				
Course Summary	This course aims to familiarise the various types commonly misused narcotics and psychotropic substances and their analytical techniques. Students will be exposed to the basic principles underlying the use, effects, and regulation of narcotics and psychotropic drugs				
Semester	VI	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		4			60
Pre-requisites, if any	NA				

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the classification of narcotic drugs	U	1,2,8
2	Explain methods of identification and purification of narcotic drugs and psychotropic substances	A, An, E, S	1,2,6
3	Understand the methods of analysis of narcotic drugs	A, An, E, S	1,2,6
4	Understand the concept of designer drugs	U, E	1,2,6
5	Explain the instrumental methods of analysis of narcotic drugs and psychotropic substances.	A, An, S	1,2,10

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	**1**	**Introduction**	**5**	
	1.1	Scope and significance of the analysis of controlled substances in forensic science, Classification of NDPS Drugs and their characterization. NDPS Act- Relevant Sections Drug dependence, drug addiction and its problems.	3	1
2	**2**	**Analysis of Narcotic Drugs**	**15**	
	2.1	Analysis of opium and its major alkaloids, heroin and other synthetic narcotics. Analysis of Psychotropic substances: Barbiturates, methaqualone, benzodiazepines, Analysis of Stimulants: Cocaine and amphetamines and ephedrine, pseudoephedrine, mephedrone Methamphetamine, MDMA and derivatives and cathinone. Analysis of Hallucinogens: Ganja, hashish (Charas), LSD, Mushrooms and Cactus. Define precursor, common precursors of NDPS drugs and their analysis. Analysis of Designer drugs, club drugs,	7	2
	2.2	Analysis of drugs by colour test, micro crystal test, thin layer chromatography and instrumental analysis. Analysis of NDPS drugs in biological samples and their importance, methods of extraction of drugs from urine, blood, and saliva. Excretion of drugs through hairs and nail and their examination. Procedure for collection of hair sample, storage preservation. Method of extraction of drugs from hair and nails and their identification using instrumental techniques.	8	3
		Confirmatory tests	**10**	
	2.3	Confirmatory tests of drugs through instrumental techniques: Analysis of Narcotic drugs, depressants, tranquillizers, stimulants, hallucinogens, club drugs & other drugs of abuse through High Performance Thin Layer Chromatography, Gas liquid chromatography, High Pressure liquid chromatography, , UV-visible spectrometry, IR/FTIR and Raman spectroscopy, Mass Spectrometry, GC- Mass and LC-Mass, HPTLC-Mass. Method validation and calibration of instruments.	10	5
3	**3**	**Adulteration of Drugs and Designer drugs**	**15**	
	3.1	Detection of adulterants: NDPS drugs and their commonly encountered adulterant. Determination of nature of adulterant, diluent, and additives. Percentage purity	5	

		determination: Estimation of % purity of the NDPS drugs and detection in seized samples such as opium charas, amphetamine, cocaine, and tranquilizers in seized sample Laboratories authorized to conduct examination and experts authorized to report NDPS substances.		
	3.2	Limitation of chemical analysis of drugs. Report writing and interpretation of drugs analysis. Reporting of cases and court testimony in NDPS Act cases. Case studies and grounds for acquittal.	5	
	3.3	Designer drugs-Definition, Analogs of Fentanyl and Meperidine (both synthetic opioids), Phencyclidine (PCP), Amphetamines and methamphetamines (which have hallucinogenic and stimulant properties).	5	4
4	**4**	**Practical (demonstration)**	**15**	
	4.1	1. Relevant sections of NDPS Act 1985 2. To identify illicit drugs by spot tests. 3. To perform colour tests for opiates 4. To perform colour tests for barbiturates. 5. To perform colour tests for opiates. 6. To perform colour tests for Benzodiazepines 7. To perform colour tests for amphetamines. 8. Preparation of test report.		
5		**Teacher specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	B. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

Reference Books:

1. Clark E.G.C; “Isolation and Identification of drugs”. Vol.1 and Vol.2, Academic Press 1986.

2. NDPS Act, 1985.

3. Feigl; “Spot Test in Organic Analysis”, Elsevier Pub. New Delhi.

4. “Working Procedure Manual – Chemistry, Explosives & Narcotics”, BPR&D Publications.

5. Feigl, F; “Spot Test in Inorganic Analysis”, Elsevier Publication. New Delhi, 2005.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FORENSIC ANTHROPOLOGY**					
Type of Course	**DSC A**					
Course Code	**MG6DSCFSC301**					
Course Level	**300-399**					
Course Summary	To provide a basic knowledge about the importance of body fluids in crime investigations					
Semester	VI	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0		60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	The students should be able: To have the basic concepts of forensic anthropology and to understand its importance in knowing the individual bones to the effect of personal identification.	U, A	1,2
2	To have a knowledge of the method of examination of human bones and the method of collection and preservation of skeletal remains as evidence.	A, S	1,2
3	To know regarding anthropometry, basics of Bertillon system of identification, archaeology and exhumation.	U, An	1,2,3
4	To have a knowledge on teeth, evidence from teeth and personal identification from teeth.	U,A,S	1,2,6,10

5	To have a thorough knowledge of facial reconstruction from skull including superimposition and the ways of identification through hair morphology.	U, A, An, S	1,2,6,10
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

FORENSIC ANTHROPOLOGY

Module	Course Description	Hours	CO No
1	**Introduction to Forensic Anthropology**	**12**	
1.1	Forensic Anthropology: Introduction- Types of Anthropology, Physical anthropology. History of Forensic anthropology, role of Anthropologist, scope of Forensic Anthropology, Importance of Forensic anthropology	3	1
1.2	Human Osteology: Introduction- Forensic osteology is a sub-discipline within forensic anthropology, analysis of human skeleton for medicolegal purposes, characteristics of bones, biological identity, determination of sex from different bones	4	2
1.3	Different types of bones; Introduction, types of bones:- long bones, short bones, flat bones, irregular bones. Anatomy of skull, Difference between male and female skull. Comparative skeletal anatomy- Human and non human – distinguishing parameters between humans and other mammals; how non human animal bones are commonly confused with human bones? Cremation or thermal damage to skeletal remains	5	2
2	**Ossification and its importance**	**12**	**2**
2.1	Introduction: Ossification, skeletal age and ossification, ossification of bones, sutural closure of skull, the important ossification centers and their fusion.	4	2
2.2	Examining the human remains:- Determination of race by comparison of skulll remains. Biological categorization on the basis of race.	4	2
2.3	Chemistry of bones; Collection, preservation and packaging of osteological evidence- ethics involved while handling human bones, code of conduct.	4	2
3	**Anthropometry, Forensic Archaeology and Exhumation**	**12**	3
3.1	Introduction, History of Anthropometry, subdivision of anthropometry, estimation of stature, sex and race determination. Bertillon system of Identification, How Alphonse Bertillon developed this system? Bertillon's portrait parle and its descriptive roll comprising of general appearance	6	3

	and facial characteristics; Anthropometric and osteometric variations in Caucasoids, Negroid and Mongoloid.		
3.2	Exhumation:- Introduction, who authorizes for exhumation? Procedure, time limit for exhumation. Whether belong to one or more individuals? stature of the individual, identifying features, nature of injury, time since death, the dating of human bones.	6	3
4	**Forensic Odontology and facial reconstruction**	**24**	4
4.1	Forensic Dentistry, definition and scope;- Bite marks; human dentition; different types of teeth and their functions, structure of various teeth, photography of bite marks.	4	4
4.2	Age estimation from teeth in young and adult human being; difference between temporary teeth and permanent teeth; temporary dentition, age of eruption of permanent teeth;	4	4
4.3	Dental anomalies and their significance in personal identification, Forensic significance of odontology studies- such as physical abuse, mass disasters, abuse, rape.	4	4
4.4	Introduction, types of identification- circumstantial and positive identification, types of reconstruction- two dimensional and three dimensional reconstruction, superimposition; limitations of facial reconstruction;	3	5
4.5	Facial superimposition:- Two dimensional images, three dimensional skull models from clinical imaging, craniofacial superimposition, video superimposition, imagery analysis of facial structure, technique and facial morphology, importance and accuracy of forensic facial reconstruction, assessment methods for accuracy evaluation.	5	5
4.6	Identification through Hair morphology:- Morphology of hair: cuticle, cortex, medulla. Difference between human and animal hair, identification and comparison of hair:- colour of hair, area of origin, presence of micro residual material, unusual appearance of hairs, pigments.	4	5
5	**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **C. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks

