P.GIIYearCourse

TwoYEARP.GProgramCourseworkandResearch Work						
Year/Semester		**Courses Level**	**Corecourse/ Dissertation**	**Practicum Courses**	**Internship/ Apprenticeship /SeminarOr VAC (CHM/ EESC)**	**TotalCredits**
Firstyear	SemI	400 400	CC-11 (6 Credits) CC-12 (6 Credits)	PC-11 (4 Credits) PC-12 (4 Credits)	**Internship/ Apprenticeship/ Seminar** (2 Credits)	22
	Sem II	400 500	CC-21 (6 Credits) CC-22 (6 Credits)	PC-21 (4 Credits) PC-22 (4 Credits)	**VAC(CHM/ EESC)** (2 Credits)	22

TwoYEARP.GProgramOption – IOnly Coursework						
Year/Semester		**Courses Level**	**Corecourse/ Dissertation**	**Practicum Courses**	**Internship/ Apprenticeship /SeminarOr VAC (CHM/ EESC)**	**TotalCredits**
Second year	SemIII	500 500	CC-31 (6 Credits) CC-32 (6 Credits)	PC-31 (4 Credits) PC-32 (4 Credits)	**Internship/ Apprenticeship/ Seminar** (2 Credits)	22
	SemIV	500 500	CC-41 (6 Credits) CC-42 (6 Credits)	PC-41 (4 Credits) PC-42 (4 Credits)	**VAC(CHM/ EESC)** (2 Credits)	22

TwoYEARP.G ProgramOption– IICoursework andResearch Work						
Year/Semester		**Courses Level**	**Corecourse/ Dissertation**	**Practicum Courses**	**Seminar /Research Thesis/ Project/Patent**	**TotalCredits**
Second year	SemIII	500 500	CC-31 (6 Credits) CC-32 (6 Credits)	PC-31 (4 Credits) PC-32 (4 Credits)	**Seminar (2Credits)**	22
	SemIV				**/Research Thesis/ Project/ Patent (22Credits)**	22

TheoryPaper:SchemeB-1forTwo YearPG Program			
Program:	**Class:**M.Sc.I Semester	**Year: 2025**	**Session:2025-26**
Subject:**Forensic Science**			

1	CourseCode	CC – 11	
2	Course Title	**Forensic Science Investigation and Criminal Justice System: Theory**	
3	Course Type		
4	Pre-Requisite(if any)		
5	CourseLearning Outcome(CLO)	**The fundamental principles and functions of forensic science and their significance tohuman society, the art of collecting, packaging, and preserving different types of physicaland trace evidence at crime scenes, the importance of chain of custody, different types ofcrime scenes; various tools and techniques for analysis of different types of crime sceneevidence and their processing in courts.**	
6	Credit Value	6	
7	TotalMarks	Max. Marks: 100	Minimum Passing Marks:40

TotalNo.OfLectures-TutorialPractical(inhoursperweek):
L-T-P:

Unit	Topics	No. OfLectures
I	**Foundations of Forensic Science and Ethical Framework:** The History and Development of Forensic Science, The Nature and Scope of Forensic Science. Organizational Structure of Forensic Science Laboratories at Central & State Level. Ethics in Forensic Science. Basic principles and its significance. **Concept of *Dharma*, *Nyaya* (justice), and *Satya* (truth)**	14
II	**Definition, Theories of Causation of Crime**: Pre-Classical and Neo-Classical, Constitutional, Geographical, Economic, Psychological, Sociological, Multiple Causation Approach. General Factors of Crime, Forms of Punishment in Brief, Radical Theory of Crime. Scene of Crime: Types, Protection of Scene of Crime, Crime Scene Documentation, Note Taking, Videography, Photography and Sketching Methods. Physical Evidence: Meaning, Types, Searching Methods, Collection and Preservation, Forwarding. chain of custody. Collection, Preservation, Packing and Forwarding of: Blood, Semen and Other Biological Stains, Firearm Exhibits, Documents, Fingerprint, Viscera, Hair & Fiber, Glass, Soil and Dust, Petroleum Products, Drugs and Poisons, etc. Investigation of the Following Crimes: Murder, Theft and House Breaking, Road Accident, Railways and Air Accidents, Arson, Sexual Assault Cases, Dowery Cases and Explosion	22

