M.Sc. (Forensic Science)

Program Outcomes (POs)

PO1: Demonstrate the fundamental knowledge & basic principles in respective field of sciences.

PO2: Design and conduct experiments and simulations, as well as critically analyzing the results and interpret them.

PO3: Develop a research culture and implementation of the policies to tackle the burning issues at global level and enhance the scientific temper.

PO4: Inculcate logical thinking to address a problem and become result oriented with a positive attitude.

PO5: Analyze, and apply appropriate tools & techniques for decision making and problem solving.

PO6: Develop personal strengths like emphasizing perseverance, building negotiation skills and communication skills as a team member or team leader.

PO7: Understand professional and ethical responsibility while carrying out research and design activities.

PO8: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO 01: Recognize diverse aspects of Forensic science, like crime scene management, cyber and digital forensics, questioned document examination, Forensic Chemical, biological &physical sciences evidence collection, preservation and evaluation.

PSO 02: Interpret the functioning of the justice system, police organizations, forensic scientists, techniques involved in collection, preservation and evaluation of evidences; various aspects of the allied sciences that assist in forensic investigation protocols, and the step by step development of the investigative procedures.

PSO 03: Appraise the concepts learned in the classroom and make conclusions based on scientific thinking, ability to identify and differentiate between methods/protocols, instrumentation and evaluative procedures required in the investigative process that is required for crime solving and also document the same as per norms.

PSO 04: Work collaboratively in the laboratory to acquire and analyze data and to solve problems scientifically and systematically. Develop professional and ethical responsibility.

Course Outcomes (COs)

2019-20 Batch

Semester	Course Code	Course Name	Course Outcomes (COs)
I	**18MSFS1H01**	General Forensic Science and Crime Scene Management	**CO1**: Describe the scope of Forensic Science along with various principles governing it. **CO2**: Recall various sections of law. **CO3**: Discuss various quality control & lab management methods required to work in a Forensic setup. **CO4**: Demonstrate various Crime Scene Management techniques. **CO5**: Operate Crime Scene Reconstruction process along with the law enforcement agencies.
	18MSFS1H02	Forensic Physics and Ballistics	**CO1**: Recall physical and chemical properties of trace evidence such as glass, soil, paint, fiber and their forensic examination. **CO2**: Describe class and individual characteristics of tool marks and its forensic significance. **CO3**: Recall the history, the classification, characteristics and working mechanism of firearms **CO4**: Differentiate between Internal, External and Terminal Ballistics and its significance in forensic examination. **CO5**: Elaborate the application of statistics in Forensic Ballistics.
	18MSFS1H03	Forensic Biology and Serology	**CO1**: Define and relate the various concepts behind the Forensic Biological and Serological analysis of evidence. **CO2**: Interpret the results obtained after examination through Forensic Biology and serological techniques **CO3**: Distinguish the different evidential points by applying the modern methods, concepts and techniques of biology and serology, which further helps in reconstruction of Scene of Crime (SOC). **CO4**: Defend the importance of various biological trace evidences and microbial evidences during legal investigations. **CO5**: Design solutions for the challenges faced during forensic examinations of biological evidence.

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	18MSFS1H04	Introduction to Psychology	**CO1**: Develop basic concepts in the field of psychology with an emphasis on applications of psychology in everyday life. **CO2**: Identify the influence of behavior, cognition, and the environment on the bodily system and develop an appreciation of the neurobiological basis of psychological function and dysfunction. **CO3**: Explain the concept of individual differences with the goal to promote self-reflection and understanding of self and others. **CO4**: Apply emotion, learning and motivation concepts to explain personal experiences to analyze and apply knowledge of learning principles and motivational concepts to improve academic performance and personal well-being. **CO5**: Analyze the clinical features, etiology and management of different types of abnormal behavior to diagnose and to take case histories.
	18MSFS1H05	Criminal Law and Minor Acts	**CO1**: Recall the concept of Criminal Justice System of India, its nature, function, authorities, and limitations. **CO2**: Describe the provisions of the Indian Penal laws and Procedural laws along with analysis of landmark cases **CO3**: Appraise the establishment and functioning of courts and authorities as per the procedural code. **CO4**: Criticize and critique various criminal laws. **CO5**: Assess and argue upon various case study and the criminal laws applied.
	18MSFS1H01L	Crime Scene Management Lab	**CO1**: Demonstrate how to secure various types of Crime Scenes. **CO2**: Illustrate various types of search patterns & information that can be gathered from them. **CO3**: Sketch various types of Crime Scene. **CO4**: Choose various types of evidence collection methods for effective and proper packing. **CO5**: Appraise various types of photography techniques for better visual representation in the Court of Law.

