

ST. JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM
FORENSIC SCIENCE
SYLLABUS

COURSE: INTRODUCTION TO FORENSIC SCIENCE AND CRIMINOLOGY
COURSE CODE: FS-Ma1-1101(3)

TIME: 3HRS/WEEK

SEMESTER - I
MARKS: 100

OBJECTIVES

- · To understand the fundamental principles and concepts of forensic science and criminology.
- · To analyse the relationship between crime, law, and justice.
- · To understand the forensic science toolkits.

LEARNING OUTCOMES

After studying this course the students will know-

- The significance of Forensic Sciences to the Criminal Justice System.
- The working conditions of Forensic Science Laboratory.
- The importance of criminology and penology for crime detection.
- The working of Indian courts and role of criminal justice system in crime detection.

UNIT - 1: BASICS AND HISTORICAL DEVELOPMENT OF FORENSIC SCIENCE

Introduction, Definition, need, signification and scope of Forensic Science. Principles of Forensic Science .Domains in Forensic Science: Forensic Biology, Forensic Medicine, Forensic Toxicology, Forensic Osteology and Odontology, Forensic Physics, Forensic Photography, Ballistics, Fingerprint, Questioned Documents, Forensic Psychology, Forensic Anthropology, Wild life Forensic, DNA profiling, Computer Forensic etc.

Specific contribution of scientists in the field of Forensic Science. Development of Forensic Science in India. National and international scenario of teaching and research institution in Forensic Science. Functions of: Forensic Scientist, Police officers, Prosecution, Judicial Officers and Medico legal expert etc. Problem of proof in Forensic Science, corpus dilecti, modus operandi.

UNIT 2: FORENSIC SCIENCE LABORATORY AND NATIONAL AND INTERNATIONAL PERSPECTIVE OF FORENSIC SCIENCE

Structure and function of State and regional Forensic Science Laboratory, Central Forensic Science Laboratory and facility provided, Mobile Forensic Science Laboratory. Directorate of Forensic Science Service. Police and Forensic scientist relationship, role of FSL in criminal investigation, relationship between forensic expert and judiciary officer, Importance of FSL, National and International scenario of FSL, facilities provided in forensic science laboratory. Ethical issues in FSL.

National perspective of forensic science: Central and Divisional Fingerprint Bureaus, National Crime Records Bureau, Police & Detective Training Schools, Bureau of Police Research & Development, Police Academies, Police dogs.

International perspectives of forensic science: INTERPOL, FBI, CIA, CSI, Ameripol, Europol, Frontex etc.

UNIT 3: POLICING SYSTEM AND CRIMINAL JUSTICE SYSTEM IN INDIA

Policing style and principles, police power of investigation, filling of criminal charges, community policing a heterogeneous society. Introduction to penology, Broad concepts of criminal justice system, Correctional measures and rehabilitation of offenders, Human rights and criminal Justice system in India.

Criminal Justice System in India- Introduction, Administration of Civil and Criminal Laws. Introduction to constitution of India- Fundamental Rights, BNS, BNSS, BSA, IT Act-2000, Wild Life Protection Act- 1972, POCSO Act, etc. Indian Courts- Introduction, Hierarchy of courts- Powers of courts, types of courts, Lok Ayukta & Lok Adalat, etc. Role and responsibilities of Public Prosecution – Defence Council -Admissibility of Expert Testimony.

UNIT 4: CRIME & CRIMINOLOGY

Crime: Definition of crime, history and development, Victimology, criminological perspective, characteristics of crime, classification of crimes, present scenario of crime in India. Criminal and Criminology: Definition of criminology & criminal, classification of criminals, growth of criminology in India, conservative criminology, liberal criminology, radial criminology.

Criminal behaviour: Introduction of criminal behaviour, theories of criminal behaviour, Ethical issues in forensic science: Definition of ethics, professional standards for practice of Criminalistics, sanction against expert for unethical conduct.

UNIT 5: CRIMINAL PSYCHOLOGY

Introduction, Definition & Scope. Mc. Naughten Rule, Insanity in IPC, Sensation and Perception. Gestalt principle of perceptual process. Personality – definition, traits and approaches. Freud's psychoanalytical theory. Personality disorders, delusional disorder, anti- social personality. Psychological Motives and its impact on behaviour. Mental disorder and Mental deficiency as factor in the causation of Crime. Psychological methods of control and rehabilitation of offenders – Psychotherapy and counselling – Victims, Witnesses and Suspects. Polygraphy, Narco Analysis & BEOS in the Criminal Justice System.