	Cases.	
III	**Elements of Crime Scene Management**- Information Management, Technology Management, Man-Power Management, and Logistic Management. An Introduction to Crime Scene Reconstruction, The Nature of Reconstruction, Physical Evidence and Reconstruction (Recognition, Identification, Individualization, and Reconstruction), Stages in Reconstruction, Types of Reconstruction, Pattern. Evidence in Reconstruction (Bloodstain Pattern Analysis for Reconstruction, Glass Fracture Pattern Fire Burn Patterns, Tire and Skid Mark Patterns), Shooting Scenes, Requirements for Reconstruction after Crime Scene Released, Writing a Reconstruction Report.	18
IV	**Bhartiya Nyaya Sanhita (2023)**: Introduction, General Exceptions, Offences against Person, Offences against Property, Attempt to Suicide, Sexual Offences. **Bhartiya Nagarik Suraksha Sanhita (2023):** Introduction and General Idea of Sections: 173, 174, 175, 176,177, 178,179, 180, 181, 192,193, 194, 195 and 196. **Bhartiya SakshyaAdhiniyam (2023):** Introduction and General Idea of Sections: 26, 39, 40, 41, 52, 53, 55, 72,140, 141,142 and 162.	18
V	**Organization of Police in India**, Organization of Courts in Courts Cases, Prosecution, F.I.R., Case Diary, Interrogation of Suspects, Interview of Witness, and Procedure in Court as Per Bhartiya Nagarik Suraksha Sanhita: Trial of Summons, Trial of Warrant, and Summary Trial. Report Writing and Evidence Evaluation Report Formats of Crime Scene and Laboratory Findings court Testimony: Admissibility of Expert Testimony, Pre Court Preparation and Court Appearance	18
Keywords/Tags: Evidence Investigation, Forensics, Analysis, Justice		

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Ahuja R. (2001). Criminology. India, Rawat Pub.
2. Aitken C.G.G. & Stoney, D.A. (1991). The Use of Statistics in Forensic Science. England,Ellis Harwood Limited.
3. Bowen R.T. (2016). Ethics and the Practice of Forensic Science. USA, CRC Press.
4. Burke R.H. (2013). An Introduction to Criminological Theory, 4th ed., UK, Routledge-Taylor & Francis Group.
5. Horswell J. (2016). The Practice of Crime Scene Investigation. USA, CRC Press.
6. Indian Penal Code, Criminal Procedure Code, Indian Evidence Act.

PracticalPaper:SchemeB-1 forTwoYearPG Program

7. James, S.H., and Nordby, J.J. (2003). Forensic Science: An Introduction to Scientific and Investigative Techniques. USA, CRC Press.
8. James S.H. (2014). Forensic Science: An Introduction to Scientific and Investigative Techniques. UK,Taylor& Francis.
9. Nordby J. (1999). Dead Reckoning-The Art of Forensic Science Detection. USA, CRC Press.
10. O'Hara & Osterberg, (1949). An Introduction to Criminalistics. New York, The Macmillan Company.

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100
ContinuousComprehensiveEvaluation(CCE): 40 **UniversityExam (UE): 60**

InternalAssessment	**Marks**	**External Assessment**	**Marks**
Mid-Semester Test (MST)	20	Term End Exam	60
Teacher Assessment* (TA) and Class attendance	20		
Total	40		60

Teacher Assessment* Presentation/Assignment/Quiz/Group-Discussion etc.

Program:			
Subject:**Forensic Science**	**Class:**M.Sc.ISemester	**Year: 2025**	**Session:**2025-26

1		
2	CourseCode	PC - . 11
3	Course Title	**Forensic Science Investigation and Criminal Justice System: Practical**
4	Course Type	
5	Pre-Requisite(if any)	
6	CourseLearning Outcome(CLO)	**Crime scene management and photography; different searching methods of crime scenes;different methods of crime scene sketching; collection, packing, labelling, andforwarding of physical evidence from the crime scene to the forensic science laboratory,methods of crime scene reconstruction.**
7	Credit Value	4

	TotalMarks	Max.Marks: 100	Minimum PassingMarks:40

TotalNo.OfLectures-Tutorial-Practical(in hoursperweek): L-T-P:

Topics	
1. Demonstration of Crime Scene Management. 2. Photography of Scene of Crime Digital Camera. 3. Methods for Searching for Physical Evidence at the Scene of Crime. 4. Sketching of an Outdoor Scene of Crime (Homicide or Suicide). 5. Sketching of an Outdoor Scene of Crime (Accident). 6. Sketching of Indoor Scene of Crime (Theft or Dacoity or Robbery). 7. Sketching of an Indoor Scene of Crime (Murder or Suicide). 8. Sketching of a Mobile Scene of Crime (Hit & Run Case). 9. Collection, Packing, Labeling and Forwarding of Physical Evidence from Scene of Crime to ForensicScience Laboratory. 10. Reconstruction of a Scene of Crime.	**No.OfLectures**
Keywords/Tags: Evidence Investigation, Scene of Crime, Sketching, Searching	

TextBooks,ReferenceBooks,Other Resources
Suggested Readings: 1. Ahuja R. (2001). Criminology. India, Rawat Pub. 2. Aitken C.G.G. & Stoney, D.A. (1991). The Use of Statistics in Forensic Science. England,Ellis Harwood Limited. 3. Bowen R.T. (2016). Ethics and the Practice of Forensic Science. USA, CRC Press. 4. Burke R.H. (2013). An Introduction to Criminological Theory, 4th ed., UK, Routledge-Taylor & Francis Group. 5. Horswell J. (2016). The Practice of Crime Scene Investigation. USA, CRC Press. 6. Indian Penal Code, Criminal Procedure Code, Indian Evidence Act. 7. James, S.H., and Nordby, J.J. (2003). Forensic Science: An Introduction to Scientific and Investigative Techniques. USA, CRC Press. 8. James S.H. (2014). Forensic Science: An Introduction to Scientific and Investigative Techniques. UK,Taylor& Francis. 9. Nordby J. (1999). Dead Reckoning-The Art of Forensic Science Detection. USA, CRC Press. 10. O'Hara & Osterberg, (1949). An Introduction to Criminalistics. New York, The Macmillan Company.