	D. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCE BOOKS

1. Forensic Anthropology: Current Methods and Practice.
2. Forensic Odontology: Principles and Practice , Editor(s); Jane A. Taylor, Jules A. Kieser.
3. The human bone manual, Tim D White, Peiter A Folkens.
4. Forensic anthropology training manual, Karen Ramey Burns.
5. Atlas of Human Anatomy by Mark Nielsen; Shawn D. Miller.
6. Anatomy at a Glance by Omar Faiz; Moffat David.
7. NB: Notes from digital epgpathshala
8. Understanding Anatomy and Physiology: a Visual, Auditory, Interactive Approach by gale Sloan Thompson.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**CORRECTIONAL ADMINISTRATION**					
Type of Course	DSE					
Course Code	**MG6DSEFSC300**					
Course Level	**300-399**					
Course Summary	The students will comprehend the function of correctional facilities in the treatment and reformation of offenders as well as the management and operation of Indian prisons					
Semester	VI	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	1 The historical development of punishments and the concepts of theories of punishments	U	5
2	Establishment, functioning and the role of correctional institutions in rehabilitation, reformation and resocialization in the Indian cjs.	U	5
3	Basic understanding of the discipline of penology, the concept of punishment and its overall significance in the field of criminology.	U	5

4	The legal and structural framework of the Indian penal system from a comparative perspective.	A	4
5	The prison management, prison administration and types of prisons in India.	E	3
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
		Introduction Punishment and Prison system	**30**	
1.	1.1	Definition, Nature, Scope, Types of Punishment, Treatment of offenders.	6	1
	1.2	Three R's –Reformation, Rehabilitation and Resocialization; Just Desserts, Corporal Punishment in Prison.	6	2
	1.3	Theories - Retributive Theory, Preventive Theory, Deterrent Theory, Reformation Theory	3	2
	1.4	Historical Development of Prison System In India, Prison Manual, Prison Act 1894, Prisoners Act 1894, 1900, 1020 & 2003,	6	1
	1.5	Riots in Prison – International Perspectives, Auburn System, Pennsylvania System.	3	1
	1.6	International instruments - Standard Minimum Rules for the Treatment of Prisoners & The Nelson Mandela Rules – Overview	6	3
2.		**Institutional Treatment**	**9**	
	2.1	Adult Institutions- Central, District and Sub Jails, ,	3	5
	2.2	Open Prisons, Juvenile Institutions, Borstal Schools, Observation Homes, Special Homes, Short Say Homes	3	5
	2.3	Women Institutions: Vigilance Home, Protective Home, Half way Home.	3	5
3		**In Community Treatment**	**9**	
	3.1	Probation: Concept and Scope, Historical development, Probation in India, International Perspective, Probation of Offenders Act 1958	3	4
	3.2	Probation Procedures, Pre-Sentence Investigation Report, Revocation of Probation –	3	4
	3.3	Re-integration into Society, Furlough, Parole- Meaning and Scope, provisions and rules	3	2

		After Care services	**12**	
4	4.1	After Care services Discharged Prisoners Aid Society	4	5
	4.2	Recidivism, Government and Non-governmental Initiatives	4	5
	4.3	Role of NGOs in Aftercare Service.	4	5
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **E. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	F. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCES

TEXT BOOK

- M. Ponnian IPS., "Criminology and Penology", III Edn. Pioneer Books, New Delhi, 1987

REFERENCE BOOKS

- Siddique, A., "Criminology, problems and perspectives", III Edn. Lucknow: Eastern Book Company, 1993. 3. Chockalingam, K.,
- "Issues in probation in India". Chennai: Madras University Publications, 1993. 4. Christopher J. Emmins.,
- "A practical approach to sentencing", London: Financial Training Publications Ltd., 1985 5. Devasia, V. D & Leelamma D.,

- “Criminology, victimology and corrections”, New Delhi: Ashish Publishing House, 1992 6. Goswami, B. K.,
- “Critical study of criminology and penology”, Allahabad: Allahabad Agency, 1980.

7. Ghosh, S.,

- “Open prisons and the inmates”, New Delhi. Mittal Publications, 1992.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**				
Course Name	**INTRODUCTION TO DIGITAL EVIDENCES**				
Type of Course	DSE				
Course Code	**MG6DSEFSC301**				
Course Level	**300-399**				
Course Summary	Digital Forensics is a science of finding evidence from digital media like a computer, mobile phone, server, or network and the process of preservation, identification, extraction and documentation of computer evidence which can be used by the court of law.				
Semester	VI	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		4			60
Pre-requisites, if any	NA				

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Become familiar with the concept of digital forensics and cyber threats	K	3
2	Understand the various digital forensic investigation methods	U	5
3	Gain basic ideas of operating system and network forensics	U	5
4	Understand the threats associated with mobile devices.	An	1

5	Acquire knowledge in emerging trends in digital Forensics	A	4
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Introduction to Digital Evidence and Digital Forensics**	**24**	
	1.1	Overview of digital evidence and its importance in investigations	4	1
	1.2	Types of digital evidence : computer, mobile devices, cloud, and social media,	4	1
	1.3	Legal and ethical considerations in collecting, analyzing, and presenting digital evidence.	4	1
	1.4	Principles of digital forensics : preservation, identification, extraction, documentation, and analysis	4	2
	1.5	Tools and techniques used in digital forensics investigations-Wireshark, EnCase, FTK, Autopsy	4	2
	1.6	Maintenance of chain of custody and its importance in digital forensics.	4	2
2		**Operating Systems and File Systems**	**12**	
	2.1	Introduction to operating systems and file systems, Types of file systems : FAT, NTFS, EXT, and HFS Network Forensics.	4	3
	2.2	Analysis of file systems : data carving, file headers, and footers.	4	3
	2.3	Introduction to network forensics and its importance, Packet analysis and its role in network forensics, Tools used in network forensics	4	3

3		**Mobile Devices and social media forensics**	**12**	
	3.1	Introduction to mobile device forensics, Types of mobile devices: smartphones, tablets, and wearable devices.	4	4
	3.2	Tools and techniques used in mobile device forensics.	4	4
	3.3	Cloud and Social Media Forensics; Introduction to cloud and social media forensics, Types of cloud and social media platforms, Tools and techniques used in cloud and social media forensics.	4	4
4		**Trends in Digital Evidence**	**12**	
	4.1	Introduction to emerging trends in digital evidence : Internet of Things.	4	5
	4.2	Artificial Intelligence, and Blockchain and its impact in digital crimes and evidences.	4	5
	4.3	The impact of emerging trends on digital forensics investigations. Future of digital evidence and digital forensics.	4	5
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **G. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	H. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCES

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"Digital Forensics: Principles and Practices" by Niranjan Reddy, K. Srinivas, and V. Kamakshi Prasad

REFERENCE BOOKS

1. Digital Forensics and Cyber Crime: Second International ICST Conference, ICDF2C 2010, Abu Dhabi, United Arab Emirates, October 4-6, 2010, Revised Selected Papers" edited by Pavel Gladyshev and Marcus K. Rogers
2. "Handbook of Digital Forensics and Investigation" edited by Eoghan Casey
3. "Cyber Crime and Digital Evidences: Indian Perspective" by S. C. Lakhotia and Abhishek Kumar
4. "Digital Evidence and Computer Crime: Forensic Science, Computers and the Internet" by Eoghan Casey

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FUNDAMENTAL CYBER FORENSICS**					
Type of Course	DSE					
Course Code	**MG6DSEFSC302**					
Course Level	**300-399**					
Course Summary	Cyber forensic Science is an advanced area in forensic science. This course is designed to introduce the concepts to any forensic student who wish to specialize in the cyber forensic field.					
Semester	VI	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Recognize terminologies related to computers and cyber security.	K	1,2
2	Have an overall view of various cybercrimes.	U	5
3	Develop a basic idea about the tools and techniques in the field of cybercrime investigation.	An	1,5
4	Legal framework in which cybercrime investigation is done.	U	5
5	Know the role and functions of various cybercrime investigation tools.	A	4

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Computer Fundamentals and Basics**	**12**	
	1.1	Introduction to Computer fundamentals and historical background, Computer Peripherals and Hardware, Computer Software	4	1
	1.2	Operating Systems: Windows, Linux and Mac	4	1
	1.3	Introduction to Networks and types of Networking	4	1
2.		**Cybercrime Introduction, Classification, Types and Techniques**	**24**	
	2.1	Introduction to Computer Crime, Characteristics of Computer Crime, ,	4	2
	2.2	Classification of computer crimes	4	2
	2.3	The Internet. Introduction to cybercrimes and their classification	4	2
	2.4	Hacking and Cyber Laundering, Spamming, Obscenity	4	3
	2.5	Pornography, Programme Manipulation, Cyber stalking and web jacking, Phishing and Spoofing	4	3
	2.6	DOS and DDOS Attacks, Intellectual Property Crimes & Computer Security	4	3
3		**Digital Evidence and Forensic Tools**	**12**	
	3.1	Imaging of Hard disk and other media, Password Cracking, E-Mail Investigation	4	4
	3.2	, Encryption and decryption methods, Restoration of Deleted File, Tools for Cyber Forensic Analysis, Digital crime scene investigation.	4	4
	3.3	Cyber Forensic Workstation, Legal Perspective of Digital Evidence	4	4

4.		**Cyber Forensic Investigation**	**12**	
	4.1	Introduction to Cyber Forensic, Malware and their types, Types of viruses and worms	4	5
	4.2	Identity Theft Frauds, Cyber Criminals & Their Targets	4	5
	4.3	Modus operandi of cyber criminals, Cardinal rules of cyber forensic.	4	5
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **I. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	J. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCES

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" Dejey, & Murugan. (2018). CYBER FORENSICS.

