MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS						
SIGNATURE COURSE						
Name of the College	Marthoma College for Women, Perumbavoor					
Faculty/ Discipline	Zoology					
Programme	BSc (Hons) Zoology					
Course Coordinator	Reemy Sara Mathai					
Contributors	Reemy Sara Mathai					
Course Name	Forensic Toxicology & Medico-legal applications					
Type of Course	DSE					
Specialization title	Forensic Biology and Toxicology					
Course Code	MG3DSEZGYA02					
Course Level	200					
Course Summary	This course provides a comprehensive understanding of forensic toxicology and its critical role in the medico-legal system. It begins with the foundations of forensic science, including its history, principles, and relevance in crime investigation. Students explore the classification of toxicants, toxic effects on the body, and medico-legal procedures involved in poisoning cases. The curriculum delves into special toxic syndromes, emerging threats, and legal responsibilities surrounding toxic exposure. A dedicated module addresses ethical in forensic investigations. By the end of the course, students will possess the knowledge and awareness needed to contribute to forensic investigations with professionalism and ethical responsibility.					
Semester	3	**Credits**			4	**Total Hours**
Course Details	**Learning Approach**	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	Only applicable for Students who have completed 1st year of B.Sc. Zoology (Honours) Programme					

Course Outcomes (CO)

Number of COs		**4**	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Describe the development and scope of forensic science.	U	PO1, PO2, PO3
2	Explain the ethical principles and guidelines relevant to forensic toxicology.	U	PO1, PO2
3	Summarize clinical and legal protocols in poisoning cases.	U	PO1, PO2
4	Identify toxic effects and modern threats.	U	PO1, PO2

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

CO-PO Articulation Matrix

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

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

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Foundations of Forensic Science			
	1.1	History and principles of forensic science in India: Foundations of Forensic Science. Development of Forensic Science in India, Key concepts and principles	8	["1"]
	1.2	Role in crime investigation	4	["1"]
2	Ethical Dimensions in Forensic Toxicology			
	2.1	Ethics in Forensic Toxicology: Integrity, objectivity, and impartiality. Confidentiality, informed consent, and chain of custody.	4	["2"]
	2.2	Legal and Institutional Ethical Guidelines: Ethical issues in toxicological testing: Guidelines for human and animal research (ICMR, CPCSEA), , implications of ethical violations, including legal liabilities and impacts on justice delivery.	5	["2"]
3	Clinical and Medico-Legal Toxicology			
	3.1	Poison laws and legal responsibilities: Relevant laws surrounding poisonings, including the legal classifications of poisoning (e.g., criminal negligence, intentional harm, accidental exposure) and how they impact investigations.	6	["3"]
	3.2	Classification of toxicants • Based on mode of action (e.g., corrosive, irritant, neurotic, cardiac poisons, asphyxiants) • Based on physical state (e.g., solid, liquid, gaseous) • Medicolegal classification (e.g., homicidal, suicidal, accidental, abortifacient, stupefying agents) • Toxico-analytical classification (e.g., gaseous and volatile substances, organic non-volatile substances, metallic poisons, anionic poisons)	9	["3"]
	3.3	Sample handling and documentation: Proper Collection Techniques to prevent contamination (e.g., blood, urine). Maintenance of proper documentation to track evidence and preserve its integrity.	7	["3"]
4	Special Toxic Syndromes and Threats			
	4.1	Cardiac/spinal toxins, asphyxiants	5	["4"]
	4.2	Household, food, occupational poisons	6	["4"]
	4.3	Envenomation, chemical/biological warfare agents	6	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecturing, TED talks, ICT enabled learning

Assessment Types	**MODE OF ASSESSMENT** Mode of Assessment: Theory **A. Continuous Comprehensive Assessment (CCA)** **• Theory – 30 Marks** Quiz, Literature review, Written test **B. End Semester Evaluation (ESE)** **• Theory – 70 Marks** Assessment Methods – Written test Duration of Examination – 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B , C Answer Type: ◦ PART - A ◦ MCQ - (10 out of 10) – 10 × 1 = 10 ◦ PART - B ◦ Short answer - (10 out of 12) – 10 × 3 = 30 ◦ PART - C ◦ Short Essays - (6 out of 8) – 6 × 5 = 30