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100
ContinuousComprehensiveEvaluation(CCE): 40 **UniversityExam (UE): 60**

InternalAssessment	Marks	External Assessment	Marks
Internal Test, Teacher Assessment* (TA) and Class Attendance	40	Term End Exam	60
Total	40		60

Teacher Assessment* Demonstration/Viva-Voce/Lab record etc.

TheoryPaper:SchemeB-1forTwo YearPG Program				
Program:	**Class:**M.Sc.ISemester	**Year: 2025**	**Session:2025-26**	
Subject:**Forensic Science**				
1	CourseCode	CC-12		
2	Course Title	**Forensic Physics, Ballistics & Cyber Theory**		
3	Course Type			
4	Pre-Requisite(if any)			
5	CourseLearning Outcome(CLO)	**Understanding firearms and their ammunition, Different fields of forensic ballisticswhich include Internal Ballistics, External and Terminal ballistics, Methods ofinvestigation in shooting cases.**		
6	Credit Value	6		
7	TotalMarks	Max. Marks:100	Minimum Passing Marks: 40	

TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:

Unit	Topics	No. OfLectures
I	**Introduction:**Density, Refractive Index, Birefringence; Other Optical Properties of Crystalline Material. Examination of the Following- 1. Hair and Fiber 2. Soil 3. Dust 4. Paints 5. Glass 6. Glass Fracture 7. Tool Marks 8. Explosives Restoration of Erased / Obliterated Marks. Examination of Wire/ Cables, Counterfeit Coins. Physical Matching of Severed / Broken Objects. Speaker Identification and Tape Authentication: Voice Production Theory-Vocal Anatomy, Speech Signal Processing & Pattern Recognition- Basic Factors of Sound in Speech, Acoustic Characteristics of Speech Signal, 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, Introduction to the Techniques of Pattern Recognition and Comparison.	14
II	**History and background, their classification and characteristics**, Shotgun and rifled firearms (including pistols, revolvers and assault rifles), Various Components of Firearms: Barrel: chamber,leed, bore (calibre and its nomenclature Rifling, Purpose of Rifling, Types of Rifling), Action: its components and various types including manual, semiautomatic and automatic stock Improvised/Country-Made/Imitative Firearms and their Constructional Features. Ammunition:,Classification and Constructional Features of Different Types of Cartridges, Types of Primers and Priming Composition, Propellants and	22

	their Compositions, Various Types of projectiles, Bullets and Compositional Aspects, Safety Aspects for Handling Firearms. **Traditional Indian warfare technologies: bows, arrows, catapults, and projectiles in Dhanurveda and Shastra Vidya.**	
III	Definition, Ignition of Propellants, Shape and Size of Propellants, Manner of Burning, Various Factors affecting the Internal Ballistics, Theory of recoil, Exterior Ballistics, Vacuum Trajectory, Effect of external and internal factors on Trajectory of cylinder-conoidal bullets and shotgun projectiles, Ricochet bullets, maximum and effective range.Concept of wound formation, Temporary and Permanent Cavities, Threshold Velocity for Penetration of Skin/Flesh/Bones, Effect of various types of projectiles on hitting the target, effect of various factors on wound formation: function of bullet shape, striking velocity, striking angle of intermediate target, tumbling of bullets, effect of instability of bullets, effect of intermediate targets, influence of range, yaw, stopping power.	18
IV	**Identification of Firearms** -Matching of crime and test: Principles and Practice of Identification of Firearms with fired projectiles in regular firearms and country made firearms. Gun-shot residue: its formation and analysis (chemical and instrumental methods), Reconstruction of crime scene: Range of fire, Time of Fire, Different Method Employed and their Limitations. **Firearm Injuries**- Nature of Wounds of Entry, Exit, and Initial Track with Various Ranges and Velocities with Evaluation of Injuries Caused by Shot-Gun, Rifle, Handguns, and Country Made Firearms, Post-Mortem and Antemortem Firearm Injuries.	18
V	What is Computer Forensic? Basic Introduction to Computers, Hardware and Accessories, Operating Systems and Software. Cyber Crime- Definition, Crimes on Internet, Hacking, Virus, Worms, Cookies, Obscenity and Pornography. Programme Manipulation. Software Piracy, Intellectual Property and Computer Security. Encryption and Decryption Methods. What is Computer Forensic? Basic Introduction to Computers, Hardware and Accessories, Operating Systems and Software. Cyber Crime- Definition, Crimes on Internet, Hacking, Virus, Worms, Cookies, Obscenity and Pornography. Programme, Manipulation. Software Piracy, Intellectual Property and Computer Security. Encryption and Decryption Methods.	18
Keywords/Tags: Computer Forensic, Firearms, Ballistics, Bullets		