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	18MSFS1H02L	Forensic Physics and Ballistics Lab	**CO1**: Examine different types of trace evidence based on their properties. **CO2**: Describe and identify various parts of firearms. **CO3**: Examine and Compare fired and test bullets and cartridge cases. **CO4**: Exhibit competency to collect GSR from crime scene and shooter. **CO5**: Demonstrate restoration of obliterated marks using chemical methods.
	18MSFS1H03L	Forensic Biology and Serology Lab	**CO1**: Describe various types of the presumptive and confirmatory test for blood. **CO2**: Demonstrate the blood grouping of fresh and old age blood stain. **CO3**: Examine the various biological stains to determine the species origin of it. **CO4**: Differentiate between secretor and non-secretor status and also the normal microflora of human skin. **CO5**: Develop the report as per inquest for a given biological sample.
II	**18MSFS2H01**	Forensic Chemistry and Toxicology	**CO1**: Define the basic concepts of chemistry, forensic chemistry, toxicology, drugs of abuse and various related Acts. **CO2**: Describe the process of forensic chemical analysis, petroleum analysis, and instrumental analysis. **CO3**: Employ various instruments in forensic chemical and toxicological analysis. **CO4**: Exhibit competency to examine various evidences of chemical and toxicological relevance. **CO5**: Formulate reports and expert opinions on the investigation of toxicological evidences.

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	18MSFS2H02	Questioned Document Examination and Fingerprints	**CO1**: Recall the scope of questioned document examination and fingerprints. **CO2**: Distinguish among different types of questioned documents, forgeries, disguise using appropriate instrumentation and techniques. **CO3**: Explain the various methods of construction of characters used in handwriting and signatures and to identify natural and deliberate modifications. **CO4**: Compare basic patterns of fingerprints, minutiae, and its significance on fingerprint matching. **CO5**: Formulate written reports on questioned documents and fingerprints to represent as an expert witness at court of law.
	18MSFS2H02	Forensic Computing and Cyber Crime	**CO1**: Name and define the basic components of a computer and its organization; recall certain fundamentals of hardware, software and networking. **CO2**: Describe the concept of cybercrime, its types and legal aspects; classify cyber offences and their implications under Indian law; describe computer number system and morphology of hardware and software. **CO3**: Employ the knowledge of computer fundamentals to forensic scenario under the context of law. **CO4**: Distinguish between basic computer analysis and cyber forensics; compare various types of cybercrimes and their penalties under law. **CO5**: Assess and evaluate their knowledge of basic computing to solve cases. **CO6**: Formulate computing techniques and design protocols to analyze evidences in various crime scenarios.

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	18MSFS2H04	Instrumentation	**CO1**: Infer and summarize the concepts behind any instrumental techniques and they are also able to interpret which techniques are better applicable with respect to the particular forensic evidence under examination. **CO2**: Illustrate the role of instruments for Physical and Analytical purpose. By examining the evidences (micro to macro), such as physical (microscopy) examination and analytical (UV spectroscopy, NAA, GC, MS etc.) examination, which will help in solving the respective queries. **CO3**: Distinguishing according to experimental conditions the requirement of type of instrument, those helps in analysis of questioned samples. **CO4**: Appraise the importance of instrumental techniques during legal investigations. **CO5**: Propose solutions for the challenges which are faced during physical and analytical examination of evidences.
	18MSFS2H01L	Forensic Chemistry and Toxicology Lab	**CO1**: Examine different exhibits for forensic purpose **CO2**: Summarize the investigation of various toxicological exhibits **CO3**: Evaluate the various forensic exhibits **CO4**: Examine the various exhibits for adulteration **CO5**: Recall the concepts of chemistry of solution.
	18MSFS2H02L	Questioned Document Examination and Fingerprints Lab	**CO1**: Compare several characteristics of handwriting and signature **CO2**: Identify various fingerprint patterns and minutiae's after recording fingerprints. **CO3**: Employ various methods used for the development of latent fingerprints. **CO4**: Identify the sequences of strokes and writings on different documents