SUGGESTED READINGS:

1. Henry Lee's Crime Scene Handbook: Henry C Lee
2. Crime Scene Processing and Laboratory Work Book: Patric Jones
3. Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed.: Stuart H. James
4. Criminalistics: An Introduction to Forensic Science, 9th edition.: Richard Saferstein
5. Criminal Profiling: An Introduction to a Behavioral Evidence Analysis, 3rd edition.: Brent E. Turvey
6. Forensic Science in Criminal Investigation and Trial, 4th edition.: B.R. Sharma
7. Handbook of Forensic Psychology: Dr. Veer raghavan
8. Crime Scene Management with Special Emphasis on National Level Crime Cases: Dr. Rukmani Krishnamurthy
9. Richard Saferstein: Forensic science from the crime scene to the crime lab.
10. S.H. James and J.J. Nordby, *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton (2005).
11. Criminology – Ram Ahuja

SUGGESTED CO-CURRICULAR ACTIVITIES:

- Visit to FSL and Allied institutions.
- Quiz and seminars on Forensic Science.
- Jurisdiction & Powers of various courts in India.
- Debate on Criminology & its importance
- Case studies and assignments on criminal psychology.

COURSE: CRIME SCENE MANAGEMENT

COURSE CODE: FS-Ma2-1101(3)

TIME: 3HRS/WEEK

SEMESTER - I

MARKS: 100

OBJECTIVES

To assess securing and managing the crime scenes.

To gain the knowledge of systematic collection and preservation of evidence.

To understand the accurate documentation of the crime scene.

COURSE OUTCOMES

After the end of the course, the students will be able to

CO1: Apply the fundamental principles and concepts of crime scene management to real world scenarios.

CO2: Analyze the role of crime scene investigators in crime scene management.

CO3: Recognize the concept of Chain of custody and its importance in crime scene management.

CO4: Recognize the importance of crime scene safety and security.

CO5: Analyse the role of Forensic science in Crime Scene management.

UNIT 1: CRIME SCENE MANAGEMENT

Types of crime scenes- Macroscopic, Microscopic, Indoor and Outdoor. Set up involved in CSM- Components of Crime Scene Management- Information management, manpower management, technology management & logistics management, Role of crime scene managers and FRO, Duties of various officers at crime scene, educational background & hierarchy of forensic expert. Crime scene security, contamination control, documentation protocols and maintaining health & safety procedures.

UNIT 2: CRIME SCENE EVIDENCE

Introduction to evidence, Importance of evidence, Classification of crime scene evidence, Locard's principle of exchange, Handling of evidences, Precautions, Evidence collection methodologies and materials, Collection, preservation, labelling, sealing and forwarding of evidences, Chain of custody.

UNIT 3: CRIME SCENE INVESTIGATION

Steps of CSI- Self-protection, Medical Assessment, Secure the crime scene, Search for evidence, Crime Scene Documentation (Note taking, Photography, Sketching and Videography), Role of first responding officer, Coordination between police personnel and forensic scientists at crime scenes. The evaluation of 5Ws -who? what? when? where? why? and 1H -how?

UNIT 4: CRIME SCENE RECONSTRUCTION

Defining crime scene reconstruction, nature & importance of crime scene reconstruction, basic principles of physical evidence and crime scene reconstruction, stages of crime scene reconstruction, types of crime scene reconstruction- (Specific Type of Incident/Crime Reconstruction, Specific Events

Reconstruction, Degree of Involvement Reconstruction and Specific Type of Physical Evidence Reconstruction), Crime Scene Staging, Sequence of events recording, Documentation required for Crime scene reconstruction, Computerized Reconstruction (Faro).

UNIT 5: REPORT WRITING

Introduction, Expert report, General guidelines, Importance of report, Nature of report, Types of report, Report format, Length of report, Common reporting mistakes, Tips to Keep in Mind When Writing an Expert Report, Do's and Don'ts while preparing forensic report, Legal challenges, Legal considerations of report: Sec 45 of IEA, Sec 293 of Cr.P.C.