PracticalPaper:SchemeB-1 forTwoYearPG Program

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Bengold&Moryson N. (1999). Speech and Audio Signal Processing. USA, John Wiley & Sons.
2. Caddy B. (2001). Forensic Examination of Glass and Paint Analysis and Interpretation. UK, Taylor and Francis.
3. Hatcher, Jury, & Weller (1977). Firearms Investigation, Identification, and Evidence. Harrisburg, Stackpole Books.
4. Heard B.J. (1997). Handbook of firearms and ballistics. London, John Willey.
5. Hogg. V. (1982). The Cartridges Guide - A Small Arms Ammunition Identification Manual. Harrisburg, The Stackpole Co.
6. Jenkins and White, (2003). Fundamentals of Optics. USA, McGraw Hill.
7. Johari M. (1980). Identification of Firearms, Ammunition and Firearms Injuries. India, BPR&D.
8. Maio V.D. (1999). Gunshot Wounds. US, CRC Press.
9. Mathews, J.H. & Thomas, C.C. (1973). Firearms Identification, Vols. 1, 2, & 3. Illinois, Springfield.
10. Murray, R.C. &Tedrew J.C.F. (1991). Forensic Geology. New Jersey, Prentice hall.
11. Bayuk J. (2010). Cyber Forensics: Understanding Information Security Investigations. NY,Springer.
12. Santanam R., Sethumadhawan M. (2010). Cyber Security, Cyber Crime and CyberForensics: Applications and Cyber Forensics: Applications and Perspectives. NY, InformationScience Reference

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100
ContinuousComprehensiveEvaluation(CCE): 40 **UniversityExam (UE): 60**

InternalAssessment	**Marks**	**External Assessment**	**Marks**
Mid-Semester Test (MST)	20	Term End Exam	60
Teacher Assessment* (TA) and Class attendance	20		
Total	40		60

Teacher Assessment* Presentation/Assignment/Quiz/Group-Discussion etc.

Program:	Class:M.Sc.ISemester	Year: 2025	Session:2025-26

Subject:**Forensic Science**		
1	CourseCode	PC-12
3	Course Title	**Forensic Physics, Ballistics & Cyber Practical**
4	Course Type	
5	Pre-Requisite(if any)	
6	CourseLearning Outcome(CLO)	**Understanding of the density gradient method for matching soil, glass, glass fractures and the refractive index of glass. chemical treatment of erased tool marks, lifting and casting of footmarks, tyre marks, handling of a comparison microscope.**
7	Credit Value	4

	TotalMarks	Max.Marks: 100	Minimum PassingMarks: 40

TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:

Topics	**No.OfLectures**
1. Identification and Matching of Dust/ Soil Sample by Physical Method (Including Density Gradient Method). 2. Physical Matching of Cloth Sample and Identification of Glass Fractures. 3. Calculate the refractive index of glass with Abbe's Refractometer. 4. Restoration of an Erased Punched Mark on a Metal Piece by Chemical Treatment. 5. Comparison of Tool Marks and Fired Cartridge/ Bullet Using Comparison Microscope. 6. Identification of Shots and Pallets. 7.Collection and Handling of Digital Evidence. 8. Detection of Origin of e-Mails (IP Address) etc. 9. Data recovery from various storage devices by using data recovery software.	

Keywords/Tags: Computer Forensic, Firearms, Ballistics, Bullets

TextBooks,ReferenceBooks,Other Resources
Suggested Readings: 1. Bengold&Moryson N. (1999). Speech and Audio Signal Processing. USA, John Wiley & Sons. 2. Caddy B. (2001). Forensic Examination of Glass and Paint Analysis and Interpretation. UK, Taylor and Francis. 3. Hatcher, Jury, & Weller. (1977). Firearms Investigation, Identification, and Evidence. Harrisburg, Stackpole Books. 4. Heard B.J. (1997). Handbook of Firearms and Ballistics. London, John Willey. 5. Hogg. V. (1982). The Cartridges Guide - A Small Arms Ammunition Identification Manual. Harrisburg, The Stackpole Co. 6. Jenkins and White, (2003). Fundamentals of Optics. USA, McGraw Hill. 7. Johari M. (1980). Identification of Firearms, Ammunition and Firearms Injuries. India, BPR&D. 8. Maio V.D. (1999). Gunshot Wounds. US, CRC Press. 9. Mathews, J.H. & Thomas, C.C. (1973). Firearms Identification, Vols. 1, 2 & 3. Illinois, Springfield. 10. Murray, R.C. &Tedrew J.C.F. (1991). Forensic Geology. New Jersey, Prentic hall. 11. Santanam R., Sethumadhawan M. (2010). Cyber Security, Cyber Crime and Cyber Forensics: Applications and Cyber Forensics: Applications and Perspectives. NY, InformationScience Reference. 12. Wiles J., Reyes A. (2007). The Best Damn Cybercrime and Digital Forensics Book Period.US, Elsevier. 13. Nelson B, Philips A., Steuart C. (2014). Guide to Computer Forensics and Investigations. US, Cengage Learning

