



# TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Moradabad (U.P.)

## Ph.D. PROGRAMME

### SYLLABUS FOR DISCIPLINE-SPECIFIC COURSE

#### FORENSIC SCIENCE

Course Code: PDS240110	FUNDAMENTALS OF FORENSIC SCIENCE	L	T	P	C
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<b>Objective:</b>	This course offers a comprehensive understanding of forensic science, covering its history, principles, and practical applications. Key topics include crime scene management, forensic lab frameworks in India, legal procedures, personal identification, and medico-legal death investigations. Students explore biological evidence, DNA fingerprinting, biochemical techniques, fire chemistry, arson, explosives, narcotics, and forensic toxicology. By fostering critical thinking, analytical skills, and innovation, the course equips students to address complex forensic challenges and contribute to advancements in research and practice.				
<b>Course Outcomes:</b>					
<b>CO 1:</b>	Remember the fundamental concepts of forensic science, including its definition, history, development, and principles, and recall the organizational structure of forensic science laboratories in India.				
<b>CO 2:</b>	Understanding the legal procedures in courts, inquest processes, types of witnesses, rules for giving evidence, and the significance of personal identification in forensic investigations.				
<b>CO 3:</b>	Applying the skills to classify and explain the various domains of forensic science, including forensic biology, serology, DNA analysis, ballistics, explosives, toxicology, and digital forensics, while demonstrating their specific applications in solving forensic cases.				
<b>CO 4:</b>	Analyzing the forensic significance of biological evidence, body fluids, and DNA profiling, including methods like RELP and PCR, to solve forensic cases effectively.				
<b>CO 5:</b>	Evaluating the chemical and physical properties of fire, arson evidence, explosives, and narcotic drugs, and assessing the procedures for identifying and analyzing such evidence in forensic laboratories.				
<b>Course Content:</b>					
<b>Unit 1:</b>	Definition, History & development of Forensic Science, Principles of Forensic Science, Crime Scene Management, domains in Forensic Science (Forensic Biology, Serology, DNA, Ballistics, Explosive, NDPS, Chemistry, Toxicology, Digital and Cyber Forensic, Lie Detection, Photography etc.), Organizational structure of Forensic Science Laboratories in India.				
<b>Unit 2:</b>	Introduction, Legal Procedures in Courts, Inquest, Kinds of witnesses and rules for giving evidence, Personal identification and its importance, the concept of Death with its types, modes of death, causes and signs (Immediate Changes, Early Changes, Late Changes), and symptoms, Manner of Death and medicolegal autopsy.				

<b>Unit 3:</b>	Introduction to biological evidence, types, and significance of biological evidence. Types of Body Fluids and their properties, Significance, collection, preservation, preliminary and confirmatory tests. biochemistry and genetics of blood groups, methods of ABO blood grouping from blood stains, Origin of species, Introduction to DNA Fingerprinting, RFLP analysis, and PCR amplification. Application and Forensic Significance of DNA Profiling.
<b>Unit 4:</b>	Fire Nature and Chemistry of fire and related evidence, Methods, and techniques used in the identification of arson evidence, Classification of Alcoholic and non-alcoholic beverages and their composition, Procedure in trap cases, detection of phenolphthalein, Classification, composition and characteristics of explosives, types of explosives. Introduction and classification of Narcotic Drugs and Psychotropic Substances.
<b>Unit 5:</b>	Introduction, Concept and Significance of forensic toxicology, definition of Poisons, Classification of Poisons and Poisoning, Sign and Symptoms of Poisoning, Mode of Action, Factors Modifying the Action of Poisons, Toxicological Exhibits in Fatal and Survival Cases, Their Preservation, Methods used in poison detection in Forensic Science Laboratories.
<b>Textbooks:</b>	<ol style="list-style-type: none"> <li>1. Rechar Saferstein. Criminalistics: An Introduction to Forensic Science, Global Edition (11<sup>th</sup> edition)</li> <li>2. Reddy, KS Narayan. The Essentials of Forensic Medicine and Toxicology, Third Edition. New Delhi, Jaypee Brothers Medical Publishers (P) Ltd, 2014.</li> <li>3. Alan Gunn. Essential Forensic Biology, West Sussex PO19 8SQ, England. John Wiley &amp; Sons Ltd, 2006.</li> <li>4. Bell, S. (2022). Forensic Chemistry (3rd ed.). CRC Press.</li> <li>5. Parikh, CK. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology, 6th Edition. New Delhi, CBS Publishers and Distributors, 2002.</li> </ol>
<b>Reference Books/ Additional Electronic Reference Material:</b>	<ol style="list-style-type: none"> <li>1. <a href="https://doi.org/10.4324/9780429440915">https://doi.org/10.4324/9780429440915</a></li> <li>2. <a href="https://www.niehs.nih.gov/health/topics/science/toxicology">https://www.niehs.nih.gov/health/topics/science/toxicology</a>  <a href="https://www.sjsu.edu/people/steven.lee/courses/c2/s2/Wecht_29.pdf">https://www.sjsu.edu/people/steven.lee/courses/c2/s2/Wecht_29.pdf</a></li> </ol>