SUGGESTED READING:

1. Henry Lee's Crime Scene Handbook: Henry C Lee
2. Forensic Biology: Shrikant H. Lade
3. Crime Scene Processing and Laboratory Work Book: Patric Jones
4. Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed.: Stuart H. James
5. Criminalistics: An Introduction to Forensic Science, 9th edition.: Richard Saferstein
6. Computer Crime and Computer Forensic: Dr. R.K. Tiwari
7. Criminal Profiling: An Introduction to a Behavioral Evidence Analysis, 3rd edition.: Brent E. Turvey
8. Forensic Science in Criminal Investigation and Trial, 4th edition.: B.R. Sharma
9. Handbook of Forensic Psychology: Dr. Veer raghavan crime scene, sketching of crime scene, searching, collection, preservation, packing of physical evidence, documentation of crime scene, forwarding or dispatch of exhibit in to the laboratory, chain of custody, collection of standard/reference samples.
10. Crime Scene Management with Special Emphasis on National Level Crime Cases: Dr. Rukmani Krishnamurthy under publishing
11. Text Book of Medical Jurisprudence, Forensic Medicine and Toxicology: Parikh C.K.
12. The Identification of Firearms and Forensic ballistics: Barrard and Gerald
13. M. Byrd, *Crime Scene Evidence: A Guide to the Recovery and Collection of Physical Evidence*, CRC Press, Boca Raton (2001).
14. Richard Saferstein: Forensic science from the crime scene to the crime lab.
15. S.H. James and J.J. Nordby, *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton (2005).
16. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

SUGGESTED CO-CURRICULAR ACTIVITIES:

- Flow chart Preparation-Crime scene investigation
- Poster making –Photographic skills
- Seminar on crime scene management
- Collection of samples-for museum
- Simulation of various crime scenes
- Workshop on crime scene sketching techniques

COURSE: FORENSIC DOCUMENT EXAMINATION**COURSE CODE: FS-Ma1-2101(3)****TIME: 3HRS/WEEK****SEMESTER - II****MARKS: 100****OBJECTIVES**

- To acquire the basic knowledge of different types of questioned documents.
- To impart the basic knowledge of examination of handwriting characteristics.
- To emphasize the importance of security features of different materials like currency notes, passports etc.

COURSE OUTCOMES

At the end of the course, the student will be able to

CO1: Develop skills in analysing handwriting for authenticity, including comparisons of known and questioned samples

CO2: Understand the various types of questioned documents (e.g. forged signatures, altered documents, fraudulent writing.)

CO3: Understand the examination procedure of typewritten, photocopy documents.

CO4: Introduction to security features.

CO5 : Develop skills in analysis of various documents by using different advanced tools

UNIT I: BASICS OF DOCUMENT, HANDWRITING & SIGNATURE EXAMINATION

Definition, Types of documents, Essentials to produce document, scope of forensic document examination, document expert, Handling of Documents.

Principles of handwriting, Comparison of handwriting. Development of individuality in handwriting. Natural variations and Factors affecting handwriting, Class and individual characteristics. Standards for comparison of handwriting. Signature Examination.

UNIT II: DETECTION AND DECIPHERMENT OF FORGERIES

Definition, Types of forgery, Handwriting & Signature forgeries, Alterations in documents, including erasures, additions, deletions, over-writings and obliterations.

UNIT III: EXAMINATION OF QUESTIONED DOCUMENTS

Preliminary examination of document. Examination of Printed documents, Type written documents & Xeroxed documents. Examination of Indented writings, Invisible writings & Charred documents. Examination of anonymous letters.

UNIT IV: EXAMINATION OF SECURITY DOCUMENTS

Definition, Types of security documents, Examination of counterfeit Indian currency notes, passports, plastic cards and stamp papers.

UNIT V: TOOLS AND TECHNIQUES USED IN DOCUMENT EXAMINATIONS

Tools and techniques needed for forensic documents examination – Stereomicroscope, Projectina Nirvis, Video Spectral Comparator, Electrostatic Detection Apparatus, TLC and Paper chromatography.

SUGGESTED READINGS

1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton (1982).
2. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).

3. R.N. Morris, Forensic Handwriting Identification: Fundamental Concepts and Principles, Academic Press, London (2000).
4. E. David, The Scientific Examination of Documents – Methods and Techniques, 2nd Edition, Taylor & Francis, Hants (1997).