REFERENCE BOOKS

1. Epg pathshala notes.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FIELD VISITS**					
Type of Course	SEC					
Course Code	**MG6SECFSC300**					
Course Level	**300-399**					
Course Summary	To give hands-on practical and field exposure to Criminal Justice Institutions such as Police, Prison, judiciary, NGO's.					
Semester	VI	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
				3		90
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Aware of the different kinds of functions that are carried out in the agencies pertaining to the criminal justice system.	An	3
2	Aware of the different roles and responsibilities of the uniformed service personnel such as Police, Prison, Judiciary and NGOs	An	3
3	Apply theoretical knowledge to practical problems.	An	3
4	Make a rapport with various professionals of Criminal Justice System.	An	3
5	Evaluate the effectiveness of major social institutions.	An	3

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

COURSE CONTENT

(Visit to any 10 organisations)

Module	Units	Course description	Hrs	CO No.
1		**Practicum**	**90**	1,2,3,4,5
		1. Police Station 2. Central Jail 3. Open Air Prisons 4. Forensic Science labs 5. Finger Print Bureau 6. Crime Records Bureau 7. Magistrates Court 8. Observation / Juvenile home 9. Chemical examiner's lab 10. Police Training Academy 11. The Academy of Prisons & Correctional Administration 12. Dog squad 13. Excise department 14. Fire Station 15. Narcotic Control Bureau 16. Forensic Medicine Department 17. Cyber cell 18. Wellington Defence Training Centre, Ootty		

Teaching and Learning Approach	Field visit and report preparation.
Assessment Types	1. Attendance is mandatory for all the institutional visits. 2. Students must understand the different agencies functions and note the observations. 3. Students must submit the report of the institutions visit individually to the concerned faculty for finalizing. 4. Students must consolidate all the institution visit report and submit them as a project work at the end of the semester. 5. Oral Viva-voce will be conducted to assess the individual work and marks will be awarded

	MODE OF ASSESSMENT **A. Continuous Comprehensive Assessment (CCA)** **Practical-25 marks** Observation of practical skills/Viva/ Record
	Practical: 50 Marks Interaction (10 marks) Communication Skill (10 marks) Viva (10 marks) Field visit report (10 marks) Presentation (10 marks)

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**ANTI-MONEY LAUNDERING AND KYC**					
Type of Course	VAC					
Course Code	**MG6VACFSC300**					
Course Level	**300-399**					
Course Summary	Money laundering is one of the prominent financial crimes in modern world. This course is designed to provide an introduction to anti- money laundering and methods to investigate them.					
Semester	VI	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3				45
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the impact of money laundering.	U	5
2	Understand the legal framework in which AML is operated	U	5
3	Develop the skill read and comply various laws related to AML.	U	5
4	Get introduce to the basics of KYC	U	5
5	Access the risk involved in KYC procedure.	U	5

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

COURSE CONTENT

Content for Classroom transactions (Units)

Module	Units	Course description	Hrs	CO No.
1	1.1	**Money Laundering Methods** Money Laundering: Definition and Significance, Impact of Money Laundering on the Global Economy, Financial Terrorism, Different Methods and Techniques Used in Money Laundering	**8**	1
	1.2	**AML Legislation** Money Laundering Legislation in Different Countries International Cooperation Among Countries and International Bodies, Global Efforts and Coordination for AML and CFT Role of Financial Intelligence Units (FIUs)	**7**	2
2	2.1	**International Cooperation** Basel Committee on AML and KYC, Financial Action Task, Force (FATF) and Its Recommendations, AML Structure in India, Prevention of Money Laundering Act (PMLA) Objectives, RBI Guidelines, Key Agencies: FIU IND, ED, NIA, SFIO	**15**	3
3	3.1	**Introduction to KYC** Historical Overview of KYC and Regulatory Framework, Customer Acceptance Policy and Customer Identification Procedure, Risk Management in KYC, KYC for Different Types of Accounts and Customers.	**8**	4
	3.2	**KYC and Customer Risk Management** Monitoring Transactions and Reporting Obligations Under PML Act, Role of KYC in Fraud Control, Interconnectedness of KYC, AML, and CFT, Regulatory Coordination for AML, CFT, and KYC	**7**	5
4		**Teacher Specific Content**		

Teaching and Learning Approach	Classroom Procedure (Mode of transaction)

	Lecture Hours, Power point Presentations, Interactive sessions, SeMinors, Field visit
Assessment Types	**Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations
	End Semester Examination **Theory: 50 Marks** Short answer type questions: Answer any 10 questions out of 12 (10x2=20) Short essay type questions: answer any 5 questions out of 7 (5x4=20) Essay type questions: Answer any I question out of 2 (1x10=10)

REFERENCES

TEXT BOOKS

- Anti-money laundering and Know Your Customer by IIBF

SEMESTER-7

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FORENSIC PSYCHOLOGY**					
Type of Course	**DCC**					
Course Code	**MG7DCCFSC400**					
Course Level	**400-499**					
Course Summary	To provide a basic knowledge about the importance of psychology in forensic science.					
Semester	VII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	To know the definition, scope and importance of forensic psychology and the role of forensic psychologist.	U	1,2,3
2	To know about malingering, insanity evaluations and classification of psychiatric disorders.	U	2
3	To know individually the common psychiatric disorders such as schizophrenia, bipolar disorder, anxiety disorders, phobias, panic attacks, attention deficit hyperactivity disorder, obsessive compulsive disorder, personality disorder and sexual deviations.	U	2,3

4	To know the social learning theories, psychological factors of crime, use of media and intelligence for commission of crime, gender justice and various gender related crime.	U	1,2
5	To know about deception detection techniques, civil and criminal responsibilities, the laws related to forensic psychology, the competency to stand trial, feigned and true insanity, procedure of admission and discharge of mentally ill persons and insanity as defense.	U	2,3,8
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

FORENSIC PSYCHOLOGY

Module	Course Description	Hours	CONo.
1	**Introduction to Forensic Psychology**	**12**	
1.1	Forensic psychology- Definition, History of forensic psychology- origin and growth of forensic psychology; Role of a forensic psychologist: scope and significance of forensic psychology- evaluation of possible malingering, Mc Naughten rule.	3	1
1.2	Psychological disorders Common terms of forensic psychology: Amnesia- confabulation, dementia, delirium, fugue state, hallucinations and classification of hallucinations- visual, auditory, tactile and gustatory; Illusion, classification of illusion- optical, auditory and tactile; Neurosis, psychosis, psychopathy, stupor; Mental retardation, Dementia.	4	2
1.3	Common psychiatric disorders: Schizophrenia- signs and symptoms of schizophrenia: 1) delusions- different types of delusions- delusion of persecution, delusion of reference, delusion of grandeur, delusion of control. 2) hallucinations, 3) disorganized speech and 4) disorganized behavior, 5) Negative symptoms- lack of emotional expression, lack of interest or enthusiasm, seeming lack of interest in the world, speech difficulties and abnormalities. Diagnosis of schizophrenia- psychiatric evaluation, medical history and examination, laboratory tests.	5	2
2	**Common psychiatric disorders continued…**	**12**	
2.1	Bipolar disorder signs and symptoms of bipolar disorder, manic episodes, hypomanic episodes, depressive episodes, mixed state episodes.	4	3
2.2	Common psychiatric disorders: Panic disorder- definition of panic disorder, signs and symptoms of panic disorder-	4	2

	anticipatory anxiety, phobic avoidance. Types of panic disorder.		
2.3	Anxiety disorder: Definition, symptoms of anxiety: somatic, emotional, cognitive and behavioral symptoms; Panic disorder. Phobias: Types of phobias- Agarophobia, specific phobias, social phobia. Generalized anxiety disorder: symptoms, theories, treatment. Obcessive compulsive disorder(OCD)- definition, symptoms, theories, treatment for OCD	4	2
	Common psychiatric disorder continued - Phobia	**12**	
2.4	Common childhood psychiatric disorder: Attention deficit hyperactivity disorder(ADHD)- Autism, conduct disorder	6	
2.5	Common psychiatric disorder: Personality disorder- Definition of personality and personality disorder, Different types of personality disorder: Cluster A (Odd disorders), Cluster B (Emotional , dramatic or erratic disorders), Cluster C(Anxious or fearful disorders)	6	3
3	**Social Learning Theories**	**12**	
3.1	Psychotherapy Psychological factors of crime: Crime and criminal behavior, psychological theories for criminal behavior, Psychological factors affecting criminal behavior: parental relations, heredity and brain activity, hormones, education, peer influence and drugs and alcohol.	4	4
3.2	Use of Media and intelligence for commission of crime: Usage of technology for commission of crime; Attitude towards technology in young adults, television exposure and brain volumes. Internet use among adolescents.	4	4
3.3	Gender justice and crime: significance of gender Sense and importance of gender equality and justice, gender related crimes: gender specific Crimes under the Indian Penal Code-1 Rape (sec 376 IPC), 2 Kidnapping.	4	4
4	**Criminal Psychology**	**12**	
4.1	Criminal Psychology: Different roles of criminal psychologists, Offender profiling: Geographical profiling, Profiling personal characteristics	6	5
4.2	Forensic and Legal aspects of Insanity: The Mental Health Act of 1987, mental health care act 2012 difference between True Insanity and Feigned Insanity Medicolegal aspects of polygraph, Narcoanalysis and Brain Fingerprinting.	6	5
5	**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **K. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	L. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