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	18MSFS2H03L	Forensic Computing and Cyber Crime Lab	**CO1**: Identify the parts of a computer system. **CO2**: Demonstrate the procedure for dismantling and rebuilding of PCs with respect to seizure of hard disk. **CO3**: Employ the knowledge of computer forensics to perform various examination like verifying the integrity of a file and also crack passwords. **CO4**: Differentiate between a genuine file and a tampered file& able to write opinion-based report on it. **CO5**: Design tools which will be able to perform functions like monitor network traffic, crack password and check integrity of a file.
	18MSFS2S51	Criminology and Victimology	**CO1**: Recall the definition and concepts of crime, criminology, criminal justice system and victimology. **CO2**: Recognize various theories of criminology and victimology. **CO3**: Articulate the functioning of Police in response to the crime and also laying down its organizational process and duties. **CO4**: Appraise neglected areas of study in victimology with relation to Criminal Justice System. **CO5**: Construct a thought process through real or hypothetical cases for practical implementation of the subject.
	18MSFS2S52	Forensic Photography	**CO1**: Discuss the basic principles of photography, digital image processing and understand the types of forensic photography. **CO2**: Employ various tools and techniques of photography and digital imaging for forensic scenario. **CO3**: Use of forensic photography techniques in medico-legal aspects. **CO4**: Compare basic artistic photography and forensic photography; examine various techniques of photographing evidences pertaining to different types of crimes. **CO5**: Mention the significance of photographic documentation in forensic context; appraise the contribution of various photographic techniques and equipment for forensic evidence photography and analysis.

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	18MSFS2S53	Security and Vigilance	**CO1**: Recognize the concepts of Security, Vigilance, Intelligence and its management, as a professional subject **CO2**: Paraphrase theories, process and methodologies with legal provisions pertaining to the Physical security of India reckoning with understanding of Safety management, Risk Management, Disaster Management and investigation. **CO3**: Illustrate the role and responsibilities of Security Organizations of the country. **CO4**: Access the risk areas of vulnerability, security counter measures and recommend appropriate safety awareness, risk management and quality control measures. **CO5**: Formulate ideal strategies of risk and disaster management, internal and external communication, negotiations and report the same
III	**18MSFS3H01**	Research Methodology and Statistics	**CO1**: Develop foundation on the basics of research methods to sensitize students on the importance of scientific research and to address ethical issues in forensic science. **CO2**: Infer the process involved in framing of research questions, identifying the variables, research designing and sampling techniques involved in forensic research. **CO3**: Formulate the process of writing research proposals, designing research and enabling students to be well equipped in writing research articles in SCOPUS/Web of Science Journals. **CO4**: Apply the basics of statistical methods and tools used in both descriptive and inferential statistics of forensic research. **CO5**: Outline the notion of Parametric/Non-parametric test involved in hypothesis testing and interpreting its results.

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	18MSFS3D21	Instrumentation in Questioned Document and Impression Analysis	**CO1**: Describe the various instruments used in questioned document examination **CO2**: Explain the various types of light sources and microscopes used in questioned document examination **CO3**: Differentiate the various instruments used in different scenarios or cases in the examination of questioned documents **CO4**: Exhibit technical competency to operate various instruments like microscopes, VSC. **CO5**: Assess the type of instrument that is suitable for a particular analysis in questioned document examination
	18MSFS3D22	Applied Forensic Chemistry	**CO1**: Identify and differentiate alcoholic beverages, its poisoning and laboratory analysis of the same **CO2**: Interpret and analyses the chemistry and behavior of fire, its effects on a crime scene, arson and motor vehicle fire scene, to determine its cause and to evaluate the clue materials. **CO3**: Explain the basics of explosives and its classification, and gain comprehensive knowledge about explosion process, investigation of explosion crime scene and analysis of explosion crime scene.
	18MSFS3D21L	Instrumentation in Questioned Document and Impression Analysis Lab	**CO1**: Identify the security features of various documents like currency notes and passports **CO2**: Identify different types of forgery and also if a particular document has been forged **CO3**: Demonstrate the technique of TLC for ink analysis **CO4**: Judge whether a document is authentic or has been altered **CO5**: Formulate new methods of analysis in case of fingerprint and questioned document examination
	18MSFS3D22L	Applied Forensic Chemistry Lab	**CO1**: Examine various alcohol samples by preliminary examination **CO2**: Analyze various petroleum products using preliminary and confirmatory examination **CO3**: Understanding collection, packaging and preservation of debris recovered from explosion scene. **CO4**: Identify explosive residues using spot test **CO5**: Interpret the given samples and generate a report