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100
ContinuousComprehensiveEvaluation(CCE): 40 **UniversityExam (UE): 60**

InternalAssessment	Marks	External Assessment	Marks
Internal Test, Teacher Assessment* (TA) and Class Attendance	40	Term End Exam	60
Total	40		60

Teacher Assessment* Demonstration/Viva-Voce/Lab record etc.

Internship/ Apprenticeship/ Seminar (2 Credits)

TheoryPaper:SchemeB-1forTwo YearPG Program			
Program:	**Class:**M.Sc.II	**Year: 2025**	**Session:2025-26**

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100

- **Seminar: Internal Evaluation only**
- **Internship/ Apprenticeship: Marks to be allotted by the concerned organiaztion**

	Semester		
Subject:**Forensic Science**			
1	CourseCode	CC-21	
2	Course Title	**Instrumental Method- Physical, Chemical and Biological: Theory**	
3	Course Type		
4	Pre-Requisite(if any)		
5	CourseLearning Outcome(CLO)	Understanding about the sample preparation, handling and extraction techniques the basic principle and working of chromatographic and spectroscopic technique that could lead to professional job opportunities in testing and pharmaceutical laboratories, the basic principle and working of spectroscopy, microscopy and other analytical instruments	
6	Credit Value	6	
7	TotalMarks	Maximum marks: 100	Minimum marks: 40

TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:

Unit	Topics	No. OfLectures
I	Instrumental Approach (Sample, Sampling, Storage of Samples), Simple Sample Separation (Distillation, filtration, evaporation, and crystallization. Solvent Extraction techniques like LLE, SPE, Micro SPE and Distribution Law) and Preparation (Acid Dissolution &; Digestion, Fusions, Dry Ashing and Combustion), Basic Statistics and Data Handling (Significant Figures, Accuracy and Precision, Types of Errors, Quantifying Random Error, Rejection of Results), Performing the Measurement (Signals and Noise, Plotting Calibration Curves), Assessing the Data (Limit of Detection, Limit of Quantification).	14
II	General Idea on Spectroscopy, Electromagnetic Spectrum, Various Sources of Radiation and their utility and limitations, Interaction of Radiation with Matter, i.e., Reflection, Absorption, Fluorescence, Phosphorescence, Diffraction, Refraction, etc. Detection of Radiation, i.e., Photography, Photoelectric, etc. Introduction to optical systems used in Spectroscopy (Wavelength Selection Devices, Optical Slits, Detectors, Single- Beam and Double- Beam Optics), Dispersive Optical Layouts, and Fourier Transform Spectrometers. Forensic Applications of Spectroscopy.	22

III	Atomic Spectra- Energy Level, Quantum Number and Designation of States, Selection Rule. Molecular Spectra- Quantitative Discussion of Molecular Bindings, Molecular Orbital, Types of Molecular Energies, Discussion of Rotational, Vibrational, and Electronic Spectra. Ultraviolet-Visible and Infrared Spectrophotometry: Basic Principles, Instrumentation, Qualitative and Quantitative Analysis, Interpretation of Spectra, etc. Quantitative Analysis through Ultraviolet-Visible Spectroscopy, Forensic Application of UV-Vis. and IR Spectrophotometry. Mass Spectrometry: Principle and Instrumentation, Correlation of MS with Molecular Structure. A brief idea about the various forms of Mass Spectrometry Coupling with other instruments. Application of MS in Forensic Science.Radiochemical Techniques: Basic Principles and Theory, Introduction about Nuclear Reactions and Radiations, Neutron Activation Analysis (NAA), Nuclear Magnetic Resonance Spectroscopy (NMR)	18
IV	General Idea of Chromatography; Historical Aspect of Chromatography, Classification of Chromatography (Mobile Phase Mode, Technique, Development Mode, Separation Mechanism &; other Systems of Classification), Theory and Classification of Chromatography (Planar and Column Chromatography, Adsorption and Partition Chromatography, Ion Exchange Chromatography, Exclusion Chromatography, Affinity Chromatography), Principles, Working and Forensic Application of Planar Chromatography; TLC, PC, HPTLC. General Principles, Working and Forensic Application of Column Chromatography General Idea on Working of HPLC and GC. Forensic Application of Chromatography.	18
V	Gel Electrophoresis, Isoelectric Focusing etc. General Idea and Working of Gel Electrophoresis, PAGE, SDS-PAGE, Capillary Electrophoresis, Forensic Application of Electrophoresis. Production ofAntibodies, Precipitation Reaction, Gel Immunodiffusion, Immune-Electrophoresis, ComplementFixation.Molecular Biology Techniques, DNA Profiling and MicrofluidicsOutline of Genetic Manipulation Enzymes, Enzymes in Genetic Manipulation, Cloning Procedures,Isolation of Specific Nucleic Acid Sequences-Complementary DNA, Gene Libraries, ColonyHybridization, Nick Translation, Oligo-nucleotide Probes, Expression of Genes. DNAProfiling:Structure of DNA anditsPolymorphicMarker, Basis of DNA Typing and Techniques: PCR, RFLP, etc. The Introduction of Microfluidics.Theory, Instrumentation, and its applications.	18
Keywords/Tags: Electrophoresis, Chromatography, Spectroscopy, Separation		