References

- Stolman, A. (Ed.). (2013). Progress in chemical toxicology: Volume 1. Academic Press. Bamford, F. (1940). Poisons, their isolation and identification. Blakiston. Saferstein, Richard. (2007). Criminalistics: an introduction to forensic science, Pearson Education, Inc., Upper Saddle River, NJ . Pillay, V. V. (2019). Textbook of forensic medicine and toxicology (15th ed.). Paras Medical Publishing. Basu, R. (2019). Fundamentals of forensic medicine and toxicology. Books and Allied (P) Ltd. Guharaj, P. V. (2003). Guharaj forensic medicine (2nd ed., M. R. Chandran, Ed.). Orient Longman. B.B. Nanda and R.K. Tiwari, (2001). Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi .

Suggested Readings

- M.K. Bhasin and S. Nath. (2002).Role of Forensic Science in the New Millennium, University of Delhi, Delhi. https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/forensic_science/10._forensic_toxicology/34._laws_related_to_forensic_toxicology/et/9084_et_et.pdf

Affidavit

- We, Marthoma College for Women, Perumbavoor and Reemy Sara Mathai, retain the copyright of this syllabus and expressly prohibit its distribution in complete form to any institution outside our own.
- We, Marthoma College for Women, Perumbavoor, agree to appoint a new course coordinator for the proposed Forensic Biology and Toxicology in the event of the unavailability of the currently nominated coordinator. This appointment will ensure the continued coordination of course delivery, assessments, and all related academic responsibilities necessary for the successful implementation of the specialization, for as long as the college offers this programme.
- We, Marthoma College for Women, Perumbavoor and Reemy Sara Mathai, declare that no part of this signature course submitted here for approval has been taken from the course content developed by, or from any of the course titles prepared by, the BoS/expert committee in the same discipline under our University.

MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS						
SIGNATURE COURSE						
Name of the College	Marthoma College for Women, Perumbavoor					
Faculty/ Discipline	Zoology					
Programme	BSc (Hons) Zoology					
Course Coordinator	Reemy Sara Mathai					
Contributors	Reemy Sara Mathai					
Course Name	Principles of Toxicology & Environmental Health					
Type of Course	DSE					
Specialization title	Forensic Biology and Toxicology					
Course Code	MG4DSEZGYA03					
Course Level	200					
Course Summary	This course offers an introduction to the fundamentals of toxicology and environmental health. It covers the scope, branches, and ethical aspects of toxicology, with emphasis on exposure routes, toxic effects, and toxicokinetics (ADME). Students learn about dose-response relationships, toxicity testing, and the impact of toxicants in environmental and occupational settings. The course also explores risk assessment, antidotes, and legal aspects related to toxic substances. Designed for 200-level students, it provides a solid foundation for further study or careers in toxicology, forensic science, and environmental health.					
Semester	4	**Credits**			4	**Total Hours**
Course Details	**Learning Approach**	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	Should complete DSE-Forensic Toxicology & Medico-Legal Applications.					

Course Outcomes (CO)

Number of COs		**4**	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Explain toxicology’s scope, branches, and ethical standards.	U	PO1, PO2, PO3
2	Identify exposure routes and effects of toxins.	U	PO1, PO2
3	Describe the absorption and metabolism of toxins.	U	PO1, PO2
4	Assess toxic risks in the environment and workplace.	An	PO1, PO2