SUGGESTED CO-CURRICULAR ACTIVITIES:

- Visit to Forensic Document Examination Laboratory
- Poster making– Signature Examination
- Seminar on Handwriting Forgery
- Collection of standard samples for examination
- Hands on training on Security Document Examination
- Workshop on Forensic Document Examination

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COURSE: FINGERPRINT SCIENCE AND IMPRESSIONS
COURSE CODE: FS-Ma2-2201(3) TIME: 3HRS/WEEK

SEMESTER - II
MARKS: 100

OBJECTIVES

- To acquire the basic knowledge of types of fingerprints patterns.
- To understand anatomy of skin as it relates to fingerprint.
- To assess the basic knowledge of different impressions like palm prints, ear prints and lip prints.

COURSE OUTCOMES

At the end of the course, the student will be able to

CO1: Recall the history of fingerprints and anatomy of skin. **CO2:** Understand the various classification of fingerprints. **CO3:** Analyse the types and collection of fingerprints.

CO4: Analyse various physical and chemical methods to develop latent fingerprints.

CO5: Acquire basic knowledge of different impressions like palm prints, ear prints and lip prints.

UNIT I: HISTORY OF FINGERPRINT SCIENCE & BASICS OF FINGERPRINT

History and development of fingerprint in India and abroad, morphology and anatomy of dermal skin, Embryology of fingerprint- morphology of volar pad and configurational areas, development of volar pad, formation of friction ridges, Sweat glands- eccrine, sebaceous and apocrine, Definition of fingerprint, Theory and principles of fingerprint, Forensic significance of fingerprint. Case studies.

UNIT II: FINGERPRINT CLASSIFICATION SYSTEMS

Basic classification of fingerprint- arch, loop, whorl and composite, Rules for placing core and delta, counting and tracing of ridges, ridge density, Classification of identification of fingerprint- different system of classifications (Ivon, Vucetich, Purkinje, Francis Galton, Henry 10 digit, Henry FBI extension and Battley single digit classification) and their modification till date and their utilities.

UNIT III: TAKING AND COLLECTION OF FINGERPRINT

Types of fingerprint- rolled, plain, chance, latent, patent and plastic, Collection of latent, patent and plastic fingerprint : methods, procedure, precautions, limitations, preservation and preservation and lifting of fingerprint, Taking of fingerprint: Taking fingerprints of living person- purpose, requirements, procedures, precaution, limitation and collection, Taking finger prints of dead bodies- purpose, requirements, procedures, precaution, limitation and collection(techniques of recording fingerprints of dead bodies of different stages, viz, immediately after death and after rigor mortis, decomposed and charred bodies).

UNIT IV: DETECTION DEVELOPMENT AND COMPARISON OF FINGERPRINT

Detection of fingerprint using Light sources, Development of fingerprint: Physical methods and chemical methods- silver nitrate, Ninhydrin and its analogues, physical developer etc., fuming methods- iodine fuming, cyanoacrylate fuming, soot method, hydrogen fluoride fuming and metal deposition method.

Comparison of fingerprint: class and individual characteristics (minutia's), fundamentals of comparison- print to print, trace to record, trace to print, trace to trace, documentation of fingerprint, AFIS (Automated Fingerprint Identification System).

UNIT V: IMPRESSION EVIDENCE

Lip prints & Ear Prints: Introduction, Collection, preservation, Examination & their significance.

Palm Prints & Foot print impressions: Introduction, Collection, preservation, Examination & their significance.

SUGGESTED READINGS

1. J.E. Cowger, Friction Ridge Skin, CRC Press, Boca Raton (1983).
2. D.A. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis, CRC Press, Boca Raton (2000).
3. C. Champod, C. Lennard, P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton (2004).
4. Lee and Gaensleen's, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).

CO-CURRICULAR ACTIVITIES:

- Visit to Forensic Fingerprint Science Laboratory
- Poster making– Fingerprint Examination
- Seminar on Fingerprint and Other Impressions Examination
- Collection of standard samples for examination
- Hands on training on Impression Evidence Examination
- Workshop on Fingerprint Examination

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PRACTICAL SYLLABUS

COURSE: INTRODUCTION TO FORENSIC SCIENCE AND CRIMINOLOGY
COURSE CODE: FS-Ma1-1151(1) TIME: 2HRS/WEEK

SEMESTER - I
MARKS: 50

OBJECTIVES

- To understand the fundamental principles and concepts of forensic science and criminology.
- To analyse the relationship between crime, law, and justice.
- To understand the forensic science toolkits.