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Chatwal and Anand. (2016). Instrumental Methods of Chemical Analysis. India, Himalaya Publishing House Pvt. Ltd.
2. Churáček J. (1993). Advanced Instrumental Methods of Chemical Analysis. Michigan, E. Harwood,

PracticalPaper:SchemeB-1 forTwoYearPG Program

3. Dean J. A. (1995). Analytical Chemistry Handbook. USA, McGraw Hill Inc.
4. Kalri P.S. (2001). Spectroscopy of Organic Compounds. India, New Age International Pub.
5. Khandpur R.S. (2004). Handbook of Analytical Instruments. USA, Tata McGraw Hill Pub. Co.
6. Khanna D.R. &;Gulati H.R. (2002). Fundamentals of Optics Geometrical Physical &; Quantum. India, R. Chand &; Co.
7. Robards K. Jackson P.E. &; Haddad P.A. (2012). Principles and Practice of Modern Chromatographic Methods. Germany, Elsevier pub.
8. Saferstein R. (2001). Forensic Science Handbook Vol. I. London, Prentice Hall.
9.Edwin & Caney, H. M.(1993). Human Genetics: The Molecular Revolution. London, Jones & BartlettPub.
10. Epplen J. T., and Lubjumhin, T.(1995). DNA Profiling and DNA Fingerprinting. Basel, BirkhäuserVerlag.
11.Gardner E.J., Simmons M.I. &SnustadD.P.(1991). Principles of Genetics. New York, JohnWiley.
12. Glover, D.M., & Hames, B.D.(1995). DNA Cloning, vol. 1 to 4. England, Oxford University Press,Oxford Pub.
12. Joshi A. R. (2002). A Textbook of Practical Biochemistry. India, B. Jain Publishers.

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100
ContinuousComprehensiveEvaluation(CCE): 40 **UniversityExam (UE): 60**

InternalAssessment	**Marks**	**External Assessment**	**Marks**
Mid-Semester Test (MST)	20	Term End Exam	60
Teacher Assessment* (TA) and Class attendance	20		
Total	40		60

Teacher Assessment* Presentation/Assignment/Quiz/Group-Discussion etc.

Program:			
Program:	**Class:**M.Sc.IISemester	**Year: 2025**	**Session:**2025-26
Subject:**Forensic Science**			

1	CourseCode	PC-21
2	Course Title	**Instrumental Method- Physical, Chemical and Biological: Practical**
3	Course Type	
4	Pre-Requisite(if any)	
5	CourseLearning Outcome(CLO)	Understanding about the sample preparation techniques, sample handling and extraction techniques, qualitative and quantitative analysis, the basic principle and working of chromatographic techniques like TLC, HPTLC, HPLC, GC etc. and spectroscopic technique like UV Spectroscopy, FTIR etc.
6	Credit Value	4

	TotalMarks	Max.Marks: 100	Minimum PassingMarks:40

TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:

Topics	**No.OfLectures**
1. To Measure the pH of Different Substance using pH Meter. 2. To Know the Concentration of Given Liquid by Colorimeter. 3. Sample Preparation and Analysis of Drugs of Abuse by using UV-Visiblespectrophotometer. 4. To separate and identify plant pigments by paper chromatography. 5. To know the Practical Working and Handling of High-Performance Thin Layer Chromatography by analyzing the ink sample. 6.To know the Practical Working and Handling of High-Performance Liquid Chromatography by analyzing depressant drugs. 7.To know the Practical Working and Handling of Gas Chromatography by analyzing volatile poisons. 8. Demonstration of Handling and Working of PCR. 9. To Perform Protein Estimation of Given Biological Samples. 10. To Separate Cell Organelles in Given Tissues using Centrifuge. 11. Demonstration of Working and Handling of Gel Electrophoresis. 12. Demonstration of Working and Handling of Compound, Stereo Microscope, SEM and TEM. 13. Demonstration ofWorking and Handling of the UV-Spectrophotometer for the Examination ofBiological Samples.	