Reference Books:

1. The handbook of Forensic Psychology , Irving B. Weiner, Randy K. Otto 4th edition
2. Ethical Practice in Forensic Psychology,- A systematic model for decision making , Shane S, Bush, Mary A. Connell and Robert L. Denney
3. Alloy, L.B., Riskind,J.H., Manos,M.J.- Abnormal Psychology- Current Perspectives, 9th Edition(2005), Tata Mcgraw- Hill.
4. Durand, V.M., Barlow, D.H., Essentials of Abnormal Psychology, 4th Edition(2006), Thomson Wadsworth.
5. Huss, M.T. (2008). Forensic Psychology: research, clinical practice and applications. 2nd ed. USA: John Wiley & Sons.
6. Nagle, Y.K.Srivastava, K & Gupta. (2014). A Handbook of Forensic Psychology. India: Author House.

NB: Notes from digital epgpathshala

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**NETWORK FORENSICS**					
Type of Course	DCC					
Course Code	**MG7DCCFSC401**					
Course Level	**400-499**					
Course Summary	This course introduces the learner to the fundamentals of network security					
Semester	VII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	To have an overview about networks.	U	1,2
2	Manage the threats associated with a computer network.	E	1,2
3	To introduce the various network security protocols.	A	6
4	Learn the specific methods of forensic investigation of network crimes.	A	1,2
5	Understand the fundamentals of authentication mechanisms.	U	1,2

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Overview of Networking**	**12**	
	1.1	Introduction to Network and Communication technologies – Overview of OSI Model and TCP/IP Protocol.	4	1
	1.2	IP Addressing and NAT. Types of IP addresses. IP Addressing Classes, Subnet Masks, Subnetting and Super netting.	4	1
	1.3	Network Topologies. Network Devices – hubs, switches, bridges, repeaters, routers etc. Types of Networks – LAN, MAN and WAN. Routers and Routing Protocols.	4	1
2.		**Threats, Vulnerabilities, Attacks and Network Security**	**24**	
	2.1	Network threats and vulnerabilities, Types of network attacks- eavesdropping, spoofing, modification, Cross-site scripting, DNS Spoofing	4	2
	2.2	Routing Table Poisoning, ARP Poisoning, Web Jacking. Phases of Hacking and Detection – Reconnaissance Phase, Passive Attacks, Active Attacks, Detection Avoidance Phase,	4	2
	2.3	Evading anti viruses and firewalls, Tools used; Attacks on Wireless Networks. Social Engineering Attacks and its types.	4	2
	2.4	IP security architecture, Security protocols, IPSec, Web Security – Firewalls, IDS, IDPS – Types and Technologies.	6	3
	2.5	Trusted systems – Electronic payment protocols. Network Security Applications	6	3
3		**Digital Evidence and Forensic Tools**	**12**	
	3.1	**Network Forensics**	4	4

		Monitoring of computer network and activities, Live Packet Capturing and Analysis. Searching and collection of evidences from the network.		
	3.2	Network Intrusion Detection and Analysis. SQL Injection, Event Log Aggregation – role of logs in forensic analysis,	4	4
	3.3	Tools and techniques. Investigating network attacks. Evidence collection from Routers & CCTV DVRs.	4	4
4		**Authentication Mechanisms**	12	
	4.1	Passwords, Cryptographic authentication protocol, Kerberos, X.509 LDAP Directory Intrusion detection.	4	5
	4.2	Digital Signatures. Web Security: SSL Encryption, TLS, SET.	4	5
	4.3	Securing online payments (OTP). Virtual private networks.	4	5
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **M. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	N. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

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1. William Stallings; "Network Security Essentials", 3rd Edition, Pearson Education, 2006.

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- Atul Kahate; “Cryptography and Network Security” McGraw Hill Education (India), 2008 3. Beherouz. A Forouzan; “Data Communication and Networking”, 4th Edition, TMH, 2000.
- John R. Vacca; “Network and Systems Security”, Syngress Publications.
- Kevin Mandia, Chris Prosise and Matt Pepe; “Incident Response and Computer Forensics”, McGraw Hill Publications.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**MOBILE FORENSICS**					
Type of Course	DCC					
Course Code	**MG7DCCFSC402**					
Course Level	**400-499**					
Course Summary	To learn systematic procedure of handling mobile devices.					
Semester	VII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	To know the basics of mobile communication technology.	U	1
2	Manage the security in mobile communications.	A	4
3	To introduce the concept of mobile forensics.	U	1,2
4	Learn the specific methods of handling android and ios devices.	S	2,6
5	Understand the fundamentals of internet protocols and attacks	A	8,10

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Wireless Technologies**	**15**	
	1.1	Introduction to Mobile and Wireless Technologies Wireless Application Protocol (WAP).	5	1
	1.2	Cellular technologies including Advanced Mobile Phone System (AMPS), Imode, Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA) and Global System for Mobile Communications (GSM) including features and relative strengths.	5	1
	1.3	Functions of Subscriber Identity Module (SIM), International Mobile Equipment Identity (IMEI), Bluetooth and Mobile Payment Gateways. Understanding of the mobile phone operating systems – Android, iOS, Windows.	5	1
2		**Overview of Mobile Forensics**	**15**	
	2.1	Mobile Forensic, Types of Evidence present in mobile phones - Files present in SIM card, external memory dump, and evidences in memory card.	5	3
	2.2	Seizure and Preservation of mobile phones and PDA. Mobile phone evidence extraction process, Data Acquisition Methods – Physical, File System, Logical and Manual Acquisition. forensics.	5	3
	2.3	Good Forensic Practices, Mobile Forensic Investigation Toolkit. Tracking of mobile phone location. Challenges to Mobile	5	3
3		**Android and iOS Device Forensics**	**15**	
	3.1	Android Forensics – Procedures for handling android device, imaging android USB mass storage devices, Logical and physical data extraction techniques.	5	4
	3.2	Data recovery techniques. Forensic tools used. CDR and IPDR analysis. iOS Forensics – File Systems,	5	4

		iOS architecture, Data stored in iPhones, Cross contamination and Syncing,		
	3.3	Data extraction - Extracting Image Geo-Tags, Data Analysis and Recovery - SQLite databases, Forensic Tools used..	5	4
4		**Mobile and Wireless Devices Security (practicum)**	**30**	
	4.1	Security issues in Bluetooth, Mobile phones including SIM cloning and other Toll frauds		
	4.2	Bluetooth vulnerabilities. Attacks - Denial of Service (DOS), Packet Spoofing & Masquerading, Eavesdropping, VOIP Spam and Vishing (VOIP Phishing)		
	4.3	Phone Phreaking, Call tampering, Wireless Hack Walkthrough and Manin-the-Middle-attacks.		
		Overview of WEP attack		
	4.4	Attacks on WEP, WPA and WPA-2 Encryption, fake hotspots. Wireless Public Key Infrastructure.		
	4.5	Securing WLAN, WEP Decryption script, Understanding of SQLite Databases. Voice, SMS and Identification Data Interception in GSM.		
	4.6	SMS security issues – Availability, Confidentiality and Integrity issues.		
5		**Teacher Specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	B. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30

	marks Essay (15 marks) :1 out of 2 1x15= 15 marks

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TEXT BOOK

Andrew Hoog; "Android Forensics Investigation, Analysis and Mobile Security for Google Android", Syngress, USA, 2011.