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

CO-PO Articulation Matrix

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

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

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Introduction to Toxicology			
	1.1	Definition and scope of toxicology	2	["1"]
	1.2	Branches of toxicology: Analytical, Descriptive, Mechanistic, Clinical, Forensic, Occupational, Veterinary, Aquatic, Environmental, Regulatory, Food Toxicology	3	["1"]
2	Toxicity: Exposure and Effects			
	2.1	Types of toxicity: Acute, subacute, chronic, subchronic	2	["2"]
	2.2	Exposure parameters: Route, site, duration, and frequency	4	["2"]
	2.3	Spectrum of toxic effects: • Allergic and idiosyncratic reactions • Toxicity: Immediate vs. delayed, reversible vs. irreversible Local, systemic, and selective effects	5	["2"]
3	Toxicokinetics & Testing			
	3.1	ADME : Absorption, distribution, metabolism (metabolic pathways), and excretion. Processes: Translocation, transformation, bioaccumulation of xenobiotics/toxicants	10	["3"]
	3.2	Dose response and Toxicity testing : Factors influencing toxicokinetics Dose-response relationship: ED50, LD50, EC50, LC50 Toxicity testing in organisms (any one model system)	10	["3"]
4	Environmental and Occupational Toxicology			
	4.1	Pesticides, metals, industrial chemicals	7	["4"]
	4.2	Antidotes and mechanisms of action	7	["4"]
	4.3	Environmental pollutants & risk mitigation: Occupational exposure limits, Risk assessment and safety evaluation of toxicants	10	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecturing, TED talks, ICT enabled learning

Assessment Types	**MODE OF ASSESSMENT** Mode of Assessment: Theory **A. Continuous Comprehensive Assessment (CCA)** **• Theory – 30 Marks** Quiz, Literature review and report submission, Written test **B. End Semester Evaluation (ESE)** **• Theory – 70 Marks** Assessment Methods – Written test Duration of Examination – 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B , C Answer Type: ◦ PART - A ◦ MCQ - (10 out of 10) – 10 × 1 = 10 ◦ PART - B ◦ Short answer - (10 out of 12) – 10 × 3 = 30 ◦ PART - C ◦ Short Essays - (6 out of 8) – 6 × 5 = 30

References

- 1. Stolman, A. (Ed.). (2013). Progress in chemical toxicology: Volume 1. Academic Press. 2. Bamford, F. (1940). Poisons, their isolation and identification. Blakiston. 3. Saferstein, Richard. Criminalistics: an introduction to forensic science, Pearson Education, Inc., Upper Saddle River, NJ (2007). 4. Pillay, V. V. (2019). Textbook of forensic medicine and toxicology (15th ed.). Paras Medical Publishing. 5. Basu, R. (2019). Fundamentals of forensic medicine and toxicology. Books and Allied (P) Ltd. 6. Guharaj, P. V. (2003). Guharaj forensic medicine (2nd ed., M. R. Chandran, Ed.). Orient Longman.

Affidavit

- We, Marthoma College for Women, Perumbavoor and Reemy Sara Mathai, retain the copyright of this syllabus and expressly prohibit its distribution in complete form to any institution outside our own.
- We, Marthoma College for Women, Perumbavoor, agree to appoint a new course coordinator for the proposed Forensic Biology and Toxicology in the event of the unavailability of the currently nominated coordinator. This appointment will ensure the continued coordination of course delivery, assessments, and all related academic responsibilities necessary for the successful implementation of the specialization, for as long as the college offers this programme.
- We, Marthoma College for Women, Perumbavoor and Reemy Sara Mathai, declare that no part of this signature course submitted here for approval has been taken from the course content developed by, or from any of the course titles prepared by, the BoS/expert committee in the same discipline under our University.

MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS						
SIGNATURE COURSE						
Name of the College	Marthoma College for Women, Perumbavoor					
Faculty/ Discipline	Zoology					
Programme	BSc (Hons) Zoology					
Course Coordinator	Reemy Sara Mathai					
Contributors	Reemy Sara Mathai					
Course Name	Forensic Anthropology & Dermatoglyphics					
Type of Course	DSE					
Specialization title	Forensic Biology and Toxicology					
Course Code	MG5DSEZGYA03					
Course Level	300					
Course Summary	This course provides a hands-on exploration of how forensic anthropology helps solve crimes through the analysis of human remains. Students will learn how to apply anthropometric techniques to identify individuals based on skeletal features. The course also covers facial reconstruction methods, combining somatoscopic and craniometric approaches, to recreate faces from bones. Students will delve into the science behind fingerprints and dermatoglyphics, understanding how these unique patterns are used in forensic investigations.					
Semester	5	**Credits**			4	**Total Hours**
Course Details	**Learning Approach**	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	Needs to complete 200 level courses of Forensic biology and Toxicology.					