Keywords/Tags: Electrophoresis, Chromatography, Spectroscopy, Separation

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Chatwal and Anand. (2016). Instrumental Methods of Chemical Analysis. India, Himalaya Publishing House Pvt. Ltd.
2. Churáček J. (1993). Advanced Instrumental Methods of Chemical Analysis. Michigan, E. Harwood,
3. Dean J. A. (1995). Analytical Chemistry Handbook. USA, McGraw Hill Inc.
4. Kalri P.S. (2001). Spectroscopy of Organic Compounds. India, New Age International Pub.
5. Khandpur R.S. (2004). Handbook of Analytical Instruments. USA, Tata McGraw Hill Pub. Co.
6. Khanna D.R. &;Gulati H.R. (2002). Fundamentals of Optics Geometrical Physical &; Quantum. India, R. Chand &; Co.
7. Robards K. Jackson P.E. &; Haddad P.A. (2012). Principles and Practice of Modern Chromatographic Methods. Germany, Elsevier pub.
8. Saferstein R. (2001). Forensic Science Handbook Vol. I. London, Prentice Hall
9.(1978). Biology Methods Manual. London: Metropolitan Police Forensic Science Laboratory.
10. Albert S., Bray B., Lewis D., Roberts K., and Watson J.D. (1989). Molecular Biology of the Cell. New York,Garland Pub.
11. Clifford B.J.(1971). The examination and typing of bloodstains in the Crime Laboratory. USA, US Court Printing Press.
12. Edwin & Caney, H. M.(1993). Human Genetics: The Molecular Revolution. London, Jones & Bartlett Pub.
13. Epplen J. T., and Lubjumhin, T.(1995). DNA Profiling and DNA Fingerprinting. Basel, Birkhäuser Verlag.

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100
ContinuousComprehensiveEvaluation(CCE): 40 **UniversityExam (UE): 60**

InternalAssessment	Marks	External Assessment	Marks
Internal Test, Teacher Assessment* (TA) and Class Attendance	40	Term End Exam	60
Total	40		60

Teacher Assessment* Demonstration/Viva-Voce/Lab record etc.

TheoryPaper:SchemeB-1forTwo YearPG Program

Program:	Class:M.Sc.II Semester	Year: 2025	Session:2025-26
Subject:**Forensic Science**			
1	CourseCode	CC-22	
2	Course Title	**Dactylography, Biometrics and Questioned Documents: Theory**	
3	Course Type		
4	Pre-Requisite(if any)		
5	CourseLearning Outcome(CLO)	Understanding about the basics of fingerprint, history, patterns & classification, types offingerprints, location, development, photography & comparison, ear biometrics and irisrecognition, retina biometrics and face recognition.	
6	Credit Value	6	
7	TotalMarks	Max. Marks: 100	Minimum Passing Marks:40

TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:

Unit	Topics	No. OfLectures
I	**History of Fingerprints**, Formation of Ridges, Different Fingerprint Patterns and Areas, RidgeCharacteristics, Ridge Count, Ridge Tracing, Levels of Fingerprint Identification, Classification ofFingerprint- Henry system of classification, single digit classification, extension of the Henry system.Types of Fingerprint; Latent, Visible, and Plastic Prints, Location of Fingerprints; Development ofLatent Prints by Physical and Chemical Methods. Photography and Comparison of Fingerprints, 3-DDevelopment of Fingerprints **Ancient Indian palmistry (*Hasta Samudrika Shastra*):Individual fingerprint patterns for personality and destiny.**	14
II	**Fingerprint Biometrics**: Introduction to AFIS, Working of AFIS System, AFIS Components,Digitization& Processing of Fingerprints: Acquisition, Normalization & Segmentation, Enhancement,Binarization, Thinning & Post-processing, Minutiae Extraction, Fingerprint Matching in AFIS, Indexing & Retrieval. AMBIS- Integrated Biometric Identification System, CCTNS. Iris Recognition: Introduction, Anatomical and Physiological Underpinnings; Iris SignatureRepresentation and Matching; Localization, Representation; Matching. Retina Biometrics: Structure of Eye; Human Retina and Structure; Unique Pattern of Blood Vessels;Retina Pattern and Identification.	22

III	**Voice Production**, Theory-Vocal Anatomy, Speech Signal Processing & Pattern Recognition- BasicFactors of Sound in Speech, Acoustic Characteristics of Speech Signal. An Introduction to theTechniques of Pattern Recognition and Comparison. **Face Recognition and Facial Reconstruction** Face Recognition: Introduction, Detection, Representation, and Classification,Techniques and theirApplications.Facial reconstruction: 2D & 3D Facial reconstruction. **Face reading and body proportion analysis to determine personality and identity (*Samudrika Shastra* and *Ayurveda)***	18
IV	Definition of Questioned Document, Types of Questioned Document, Collection, Preservation& Handling of Questioned Document, Photography of Questioned Document, PreliminaryExamination of Questioned Document.Basic Tools Needed for Forensic Document Examination- Ultraviolet, Visible, Infrared, andFluorescenceSpectroscopy,Photomicrography,Microphotography, VisibleSpectralComparator, Electrostatic Detection Apparatus, Determining the Age and Relative Age ofDocuments.	18
V	Comparison of Handwriting, Development of Individuality in Handwriting, Natural Variationsand Fundamental Divergences in Handwriting, Class & Individual Characteristics.Standards for Comparison of Handwriting. Comparison of Paper, Ink, Printed Documents,Typed Documents, Xeroxed Documents.Alterations in Documents, Including Erasures, Additions, Over-Writing, and Obliterations.Indented and Invisible Writings. Charred Documents. Examination of Counterfeit IndianCurrency Notes, Passports, Visas, and Stamp Pads. **Role of handwriting in resolving disputes in ancient India (Document examination in Dharamasastra)**	18