REFERENCE BOOKS

1. George Mohey, Alison Anderson, Byron Collie, Olivier De Del, Rod McKemmish; "Computer and Intrusion Forensics", Artech House, London, 2003.
2. Jonathan Zdziarski, "iOS Forensic Investigative Methods", 2012.
3. Iosif I. Androulidakis, "Mobile Phone Security and Forensics – A Practical Approach", Springer New York Heidelberg, 2012.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FORENSIC FINANCE**					
Type of Course	DCE					
Course Code	**MG7DCEFSC400**					
Course Level	**400-499**					
Course Summary	Financial forensics is a field that combines criminal investigation skills with financial auditing skills to identify criminal financial activity coming from within or outside of an organization.					
Semester	VII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Acquire knowledge about the concept of Forensic Finance	U	5
2	To learn various Financial Analysis Techniques	U	5
3	Acquire skills to detect and prevent Fraud	S	2
4	Know about various investigative techniques and tools	U	5
5	Learn the Professional Conduct and legal framework	An	1,5

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Introduction and operation analysis**	**12**	
	1.1	Definition of Forensic Finance, History and Evolution of Forensic Finance, Role of Forensic Finance in Investigations and Litigation	4	1
	1.2	Business Model and Strategy, Industry and Market Analysis, Customer Base and Revenue Streams	4	1
	1.3	Operations and Supply Chain, Human Resources and Management	4	1
2.		**Financial Analysis Techniques**	**12**	
	2.1	Financial Statement Analysis, Ratio Analysis, Cash Flow Analysis	6	2
	2.2	Projections and Forecasts, Valuation Methods, key performance indicators	6	2
		Fraud Detection and Prevention	**12**	
	2.3	Types of Financial Fraud, Red Flags and Warning Signs,	6	3
	2.4	Fraud Detection Techniques, Fraud Prevention Strategies	6	3
3		**Investigative Techniques and Tools**	**12**	
	3.1	Interviewing Techniques, Document Analysis,	6	4
	3..2	Digital Forensics Data Mining and Analysis, Case Management Software	6	4
4		**Professional Conduct and legal framework**	**12**	
	4.1	Code of Conduct and Professional Standards, Confidentiality and Data Protection, Conflict of Interest and Independence,	4	5
	4.2	Communication and Transparency. Laws and Regulations Governing Financial Crimes in India	4	5
	4.3	Investigation and Litigation Process in India, Expert Witness Testimony and Reports in India	4	5
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.

Assessment Types	**MODE OF ASSESSMENT** **C. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	D. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**FORENSIC STATISTICS**					
Type of Course	DCE					
Course Code	**MG7DCEFSC401**					
Course Level	**400-499**					
Course Summary	This course explores foundational probability concepts, statistical techniques, and their application in forensic science.					
Semester	VII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Foundational Understanding of Probability Concepts	U	1,2
2	Application of Probability in Forensic Contexts	A	2
3	Distribution Models and Statistical Techniques in Forensic Analysis	E	1,2
4	Likelihood Ratio and Transfer Probabilities	E	1,2
5	Advanced Concepts in Forensic Probability and Evidence Evaluation	S	1,2

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Uncertainty in forensic science**	**12**	
	1.1	Probability: Introduction, standard for uncertainty, events, subjective probability, dependent events	6	1
	1.2	law of total probabilities, updating of probabilities.	6	1
2.		**Variations**	**12**	
	2.1	Populations, samples and estimates, counts-binomial distribution, multinominal distribution	6	2
	2.2	hypergeometric distribution, poison distribution, beta binomial distribution.	6	2
3.		**Transfer and Evaluation of evidences**	**24**	
	3.1	Likelihood ratio: Probability of guilt, justification, combination of evidences, correspondence probabilities	6	3
	3.2	Direction of transfer-from criminal to scene and from scene to criminal. Transfer probabilities, presence of non-matching evidences.	6	3
	3.3	Bayes' theorem and examples. Value of evidence	4	4
	3.4	Errors in interpretation-fallacy of transposed conditional, source probability error	4	4
	3.5	false positive fallacy, empirical errors in interpretation	4	4
4		**Value of evidence**	**12**	
	4.1	Evaluation of forensic evidence, summary of competing propositions, qualitative scale for value of evidences	12	5
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **E. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA :30 marks
	F. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.

Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCES

TEXT BOOK

Lucy, D. (2005). Introduction to statistics for forensic scientists. *John Wiley & Sons.*

	Mahatma Gandhi University **Kottayam**
Programme	**BSc (Hons) FORENSIC SCIENCE**
Course Name	**FUNDAMENTALS OF DUE DILIGENCE**
Type of Course	**DCE**
Course Code	**MG7DCEFSC402**
Course Level	**400-499**
Course Summary	Due diligence is next level forensic science in which the course has an objective of training forensic scientists in preventing potential crimes.

Semester	VII	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Examine the concept of legal due diligence.	U	1,3
2	Understand the concepts of Financial Due Diligence.	U	2,3
3	Gain knowledge about operational due diligence.	U	3,5
4	Understand ESG Analysis and Risk Assessment.	U	3,6,7
5	Acquire a basic idea about Due Diligence Process and Best Practices.	U	6,7,8

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Legal Due Diligence and Financial Due Diligence**	**20**	
	1.1	Definition and importance of Due Diligence, Types of Due Diligence.	4	1
	1.2	Corporate Structure and Governance, Compliance with Laws and Regulations	3	1
	1.3	Contracts and Agreements, Intellectual Property, Litigation and Dispute.	3	1
	1.4	Financial Statements Analysis, Cash Flow Analysis,	5	2
	1.5	Projections and Forecasts, Valuation Methods, Key Performance Indicators.	5	2
2		**Operational Due Diligence**	**15**	
	2.1	Business Model and Strategy, Industry and Market Analysis, Customer Base and Revenue Streams.	8	3
	2.2	Operations and Supply Chain, Human Resources and Management.	7	3
3		**ESG Analysis**	**10**	
	3.1	Risk Assessment Environmental Impact Assessment, Social and Community Impact Assessment, Governance and Ethics Assessment,	5	4
	3..2	Due Diligence Report Structure and Content, Risk Assessment and Mitigation Strategies, Due Diligence Checklist and Templates.	5	4
4		**Due Diligence Process and Best Practices**	**15**	
	4.1	Due Diligence Process Steps, Team Structure and Roles, Due Diligence Best Practices	8	5
	4.2	Lessons Learned, Case Studies and Examples.	7	5
5		**Teacher specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.

Assessment Types	**MODE OF ASSESSMENT** **G. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	H. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCES

TEXT BOOK

Due Diligence: An M&A Value Creation Approach by William J. Gole and Paul J. Hilger

REFERENCE BOOKS

- The Art of Due Diligence by Barbara L. Koenig
- Due Diligence Handbook: Corporate Governance, Risk Management and Business Planning by Leo F. Dalton

SEMESTER-8

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Forensic Science**					
Course Name	**ADVANCED FORENSIC CHEMISTRY**					
Type of Course	DCC					
Course Code	**MG8DCCFSC400**					
Course Level	**400-499**					
Course Summary	This course deals with chemical analysis of various forensic evidences. The course gives awareness of various crime scene exhibits, collection methods, analyzing methods including chemical and instrumental techniques.					
Semester	VIII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand identification of various crime scene exhibits by adopting the methods of chemical separation techniques and analytical procedures.	U, An	1,2
2	Understand the chemistry of fire, investigate arson cases, collect and analyse fire evidence	U,An	1,2
3	Acquire skills identify explosives, analyse post-blast residues using chemical techniques	A, An, S	1,2,6

4	Gain practical knowledge of analysis of some forensic exhibits and case studies related to fire, arson and explosives	An, E, S	1,2,6
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1		**Introduction to Forensic Chemistry (Advanced)**	**15**	
	1.1	**Scope of analytical chemistry in Forensic chemical analysis** Sample preparation in organic and inorganic analytical chemistry. PreliMinory and Confirmatory Tests **Chemical separation Techniques**: Solvent extraction (Liquid-liquid extraction), Solid phase extraction, Solid phase microextraction (SPME).	02	01
	1.2	**Industrial Products**: Physical and chemical examination of adulterated and non-adulterated oils and fats, Analysis of chemical fertilizers, consumer items such as Cement, gold, silver, tobacco, tea, sugar, salts, insecticides, chemical and instrumental for the verification of purity, adulterants. **Trace evidences of**: paint, soil, industrial dust, oil, dyes. Analysis and forensic importance, Thin layer chromatography test for identification of insecticide Detect moisture and volatile substances and Specific gravity of oil	07	01
	1.3	**Liquors (Alcoholic beverages):** Definition, classification of liquors based on origin (Indian Made Foreign Liquors, Country Made Liquors and Illicit Liquors), Fermented and Distilled methods (Pot Still and Continuous Still), Characteristics of Beer, wines and Whisky, toddy Congeners in alcoholic beverages, Laws and penalties as per Excise/ Act. Forensic analysis of distilled and fermented liquors including illicit liquors. Fujiwara test for detection of chloral hydrate in toddy, Chromotropic acid test for detection of methanol in alcoholic samples	06	01
2		**Fire and Arson**	**15**	