Course Outcomes (CO)

Number of COs		**4**	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Recognize the significance and scope of forensic anthropology	U	PO1, PO2, PO3, PO8
2	Explain the principles and applications of anthropometry for forensic identification.	U	PO1, PO2, PO3
3	Interpret the techniques used in facial reconstruction, incorporating somatoscopic and craniometric methods.	U	PO1, PO2, PO10
4	Examine the biological foundations and forensic applications of dermatoglyphics and fingerprint analysis.	An	PO1, PO2, PO3

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

CO-PO Articulation Matrix

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

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

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Introduction to Forensic Anthropology			
	1.1	Overview of Forensic Anthropology- Significance and scope of forensic anthropology. Ethical issues in forensic science and anthropology	3	["1"]
	1.2	Human Skeletal Analysis- Nature, formation, and identification of human bones. Determination of age, sex, stature from skeletal material	3	["1"]
	1.3	Methods for Identification and Estimation-Individual identification from surgical procedures, broken bones. Determining age, sex, ancestry, and estimating height from bones. Determining time of death and cause of death	5	["1"]
2	Biometry, Anthropometry, and Identification Techniques			
	2.1	Introduction to Biometry and Anthropometry- History and contributions of Alphonse Bertillon. Anthropometric measuring tools and their applications	6	["2"]
	2.2	Anthropometric Measurements and Indices-Measurements for personal identification: head, face, nose, cheeks, hands, and feet. Application of indices (cephalic index, cranial index, upper facial index, etc.)	6	["2"]
3	Facial Reconstruction Techniques and Methods			
	3.1	Facial Reconstruction Techniques- Parle/Bertillon system. Photofit and Identikit systems. Craniofacial Superimposition and Tissue Depth	7	["3"]
	3.2	Genetic and Congenital Anomalies in Forensic Reconstruction- Causes and types of genetic and congenital anomalies. Forensic significance and identification of anomalies	6	["3"]
4	Dermatoglyphics			
	4.1	Fingerprint Analysis- Biological basis of fingerprints and ridge formation. Types of fingerprints and fingerprint patterns. Methods for developing fingerprints on various surfaces (including gloves).	10	["4"]
	4.2	Other Dermatoglyphic Features- Palm prints and their historical significance. Lip prints: nature, collection, and examination. Ear prints and their forensic significance.	8	["4"]
	4.3	Methods of Enhancement and Visualization of fingerprints and other dermatoglyphic features	6	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecturing, TED talks, ICT enabled learning

Assessment Types	**MODE OF ASSESSMENT** Mode of Assessment: Theory **A. Continuous Comprehensive Assessment (CCA)** **• Theory – 30 Marks** Written test, finger print analysis report of peers- minimum 10 individuals **B. End Semester Evaluation (ESE)** **• Theory – 70 Marks** Assessment Methods – Written test Duration of Examination – 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B , C Answer Type: ◦ PART - A ◦ MCQ - (10 out of 10) – 10 × 1 = 10 ◦ PART - B ◦ Short answer - (10 out of 12) – 10 × 3 = 30 ◦ PART - C ◦ Short Essays - (6 out of 8) – 6 × 5 = 30

References

- 1. Cumins, H. and Midlo, C. (1962). Finger Prints, Palms and Soles. An Introduction to Dermatoglyphics. New York; Dover Publications Incorp. 2. Galton, F. (1892). Fingerprints. London; McMillan 3. Mukherji, D, Mukherjee, D.P. and Bharathi, P. (2009). Laboratory Manual for Biological Anthropology. New Delhi; Asian Books Pvt Ltd. 4. Singh, I. P. and Bhasin, M. K. (2004). A Manual of Biological Anthropology. New Delhi; Kamla-Raj-Enterprises. 5. M.Y. Iscan and S.R. Loth. (1997). The scope of forensic anthropology in, Introduction to Forensic Sciences, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton C. Ubelaker and H. Scammell, Bones. (2000). M. Evans & Co., New York 6. S.Rhine. (1998). Bone Voyage: A Journey in Forensic Anthropology, University of Mexico Press, Mexico