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	18MSFS3D31	Principles and Legal Aspects of Questioned Document and Impressions	**CO1**: Discuss the principles of handwriting examination. **CO2**: Classify different forensic documents. **CO3**: Use of different Indian Laws in document examination. **CO4**: Examine the security features of different Indian legal documents. **CO5**: Compare different fingerprint impressions and handwriting and figure out the characteristics.
	18MSFS3D32	DNA Profiling and Wildlife Forensics	**CO1**: Define and infer the various concepts behind the Forensic DNA Profiling of evidence. **CO2**: Interpret the results obtained after extraction and quantization of DNA through various techniques. **CO3**: Compare and Demonstrate the different evidential points in relation to analysis of wildlife evidence. **CO4**: Defend the importance of Forensic DNA profiling of various biological trace evidences during legal investigations. **CO5**: Propose solutions for the challenges faced during DNA profiling of biological evidences.
	18MSFS3D31L	Principles and Legal Aspects of Questioned Document and Impressions Lab	**CO1**: Identify different types of fingerprints at a scene. **CO2**: Examine different forged documents under various instruments. **CO3**: Examine the handwriting and signatures on a photocopied document **CO4**: Judge whether the given document is genuine or not. **CO5**: Interpret the given samples based on analysis and generate a report.
	18MSFS3D32L	DNA Profiling and Wildlife Forensics Lab	**CO1**: Explain the various types of DNA extraction methods from blood and saliva stains. **CO2**: Demonstrate the qualitative and quantitative analysis of extracted DNA. **CO3**: Examine the hair samples for identification of it **CO4**: Differentiate between ante mortem and postmortem drowning through diatom test. **CO5**: Develop the DNA report as per inquest (Criminal / Parental disputes) for given biological sample.

Semester	Course Code	Course Name	Course Outcomes (COs)
	18MCOF3006	Business Entrepreneurship	**CO1**: Outline the function of the entrepreneur in the successful, commercial application of innovations and recall the different opportunities and successful growth stories. **CO2**: Learn how to start an enterprise and design business plans that are suitable for funding by considering all dimensions of business. **CO3**: Prioritize personal attributes that enable best use of entrepreneurial opportunities. **CO4**: Examine Economic conditions with higher level knowledge and understanding of contemporary trends in e-commerce and business finance. **CO5**: Explore entrepreneurial leadership and management style. And gainful insight on causes of failure in business Entrepreneurship.
	18MAHS3O01	Philosophy and Public Policy of Science	**CO1**: Analyse the history and growth of Science and Technology Policy **CO2**: Distinguish and analyze the policy of different Science and technology cultures. **CO3**: Identify the evolutionary Phases of Science and Technology Policy **CO4**: Discuss the underlying philosophical underpinning of the policy towards science and Technology
	18MSFS3S41	Forensic Psychology	**CO1**: Interpret the relationship between various fields of Psychology i.e Forensic Psychology, Criminal Psychology and Clinical psychology. **CO2**: Describe legal, ethical and professional issues in the field of Forensic Psychology. **CO3**: Explain different techniques used in Forensic Science Laboratory that are helpful in interrogation of crime. **CO4**: Evaluate the role of Psychobiology in crime and also focus on different parameters for legal insanity and incompetent in legal proceedings. **CO5**: Appraise social, clinical, and neuroscience behavior in various types of crime (murder, mass murder, rape, serial killers etc.). **CO6**: Recommend and defend the use of scientific methods and techniques to generate criminal profiling in crime investigations.

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	18MSFS3S42	Police Administration	**CO1**: Define and recognize the hierarchy of police in India, its nature, function, authorities, and limitations. **CO2**: Illustrate the provisions of the different organization units and its functionality. **CO3**: Distinguish the functioning of police such as investigation methods, case diary maintenance, modus operandi determination and collection of evidences. **CO4**: Appraise the changes in public perception of Police and latest trends in assistance of victim of crime. **CO5**: Propose solutions for modernization and Application of advanced techniques in investigation.
	18MSFS3S43	Forensic Audio Video and Speaker Identification	**CO1**: Identify and describe different audio technology including different types of circuits, recording and playback devices and multiple video technologies **CO2**: Apply scientific methodology in the investigation of cases where forensic analysis of audio and video evidence is required. **CO3**: Articulate the fundamentals of voice, the physics behind the production of sound, forensic linguistics and phonetics. **CO4**: Demonstrate competency to employ different methods and techniques in the identification and recognition of speakers in forensic cases using multiple methods, following the concept of testing and error in speaker identification.