	2.1	**Fire** Combustion reaction, Fire Triangle, Fire Tetrahedron; Backdraft, Thermo-chemistry of Fire, Heat Capacity and Phase changes, Accelerants & types of accelerants, Combustible and Flammable liquids, Flash point, Fire point, Ignition point, Auto Ignition point, vapour density, vapour pressure, Fire extinguisher. Searching the fire scene. Collection and preservation of arson evidence, Investigation of arson cases, functions of a fire investigator, collection preservation and packing of fire evidences-Lab analysis of the evidence, instrumental techniques	06	02
	2.2	**Arson**: Legal Definition, Arson motives, Degrees of Arson, Forensic and legal Concepts, determining origin and cause; Fire patterns, Collection/Preservation of Arson Evidences, Flashover, Backdraught, Live or dead at time of arson; Documenting the fire or crime scene	04	02
	2.3	**Scheme of analysis**: Analysis of fire debris. Analysis of ignitable liquid residue. Post-flashover burning. Scientific investigation and evaluation of clue materials. Information from smoke staining, Extraction of samples from debris (Direct and solvent extraction methods, Head Space method, SPME, Distillation), Clean-up (Filtration & Acid stripping), Analysis (GC, GC-MS, FTIR etc.) Interpretation of GC-MS spectra.	05	02
3	**Explosives and Explosion**		**15**	
	3.1	**Definition and Chemistry of Explosives** Definition as per Indian Explosive Acts. History of Explosives, Chemistry of explosives, Deflagration and Detonation phenomenon, Characteristics of high and low explosives, Dust explosion, Gas/vapour explosion, BLEVE, Effect of blast wave on structures & human and Pyrotechnics. **Bomb Scene**: Specific approach to scene of explosion, Reconstruction of sequence of events, Evaluation and assessment of scene of explosion **Analysis of Explosive**: Scope & significance of explosive analysis in forensic science, Pre-blast and Post blast residue collection, collection, preservation and forwarding of exhibits, Do's and Don'ts. Systematic examination of explosives and explosion residues in the laboratory using chemical and instrumental techniques and interpretation of results. **Bomb scene management**. Searching the scene of explosion. Mechanism of explosion. Post blast residue collection and analysis.	12	03

		Blast injuries. Detection of hidden explosives		
	3.2	**Improvised Explosive Device**: Definition of IED, Components of IED, Explosives Initiation (Explosive Trains); Types (Molotov cocktail, Letter bomb, Pipe bomb, VBIED and CBRN), Detection of Hidden Explosives.	03	03
4	**Laboratory Experiments**		**30**	
	4.1	Preparation of standard solution of different compounds in ppm and ppb levels	04	04
	4.2	Detection of coal tar oil soluble colours in edible oil.	04	04
	4.3	Estimate quantity of ethyl alcohol in the given alcoholic sample	04	04
	4.4	Microscopic Examination of paint	04	04
	4.5	Collection, preservation, packaging of evidence in fire and arson cases	06	04
	4.6	Case studies related to explosives. Synthesis and actions of explosives (TNT, PETN and RDX, IED).	08	04

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture Hours, Power point Presentations, Interactive sessions, Seminar, Field visit
Assessment Types	**MODE OF ASSESSMENT** **B. Continuous Comprehensive Assessment (CCA)** **Theory-25 marks** Test Paper MCQ/ Quiz Assignments Seminar Presentations **Practical-15 marks** Observation of practical skills/Viva/ Record
	End Semester Examination **Theory: 50 Marks** xiii) Short answer type questions: Answer any 10 questions out of 12 (10x2=20)

	xiv) Short essay type questions: answer any 5 questions out of 7 (5x4=20) xv) Essay type questions: Answer any 1 question out of 2 (1x10=10) **Practical: 35 Marks** i) Laboratory Evaluation (20 marks) ii) Record (5 marks) iii) Viva (10 marks)

References

1. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, The Foundation Press, Inc., New York (1995).
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4. Mathew E. Johll (2009) Investigating Chemistry: A Forensic Science Perspective
5. DFS Manuals of Forensic Chemistry and Narcotics.
6. A Naquest (1984) legal chemistry. a guide to the detection of poisons, examination of tea, stains, etc.
7. DFS -Working Procedure Manual- Chemistry, Explosives
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11. Yinon Jitrin (1993)Modern Methods & Application in Analysis of Explosives, John Wiley & Sons ,England
12. Arthur I. Vogel, A Text Book of Macro and semi micro Qualitative Inorganic
13. Analysis, 4 th edition
14. Almirall J R & Furton K G; CRC Press (2004), Fire scene evidence
15. Redsickerr D R & Cannor J J. Practical: Fire and arson investigation;
16. Houck M M; Mute witness: trace evidence analysis; Academic Press (2001)
17. Petroleum Laws and Essential Commodities Act (E.C. Act) 1955
18. The ISI Specification for Kerosene (IS: 1459/1974)
19. The ISI Specification for Diesel (IS: 1460/2000)

	Mahatma Gandhi University **Kottayam**

Programme	**B.Sc. FORENSIC SCIENCE**					
Course Name	**ADVANCED FORENSIC PSYCHOLOGY**					
Type of Course	DCC					
Course Code	**MG8DCCFSC401**					
Course Level	**400-499**					
Course Summary	To provide a basic knowledge about the importance of body fluids in crime investigations					
Semester	VIII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	The students should be able: To know the historical perspectives of forensic psychology, definition, scope and importance of forensic psychology, services provided by forensic psychologists, different psychological disorders and forensic psychology in India.	U	
2	To know the theories of crime, causes underlying criminal behavior, criminal justice system, human rights system, Indian police system, criminal responsibility and doctrine of diminished responsibility.	U	
3	To know about different types of psychological tests and difference between forensic evaluation and clinical psychological assessment.	U	

4	To know about theories of crime, behavioral and social learning theories, alcohol and substance abuse, the central participation in the trial- effects of attorney, judges, defenders etc, models of rehabilitation, rehabilitation of prisoners and victims of crime and Counseling.	U	
5	To have an understanding of the different aspects of biostatistics in detail, application of biostatistics in forensic science and in forensic psychology, limitations of biostatistics, the fundamentals of statistics and its expressions and the different measures of biostatistics.	U	
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

ADVANCED FORENSIC PSYCHOLOGY

Module	Course description	Hours	CO No
1	**Introduction to Forensic Psychology and Criminal behavior**	**10**	**1**
1.1	History of Forensic Psychology(historical perspectives) Definition, scope and importance of forensic psychology. Description and concept of criminal psychology and forensic psychology.	5	
1.2	Services provided by forensic psychologists Understanding the various psychological disorders, cause, signs, symptoms and effects of the disorders. Forensic psychology and related fields	5	
2	**Approaches to understanding Criminal Behavior**	**11**	**2**
2.1	Crime introduction- Theories of Crime Young and adult offenders, Causes underlying criminal behavior Nature, causes and consequences of crime	4	
2.2	Broad concepts of criminal justice system Indian Police System, The police Act, Human rights system, Set up of INTERPOL	4	
2.3	Criminal responsibility, Doctrine of diminished responsibility Role as witness, evidence, Competency to stand trial. Insanity as defense	3	
3	**Assessment and Evaluation in Forensic Psychology**	**12**	**3**
3.1	Mental disability, Malingering, Substance abuse evaluation What is psychological test? Types of tests, Characteristics of good tests. Forensic psychological evaluation	4	

3.2	Tests which are used in Forensic psychological Assessment, Intelligence tests, Aptitude and Achievement tests, Personality tests (objective and projective)	4	
3.3	Neuropsychological tests, Difference between Forensic evaluation and Clinical Psychological Assessment. Civil proceedings and commitment.	4	
	Theories of Criminal Behavior and Application of Social Psychology in the Interpersonal aspects of legal system	**12**	**4**
3.4	Crime: Nature, Extent and Types (violent and sexual) Theories of Crime: Genetic factors, Psychoanalytical theory, behavioral and social learning theory	4	
3.5	Alcohol and Substance abuse Eyewitness testing: problems and solutions Effect of Police procedure and media coverage. The central participation in the trial: Effect of Attorney, Judges, Jurors and Defenders. Police psychology	4	
3.6	Rehabilitation: Models of rehabilitation, Cognitive rehabilitation and Social rehabilitation. Rehabilitation of prisoners, Rehabilitation of victims of crime. Counseling- Nature and Goals of Counseling; Levels of counseling techniques, counseling process, Characteristics of counselor. Type of counseling: Crisis, Prevention skill to counsel criminal	4	
4	**Biostatistics (Practicum)**	**30**	**5**
4.1	Introduction to biostatistics, Stages of statistical investigation Formulating and testing hypothesis, Prediction Application of statistics in Forensic Science, Application of Statistics in Psychology	10	
4.2	Limitation of Biostatistics- Does not deal with individual measurements, deals only with quantitative characteristics, Results are true only on an average, Only one of the methods of studying a problem, can be misused. Fundamentals of Statistics: Descriptive vs Inferential Statistics- Anova, T-test, Chi-square, F test Data, numerical data, Discrete numerical data, Continuous variable, Discrete variables, Categorical variables: ordinal variable, nominal variable	10	
4.3	Variance Measures of Shape: Symmetric distribution, Skewness, kurtosis	10	