Affidavit

- We, Marthoma College for Women, Perumbavoor and Reemy Sara Mathai, retain the copyright of this syllabus and expressly prohibit its distribution in complete form to any institution outside our own.
- We, Marthoma College for Women, Perumbavoor, agree to appoint a new course coordinator for the proposed Forensic Biology and Toxicology in the event of the unavailability of the currently nominated coordinator. This appointment will ensure the continued coordination of course delivery, assessments, and all related academic responsibilities necessary for the successful implementation of the specialization, for as long as the college offers this programme.
- We, Marthoma College for Women, Perumbavoor and Reemy Sara Mathai, declare that no part of this signature course submitted here for approval has been taken from the course content developed by, or from any of the course titles prepared by, the BoS/expert committee in the same discipline under our University.

MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS						
SIGNATURE COURSE						
Name of the College	Marthoma College for Women, Perumbavoor					
Faculty/ Discipline	Zoology					
Programme	BSc (Hons) Zoology					
Course Coordinator	Reemy Sara Mathai					
Contributors	Reemy Sara Mathai					
Course Name	Biology & Psychology in Criminal Forensics					
Type of Course	DSE					
Specialization title	Forensic Biology and Toxicology					
Course Code	MG6DSEZGYA03					
Course Level	300					
Course Summary	This course offers an in-depth look at how forensic biology and psychology contribute to criminal investigations. Students will learn how to identify and analyze biological evidence like hair, DNA, and bodily fluids, and understand their significance in solving crimes. The course also covers wildlife forensics, exploring how it helps in identifying illegal activities related to endangered species, and forensic entomology, focusing on how insect activity can determine time of death. Additionally, the course explores the analysis of body fluids and their role in forensic investigations. Students will also examine forensic psychology, particularly its application in mental competency assessments and its impact on legal cases. By the end of the course, students will have a solid foundation in these essential areas, preparing them for careers in forensic science and criminal justice.					
Semester	6	**Credits**			4	**Total Hours**
Course Details	**Learning Approach**	Lecture	Tutorial	Practical	Others	
		4				60
Pre-requisites, if any	Needs to complete 300 level course on Forensic Anthropology & Dermatoglyphics.					

Course Outcomes (CO)

Number of COs		**4**	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Identify the types, significance, and methods of analyzing biological evidence	U	PO1, PO2, PO3
2	Explain the methods and significance of wildlife forensics and forensic entomology in criminal investigations.	U	PO1, PO2
3	Explore the forensic importance, analysis, and identification methods for body fluids	U	PO1, PO2, PO3
4	Examine the fundamental concepts of forensic psychology, including its applications in mental competency assessment and legal investigations.	An	PO1, PO2, PO3, PO4

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

CO-PO Articulation Matrix

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

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

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Biological Evidence and DNA Profiling			
	1.1	Nature and Importance of Biological Evidence-- Significance of biological evidence in forensic science. Hair evidence: transfer, persistence, recovery, structure, morphology, and biochemical aspects. Comparison of human and animal hair.	5	["1"]
	1.2	Microbial and Botanical Evidence- Types and identification of microbial organisms of forensic significance. Identification of wood, leaves, pollens, juices, and diatoms as botanical evidence. Forensic significance of diatoms.	5	["1"]
	1.3	DNA Profiling in Forensic Science- Collection of specimens for DNA analysis. Polymerase chain reaction (PCR): historical perspective, sequence polymorphisms, and evidence individualization. Short Tandem Repeats (STR), Restriction Fragment Length Polymorphism (RFLP), and interpretation of results. Applications: personal identification, paternity testing, and wildlife forensics	10	["1"]
2	Wildlife Forensics and Forensic Entomology			
	2.1	Wildlife Forensics- Importance of wildlife forensics in conservation and crime investigation. Protected and endangered species of animals and plants. Illegal trading in wildlife items: skin, fur, bone, horn, teeth, flowers, and plants. Identification of physical evidence related to wildlife crimes, including pug marks.	5	["2"]
	2.2	Basics of Forensic Entomology- Importance of forensic entomology in death investigations. Types of insects of forensic importance. Succession and decomposition in relation to insects	5	["2"]
	2.3	Collection and Analysis of Entomological Evidence- Collection kits, preservation, and shipment of entomological evidence. Determination of time of colonization and DNA evidence from insects. Identification of insects as evidence and its analysis.	5	["2"]
3	Forensic Serology			
	3.1	Analysis of Common Body Fluids-Composition and functions of blood, semen, saliva, sweat, milk, and urine. Forensic tests for identification and individualization of body fluids. Blood group determination and distinction between human and non-human blood.	6	["3"]
	3.2	Genetic Marker Analysis- Cellular antigens, extracellular proteins, and intracellular enzymes. ABO blood group system and its significance in genetic marker typing. Applications in sexual assault investigations.	5	["3"]
	3.3	Bloodstain Pattern Analysis- Types of bloodstain patterns: impact, cast-off, projected, and contact patterns.Blood trails and drying times. Crime scene reconstruction using bloodstain pattern evidence (brief)	6	["3"]