Keywords/Tags: Comparison,Document,Voice, Biometrics

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. James S. H. (2014). Forensic Science: An Introduction to Scientific and Investigative Techniques. USA, Taylor & Francis Group.
2. Ashbaugh D. R., (1999). Quantitative and Qualitative Friction ridge analysis. NY, CRS Press.
3. Daluz H. M., (2014). Fundamentals of Fingerprint Analysis. NY, CRC Press.
4. Das R. (2014). Biometric Technology: Authentication, Bio Cryptography, and Cloud-Based.
5. Nickolls, L.C. (1956). Scientific Investigation of Crime. London, Bulterwest.
6. Kelly J. S. & Lindblom B. S. (2006). Scientific Examination of Questioned Documents. NY,CRC Press.

PracticalPaper:SchemeB-1 forTwoYearPG Program

7. Sharan M.K. (1978). Court Procedure in Ancient India. Abhinav Publications. India

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100
ContinuousComprehensiveEvaluation(CCE): 40 **UniversityExam (UE): 60**

InternalAssessment	**Marks**	**External Assessment**	**Marks**
Mid-Semester Test (MST)	20	Term End Exam	60
Teacher Assessment* (TA) and Class attendance	20		
Total	40		60

Teacher Assessment* Presentation/Assignment/Quiz/Group-Discussion etc.

Program:	Class:M.Sc.IISemester	Year: 2025	Session:2025-26

Subject:**Forensic Science**		
1.	CourseCode	PC-22
2.	Course Title	**Dactylography, Biometrics and Questioned Documents: Practical**
3.	Course Type	
4.	Pre-Requisite(if any)	
5.	CourseLearning Outcome(CLO)	Understanding about Collection, Preservation, Handling & Forwarding of Charred Document, Comparison of Forged and Genuine Document, Examination of ink by TLC, and Collection and Handling of Digital Evidence.
6.	Credit Value	4

	TotalMarks	Max.Marks: 100	Minimum PassingMarks: 40

TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:

Topics	
1. To Record a Fingerprint Chart by Direct Print Method and Rolling Method. 2. To Identify the Fingerprint Patterns along with Core and Delta. 3. To Perform Ridge Tracing and Ridge Counting of the Fingerprints. 4. Development of Latent Prints by Powder Method and Chemical Methods on Porous and Non-Porous Surfaces. 5. Lifting of Fingerprints by Different Methods. 6. Identification of Chance Prints Found on Different Surfaces. 7. Collection, Preservation, Handling & Forwarding of Charred Document. 8. Photographic Comparison of Handwriting & Signature. 9. Comparison of Forged and Genuine Document by VSC & Other Methods. 10. Decipher of Secret Writing by Physical and Chemical Methods. 11. Examination of Questioned Document & Currency by VSC. 12. Examination of ink by TLC	**No.OfLectures**

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

Suggested Readings:

1. James S. H. (2014). Forensic Science: An Introduction to Scientific and Investigative Techniques. USA, Taylor & Francis Group.
2. Ashbaugh D. R., (1999). Quantitative and Qualitative Friction ridge analysis. NY, CRS Press.
3. Daluz H. M., (2014). Fundamentals of Fingerprint Analysis. NY, CRC Press.
4. Das R. (2014). Biometric Technology: Authentication, Bio Cryptography, and Cloud-Based.
5. Nickolls, L.C. (1956). Scientific Investigation of Crime. London, Bulterwest.
6. Kelly J. S. & Lindblom B. S. (2006). Scientific Examination of Questioned Documents.NY,CRC Press.

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100
ContinuousComprehensiveEvaluation(CCE): 40 **UniversityExam (UE): 60**

InternalAssessment	**Marks**	**External Assessment**	**Marks**
Internal Test, Teacher Assessment* (TA) and Class Attendance	40	Term End Exam	60
Total	40		60

Teacher Assessment* Demonstration/Viva-Voce/Lab record etc.

Value Added Course [Constitutional Human and Moral Values (CHM)/Employability and Entrepreneurship Skill Course (EESC)] (2 Credits)

SuggestedContinuousEvaluation Methods:
Maximum Marks: 100

- **CHM: Only Term End Exam (Theory)**
- **EESC: Only Term End Exam (Theory)**