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **I. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	J. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

Reference Books

1. Alloy, L. B., Rishkind, J. H., Manos, M.J.- Abnormal Psychology- Current Perspectives, 9th Edition(2005), Tata Mcgraw- Hill.
2. Bartol, C.R & Bartol, A.M. (2008).Introduction to Forensic Psychology: Research and Application. USA: SAGE publications.
3. Durand, V.M.,Barlow, D.H.,Essentials of Abnormal Psychology, 4th Edition(2006), Thomson Wadsworth.
4. Kendall, P.C.- Childhood Disorders, Illustrated Edition (2000), Psychology Press.
5. Nagle, Y.K. Srivastava, K& Gupta. (2014). A Handbook of Forensic Psychology. India : Author House.
6. Veeraraghavan.(2009). Handbook of forensic psychology. Amity University.
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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**AUDIO VIDEO AND SPEAKER IDENTIFICATION**					
Type of Course	DCE					
Course Code	**MG8DCEFSC400**					
Course Level	**400-499**					
Course Summary	Audio-Video forensics involves the scientific interpretation of audio & video recordings which are obtained from a civil investigation or criminal legal proceedings. speaker dentification usually consists of the both aural and spectrographic analysis of voice and identifying a person solely by their speech.					
Semester	VIII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Extract an audio or video clip from the source.	A, S	1,2,6
2	Enhance the audio and video signals for examination	An, S	1,2,3,6
3	Check the authenticity of an audio or video file	An, S	1,2,3,6
4	Identification of the voice (speaker).	A, An, S	1,2,3,6,8
5	Have a strong foundation on visual examination of audio spectra.	U, A, An, S	1,2,3,6,8

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

COURSE CONTENT
Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Basic Circuits**	**12**	
	1.1	Basic Electric Circuits - LR, CR, LCR circuits, Conventional Filters and Digital Filters (high pass filters, low pass filters	4	
	1.2	Noise Characteristics : Properties of Noise, Acoustic Characteristics of Environments-Diffraction, Reverberation and Diffusion.	4	
	1.3	Recording Formats - Analog and Digital, Audio and Video file formats. Linear and Non –linear Editing.	4	
2.		**Introduction to video technology**	**10**	
	2.1	Concept of Video film production - Introduction to video technology component of Digital Image Processing.	3	
	2.2	Concept of Digital Water Marking. Visual examination technique on video frame image	3	
	2.3	Facial Image Recognition from video frame image.	4	
		Forensic audio and video analysis	**11**	
	2.4	Introduction to Forensic Audio & Video Analysis: A basic understanding of forensic audio and video technology - Audio and Video Evidence handling procedures. -	4	
	2.5	Authentication of recorded audio and video. Scientific methodology of forensic audio-video analysis. Recovery of digital audio-video / Deleted Video & Audio Files recovery	4	
	2.6	Exporting evidence as video or still image files- Software used for audio and video analysis. Admissibility of audio and video evidence in court.	3	

3		**Basics of speaker identification**	**12**	
	3.1	Introduction: Forensic Speaker Identification, Forensic Phonetics-Forensic challenges in Voice recognition. Forensic Phonetic Parameters : Acoustic vs. Auditory Parameters, Linguistic vs. Non-Linguistic Parameters.	4	
	3.2	Forensic Significance : Linguistic Analysis-Requirements on forensic-phonetic parameters. The human vocal tract and the production and description of speech parameters : Vocal tract structures. Forensic Significance – Vocal cord activity, Nasals and Nasalization.	4	
	3.3	Phonetic Aspects of Speech : Articulators – Active/Passive, Phonemes –Segmental and Supra segmental, Prosodic features- Stress, Intonation, Duration, Syllables, Nasalization, Accent features.	4	
4		**Forensic speaker identification (Practicum)**	**30**	
	4.1	Characterizing Forensic Speaker Identification: Speaker Recognition – Speaker Identification and Verification, Forensic Significance. Automatic Approach: Gaussian Mixture Models, Long Term Averaging, Vector Quantization, Hidden Markov Models, Neural Networks.	10	
	4.2	Components of Speaker Recognition. Approaches to Speaker Recognition System of Auditory Analysis, Spectrographic approach or Voice Print Identification.	10	
	4.3	Expressing Results in Forensic Speaker Recognition– Likelihood Ratio, Objective/Subjective Methods. Concept of Test and Error in Speaker Identification. Admissibility of Voice evidence in Court.	10	

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **K. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	L. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.

Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCE BOOKS

1. Philip Rose; Forensic Speaker Identification, Taylor and Francis, Forensic Science Series, London (2002)
2. Bengold & Nelson Moryson; Speech and Audio signal processing, John Wiley & Sons, USA (1999)
3. Oscar Tosi; Voice Identification-Theory of Legal Applications, University Park Press, Baltimore (1979)

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) FORENSIC SCIENCE**					
Course Name	**INTERROGATION TECHNIQUES**					
Type of Course	DCE					
Course Code	**MG8DCEFSC401**					
Course Level	**400-499**					
Course Summary	Learn the skills and strategies for conducting effective and ethical interrogations. This course covers communication, rapport-building, and legal aspects, benefiting law enforcement and security professionals.					
Semester	VIII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the Psychophysiological Basis of the Forensic Assessment	U, A	1,2
2	Gain an insight into the preparation for the Interview/Interrogation	U, A	1,2
3	Learn the methods of advanced Interrogation Techniques	A, An	1,2
4	Know question formulation and Cognitive Interviewing	U, A, An	1,2,3
5	Acquire knowledge on Specialized Interrogation Scenarios	U, A, S	1,2,6

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

COURSE CONTENT
Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1.		**Basic Psychology of Interrogation**	**15**	
	1.1	Psychophysiological Basis of the Forensic Assessment Introduction to Psychophysiology in Interrogation	5	
	1.2	Understanding the Physiology of Stress Responses Polygraph Examination and its Application in Interrogations	5	
	1.3	Ethical Considerations in Psychophysiological Interrogations	5	
2.		**Interview**	**15**	
	2.1	Preparation for the Interview/Interrogation The Importance of PreInterview Preparation Developing an Interview	7	
	2.2	Strategy Gathering Background Information and Intelligence Legal and Ethical Considerations in PreInterview Preparation	8	
3.		**Modern Techniques**	**15**	
	3.1	Morgan Interview Theme Technique (MITT) Forensic Statement Analysis Projective Analysis of Unwitting Verbal Cues	7	
	3.2	Traditional Scoring of the Forensic Assessment Interview (FAINT) The Validation of the Forensic Assessment Interview (FAINT)	8	
4.		**Question Formulation and Cognitive Interviewing (Practicum)**	**15**	
	4.1	Question Formulation: Irrelevant, Relevant, and Comparison Questions Cognitive Interviewing Techniques	7	
	4.2	Enhancing Memory Recall in Witnesses and Suspects Ethical Considerations in Questioning and Cognitive Interviewing	8	
		Specialized Interrogation Scenarios (Practicum)	**15**	

	4.3	Interviewing Witnesses and Victims Hypnosis in Interrogation Preemployment Interviewing Passenger Screening with Verbal and Nonverbal Cues	8	
	4.4	The Integrated Interrogation Technique Understanding Aggressive Behavior and Dealing with Angry People.	7	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **M. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	N. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

REFERENCE BOOKS

1. Inbau, F. E., Reid, J. E., Buckley, J. P., & Jayne, B. C. (2013). Essentials of the Reid Technique: Criminal Interrogation and Confessions. Jones & Bartlett Learning.
2. Inbau, F. E., Reid, J. E., Buckley, J. P., & Jayne, B. C. (2011). Criminal Interrogation and Confessions. Jones & Bartlett Learning.
3. Rabon, D., & Rabon, R. (2013). Interviewing and Interrogation: The Discovery of Truth. CRC Press.
4. Bull, R., Bilby, C., & Cooke, C. (2009). The Investigator's Guide to Behavioral Profiling. Springer.
5. Zulawski, D. E., & Wicklander, D. E. (2002). Practical Aspects of Interview and Interrogation. CRC Press.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Forensic Science**					
Course Name	**ADVANCED DOCUMENT EXAMINATION**					
Type of Course	DCE					
Course Code	**MG8DCEFSC402**					
Course Level	**400**					
Course Summary	After the course the students will know the importance of examining questioned documents in crime cases He will be familiarised with the tools required for examination of questioned documents, handwriting in samples etc.					
Semester	VIII	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		1		75
Pre-requisites, if any	NA					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the complexities in handwriting examination	U, A, E	1,2
2	Describe the variations in handwriting in forensic evidence	E, S	1,2
3	Explain the use of e-documents and digital signature analysis in forensic evidence.	A, An	1,2,6
4	Apply the methods for Comparison of paper and ink	A, S	1,2
5	Understand the characteristics of handwriting.	U, An, E, S	1,2,6