Module	Units	Course Description	Hrs	CO No.
4	Basics of Forensic Psychology			
	4.1	Introduction to Forensic Psychology-Definition and fundamental concepts of forensic psychology and psychiatry. Relationship between psychology and law. Ethical issues in forensic psychology.	3	["4"]
	4.2	Assessment of Mental Competency-Methods for assessing mental competency. Identification and analysis of mental disorders relevant to forensic psychology.	3	["4"]
	4.3	Psychological Disorders and Forensic Applications- Role of forensic psychology in investigating mental health issues related to criminal behavior (brief). Applications of psychological evaluation in legal cases (brief).	2	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecturing, TED talks, ICT enabled learning

Assessment Types	**MODE OF ASSESSMENT** Mode of Assessment: Theory **A. Continuous Comprehensive Assessment (CCA)** **• Theory – 30 Marks** Written test, Insect collection and display (minimum 3), Presentation. **B. End Semester Evaluation (ESE)** **• Theory – 70 Marks** Assessment Methods – Written test Duration of Examination – 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B , C Answer Type: ◦ PART - A ◦ MCQ - (10 out of 10) – 10 × 1 = 10 ◦ PART - B ◦ Short answer - (10 out of 12) – 10 × 3 = 30 ◦ PART - C ◦ Short Essays - (6 out of 8) – 6 × 5 = 30

References

- Hole, J. W., Jr. (1992). Essentials of human anatomy and physiology. USA: Wm. C. Brown Publishers. Bevel, T., & Gardner, R. M. (2008). Bloodstain pattern analysis (3rd ed.). Boca Raton, FL: CRC Press. Butler, J. M. (2005). Forensic DNA typing. Burlington, MA: Elsevier. Inman, K., & Rudin, N. (1997). An introduction to forensic DNA analysis. Boca Raton, FL: CRC Press. Stryer, L. (1988). Biochemistry (3rd ed.). New York, NY: W.H. Freeman and Company. Murray, R. K., Granner, D. K., Mayes, P. A., & Rodwell, V. W. (1993). Harper's biochemistry. Norwalk, CT: Appleton & Lange. Chowdhuri, S. (1971). Forensic biology. New Delhi, India: BPRD. Saferstein, R. (1993). Forensic science handbook (Vol. III). New Jersey: Prentice Hall.

Suggested Readings

- Duncan, G. T., & Tracey, M. I. (1997). Serology and DNA typing. In W. G. Eckert (Ed.), Introduction to forensic sciences (2nd ed.). Boca Raton, FL: CRC Press.

Affidavit

- We, Marthoma College for Women, Perumbavoor and Reemy Sara Mathai, retain the copyright of this syllabus and expressly prohibit its distribution in complete form to any institution outside our own.
- We, Marthoma College for Women, Perumbavoor, agree to appoint a new course coordinator for the proposed Forensic Biology and Toxicology in the event of the unavailability of the currently nominated coordinator. This appointment will ensure the continued coordination of course delivery, assessments, and all related academic responsibilities necessary for the successful implementation of the specialization, for as long as the college offers this programme.
- We, Marthoma College for Women, Perumbavoor and Reemy Sara Mathai, declare that no part of this signature course submitted here for approval has been taken from the course content developed by, or from any of the course titles prepared by, the BoS/expert committee in the same discipline under our University.