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IV	**18MSFS4H02**	Forensic Medicine and Entomology	**CO1**: Identify and describe the medicolegal aspects of death especially unnatural deaths (Accidental, Suicidal and Homicidal). **CO2**: Illustrate the role of Medicolegal expert in examining (autopsy) the corpses with respect to changes in body after the death; injury pattern; determination of ante mortem and postmortem in nature and in cases of unnatural deaths and sexual offenses. **CO3**: Examine the different evidential points by applying the modern methods, concepts and techniques of medical sciences which further helps in reconstruction of Scene of Crime (SOC). **CO4**: Appraise the importance of entomological evidences during legal investigations. **CO5**: Propose solutions for the challenges faced during unnatural death examinations.
	18MSFS4S31	Fingerprint and Impression Analysis	**CO1**: Articulate existing theories, methods, and interpretations in the field of fingerprint examination and working independently on solving practical difficulty in analyzing chance prints. **CO2**: Compare and evaluate the efficiency of various fingerprints classification systems like Henry, NCIC and IAFIS. **CO3**: Illustrate the importance of other neglected impression evidence such as footwear impression, lip prints and tire impression at crime scene. **CO4**: Employ relevant scientific methods in independent research in the field. **CO5**: Apply critical analysis of recent literature review and employ them in structuring and formulating scientific methods in developing fingerprints using various chemical methods. **CO6**: Employ relevant provisions of Criminal Procedure Code and Identification of Prisoner's Act in cases involving fingerprint examination.

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	18MSFS4S32	Forensic Anthropology and Odontology	**CO1**: Describe the basic osteological & dental anatomy with Forensic perspective and their relevance in the investigative process. **CO2**: Explain various ancient DNA typing methods. **CO3**: Apply the methods of craniofacial reconstruction and craniofacial superimposition. **CO4**: Examine various types of graves and its forensic analysis. **CO5**: Judge the approximate age, race, sex and stature of the deceased from the given combination of bones.
	18MSFS4S31L	Fingerprint and Impression Analysis Lab	**CO1**: Demonstrate various types of tyres and footwear impressions. **CO2**: Compare various 2-D footwear and tire impressions. **CO3**: Judge various patterns and characteristics of lip print. **CO4**: Recommend various latent fingerprint development techniques and its photography.
	18MSFS4S32L	Forensic Anthropology and Odontology Lab	**CO1**: Identify the morphological features of the given bones. **CO2**: Demonstrate the morphological features of Axial & Appendicular skeleton. **CO3**: Employ the knowledge of anthropometry to perform various Craniometric & Somatometric measurements using various Anthropological instruments. **CO4**: Differentiate between Human & Non-human bones & able to write opinion-based report on it. **CO5**: Judge the sex, stature & age of the deceased from the given skeleton.

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	18MSFS4S41	Handwriting and Signature Analysis	**CO1**: Recall the history and development of handwriting, factors affecting handwriting, types of signature from a forgery, case studies and laws with reference to IPC and IEA. **CO2**: Describe principles of handwriting identification, characteristics of handwriting, signature identification and role of expert testimony. **CO3**: Employ ideal protocols for identifying sequence of strokes, handwriting, signature, forgery and digital signature fraud. **CO4**: Examine disputed document with respect to handwriting, signatures and various other parameters. **CO5**: Recommend appropriate protocols to draw useful conclusions on disputed documents. **CO6**: Construct a scientifically correct report according to SWGDOC in the field of disputed document examination.
	18MSFS4S42	Pharmacotoxicology and Drugs of abuse	**CO1**: Recall the general concepts of pharmacology, forensic toxicology and drugs of abuse **CO2**: Describe the concepts of pharmacokinetics, toxicodynamic, nature and mode of action various poisons, and the role of anti-doping agencies **CO3**: Differentiate among various techniques used in extraction, isolation and clean -up procedures employed in toxicological analysis. **CO4**: Demonstrate competency to examine various toxicological evidences.
	18MSFS4S41L	Handwriting and Signature Analysis Lab	**CO1**: Identify freehand, simulated and trace forgery **CO2**: Examine secret writing and anonymous letters **CO3**: Construct juxtaposed charts and report writing on handwriting and signature examination **CO4**: Create and verify digital signature

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	18MSFS4S42L	Pharmacotoxicology and Drugs of abuse Lab	**CO1**: Examine different exhibits for forensic purpose **CO2**: Summarize the investigation of various toxicological exhibits **CO3**: Evaluate the various forensic exhibits **CO4**: Examine the various exhibits for adulteration **CO5**:Describe the concepts of chemistry of solution