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

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	**1**	**Introduction complexities of handwriting**	**15**	
	1.1	Handwriting: The Purposes and complexities in Examination: Comparison of Handwriting, Consideration of Similarities, The Possibility of Chance Match, The Possibility of Simulation, Subjectivity, Identification, Qualified Conclusions, Limited Populations,	7	1
	1.2	Consideration of Differences, Consistent Differences, Other Reasons for Differences, Similarities with Differences, Disguise, Simulation, Identification of the Writer of Simulations, Inconclusive Examinations, Complexities of Handwriting Comparisons, Inconsistent Known Writings, Multiple Suspects, Reproduced Writing, Unfamiliar Scripts, Statements, Expressing Conclusions, Qualified Conclusions, Scales of Conclusions, Clarity of Expression, Quality Assurance, Variety of Forms in Handwriting	8	5
2	**2**	**Handwriting:**	**15**	
	2.1	Accidental Variation of Handwriting, Writing Instruments, Writing Position, Health of Writer, Guided Hand Signatures, Drugs and Alcohol, Impairment of Vision, Deliberate Variation of Handwriting, Disguised Writings, Difficulties of Disguising Writing, Disguised Signatures, Simulated Writings, Freehand Simulation, Slowly Made Simulations, Simulations of Poorly Made Signatures, Rapidly Made Simulations, Traced Signatures, Introduction of Features of the Copier. Digital signature/writings and examination	15	2
	3	**Forensic linguistics**	**15**	
	3.1	Forensic linguistics, e-documents, digital signatures Opinion- Reporting to the court juxtaposed charts - evidence in the court- cross examination, Related Case Studies.	15	3
4	**4**	**Examination of papers (Practicum)**	**15**	
	4.1	Types of Paper, Manufacture of Paper, Paper GSM Testing of Paper, Non-destructive Tests, Destructive Tests, Comparison of Paper, Mechanical Fits, Watermarks, Dating of Paper, Envelopes, Writing Materials, Pencils,	15	4

		Inks, Liquid Inks, Ball-Point Inks, Fibre-Tipped, Roller Ball, and Gel Pens		
		Examination of Inks (Practicum)	**15**	
	4.2	Visual Examination, Examination of Colour, Absorption Spectra and the Examination of Inks, Ultraviolet and Infrared Radiation, Detection of Infrared Radiation, Infrared Absorption, Ultraviolet Fluorescence, Infrared Luminescence, Comparison of Inks Using Infrared Luminescence, Erasures, Obliterations, Other Luminescence Effects, Destructive Techniques, Chromatography, Thin-Layer Chromatography, High-Performance Liquid Chromatography, Chemical Tests, Other Components of Ink, Further Techniques, Relative Aging of Ball-Point Inks, Dating of Inks.	15	4
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
Assessment Types	**MODE OF ASSESSMENT** **O. Continuous Comprehensive Assessment (CCA)** Assignment, Oral Presentations, Quiz, Group Discussions **Evaluation:** CCA : 30 marks
	P. **End Semester Examination – 2.0 hrs.** Total marks: 70 marks.
Pattern of questions:	Total marks : 70 marks (2.0 hrs) One word answer question(1 mark):10 out of 10 10x1= 10 marks Short answer questions (3 marks) :5 out of 7 5x3= 15 marks Short essay (6 marks) :5 out of 7 5x6= 30 marks Essay (15 marks) :1 out of 2 1x15= 15 marks

References

1. Huber, A. R. and Headride, A.M. (1999) Handwriting identification : facts and fundamental CRC LLC 2. Ellen, D (1997)
2. The scientific examination of Documents, Methods and techniques. 2nd ed., Taylor & Francis Ltd.
3. Morris (2000) 3.Forensic Handwriting Identification (fundamental concepts and Principals)

4. Harrison, W.R.: Suspect Documents & their Scientific Examination, 1966, Sweet & Maxwell Ltd., London.
5. Mehta, M. K. : The identification of Handwriting & Cross Examination of Experts, N.M. Tripathi, Allahabad. 1970.
6. Saxena's : Saxena's Law & Techniques Relating to Finger Prints, Foot Prints & Detection of Forgery, Central Law Agency, Allahabd (Ed. A.K. Singla).
7. Brunelle, R.L. and Reed, R.W (1984) Forensic Examination of Ink and Paper, Charles C Thomas Publisher, U.S.A.

<table>
<tr><td>  </td><td colspan="5">Mahatma Gandhi University
Kottayam</td></tr>
<tr><td>Programme</td><td colspan="5">BSc (Hons) FORENSIC SCIENCE</td></tr>
<tr><td>Course Name</td><td colspan="5">PROJECT</td></tr>
<tr><td>Type of Course</td><td colspan="5">PRJ</td></tr>
<tr><td>Course Code</td><td colspan="5">MG8PRJFSC400</td></tr>
<tr><td>Course Level</td><td colspan="5">400-499</td></tr>
<tr><td>Course Summary</td><td colspan="5">This course provides undergraduate students with an opportunity to design, plan, and execute a research project in their field of study, developing skills in critical thinking, data analysis, and effective communication.</td></tr>
<tr><td rowspan="2">Semester</td><td rowspan="2">VIII</td><td colspan="2">Credits</td><td>12</td><td rowspan="2">Total Hours</td></tr>
<tr><td rowspan="2">Course Details</td><td rowspan="2">Learning Approach</td><td>Lecture</td><td>Tutorial</td><td>Practical</td><td>Others</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Pre-requisites, if any</td><td colspan="5">NA</td></tr>
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<tr><th colspan="4">MODE OF ASSESSMENT - INTERNSHIP</th></tr>
<tr><td rowspan="8">Assessment Types</td><td colspan="3">A. Continuous Comprehensive Assessment (CCA)</td></tr>
<tr><td rowspan="3">Internship</td><td>Performance Appraisal from the Industry/Units:
1. Technical skills,
2.Work quality,
3.Problem solving skills,
4.Communication and team work and
5. Time management.</td><td>Marks
10</td></tr>
<tr><td>Knowledge acquisition, Growth and Improvement</td><td>5</td></tr>
<tr><td>Total</td><td>15</td></tr>
<tr><td colspan="3">B. Final Evaluation</td></tr>
<tr><td colspan="2">Exam Components</td><td>Marks</td></tr>
<tr><td colspan="2">Internship Report</td><td>20</td></tr>
<tr><td colspan="2">Presentation of work done</td><td>5</td></tr>
<tr><td colspan="2">Viva-Voce</td><td>10</td></tr>
<tr><td colspan="2">Total</td><td>35</td></tr>
</table>

MODE OF ASSESSMENT – PROJECT Course code: MG8PRJBTG400	
Course code: MG8PRJBTG400	**Course Name : Project**
A. Continuous Comprehensive Assessment (CCA)	
Relevance of Topic	**10**
Depth of Research	**20**
Punctuality	**10**
Final report	20
Total	**60**
B. Final Assessment	
Evaluation components	**Distribution of mark**
Preparation of Thesis	
Certificates of guide, HOD, Declaration of student	3
Abstract, key words	2
Introduction	5
Review	5
Materials and Methods	10
Result & Discussion	10
Conclusion & Bibliography	5
Placement of Table/, Fig)	5
Neat layout	5
Total	**50**
Presentation of work	
Timing	5
Display of slides (relevant data)	10
Presentation of methodology	10
Preparation of result	10
Interpretation and analysis	10
Conclusion	5
Total	**50**
Viva	
Response to the questions	10
Knowledge and concept of objective and methodology	10
Justification of Result/Significance of hypothesis	10
Understanding on future work, its practicality and feasibility	10
Total	**40**
Grand Total	**140**
Final mark (CCA+ESA)	**200**

SYLLABUS REVISION WORKSHOP PARTICIPANTS

Sl No.	Name & Designation
1.	Dr. Jameskutty B.K. Associate Professor of Forensic Medicine & Deputy Police Surgeon, Govt. Medical College, Kottayam (**Chairman**)
3.	Sri. Jayakumaran Nair Chief Chemical Examiner (Retired) Chemical Examiner's Laboratory, Thiruvananthapuram
5.	Dr. Jameela S.R Assistant Chemical Examiner (Retired) Chemical Examiner's Laboratory, Thiruvananthapuram
6.	Dr. Sharija S Prof. Of Forensic Medicine And Police Surgeon, Govt. T.D. Medical College Alappuzha
7.	Ms. Archana Sunil Asst. Professor Department Of Forensic Science Nehru Arts And Science College, Coimbatore, Tamil Nadu
8.	Dr. Shyla Hameed Assistant Professor of Economics M.E.S. College, Nedumkandam, Idukki