COURSE OUTCOMES

At the end of the course, the student will be able to

CO1: Define and explain key concepts in forensic science and criminology.

CO2: Understand the role of forensic science in justice system.

CO3: Understands about the forensic toolkit and its application at the crime scene.

LIST OF EXPERIMENTS:

1. To study the Do's and Don'ts in the Forensic Science Laboratory.
2. To prepare a poster on various domains of forensic science.
3. To prepare a poster on the contribution of various scientists in forensic science.
4. To prepare a poster on the forensic teaching and research institutes in India.
5. To prepare a case study of famous criminal and civil cases in India.
6. To prepare a poster on the hierarchy and functions of working professionals in Central Forensic Science Laboratory.
7. To study the different forensic science kits available in the Forensic Science Laboratory.
8. To understand the roles of forensic experts of various divisions of the Forensic Science Laboratory.
(Role Play)
9. To study the types, causes and rate of crimes in India.
10. To prepare a poster on functions and hierarchy of the Policing System and Criminal Justice System in India.

REFERENCE TEXT BOOKS

1. Forensic science in criminal investigation & trials by B.R Sharma.
2. Richard Saferstein: Forensic science from the crime scene to the crime lab
3. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005).
4. Criminology – Ram Ahuja

COURSE: CRIME SCENE MANAGEMENT**COURSE CODE: FS-Ma2-1151(1)****TIME: 2HRS/WEEK****SEMESTER - I****MARKS: 50****OBJECTIVES**

- To gain the knowledge of securing and managing the crime scenes practically.
- To understand the practical knowledge of systematic collection and preservation of evidence.
- To assess the practical knowledge in accurate documentation of the crime scene.

COURSE OUTCOMES

At the end of the course, the student will be able to

CO1: Analyze the role of crime scene investigators in crime scene management.

CO2: Analyze the role of Forensic Science in practice for Crime Scene management.

CO3: Recognize the practical importance of crime scene safety and security.

LIST OF EXPERIMENTS:

1. To study the seven principles of forensic science with examples.
2. To study the different evidence collection methods with examples.
3. To study the different evidence collection materials with examples.
4. To search, collect and preserve the physical evidence recovered from the crime scene.
5. To record the crime scene by photography and videography methods of crime scene documentation.
6. To record the crime scene by Note making and Sketching methods of crime scene documentation.
7. To study the reconstruction of blood spatter patterns.
8. To study the reconstruction of glass fracture evidence.
9. To simulate the scene of crime and perform its investigation.
10. To prepare a forensic report on crime scene investigation.

COURSE: FORENSIC DOCUMENT EXAMINATION**COURSE CODE: FS-Ma1-2151(1)****TIME: 2HRS/WEEK****SEMESTER II****MARKS: 50****OBJECTIVES**

- Understand the principles of forensic document examination.
- Develop skills in handwriting comparison and analysis.
- Explore techniques for detecting document alterations and forgeries.

COURSE OUTCOMES

At the end of the course, the student will be able to

CO1: Identification of handwriting characteristics can compare questioned and reference handwriting samples.

CO2: Identification of different types of forgeries and examination procedure.

CO3: Identification of security features of currency notes, passports, credit, debit cards, stamp papers and photocopy documents.

LIST OF EXPERIMENTS:

1. To opine whether given signature samples are written by the same author or not.
2. To extract the handwriting features including class and individual from the given handwriting samples.

3. To opine whether given handwriting samples are written by the same author or not.
4. To identify and examine the exhibits for secret writing.
5. To extract and identify the security features in the Indian Currency Notes.
6. To extract and identify the security features in the debit card and credit card.
7. To extract and identify the security features in the Indian passport.
8. To extract and identify the security features in the stamp papers.
9. To identify and compare the given typewritten document.
10. To identify and compare the given photocopied document.

Reference Text Books

1. Forensic science in criminal investigation & trials by B.R Sharma.
2. Hilton, scientific Examination of Questioned Documents, CRC Press, Boca Raton (1982).
3. R.N Morris, Forensic Handwriting Identification: Fundamental concepts and Principles, Academic press, London (2000).
4. E. David, The scientific Examination of Documents-Methods and techniques ,2nd Edition, Taylor Francis, Hants (1997)

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COURSE: FINGERPRINT SCIENCE AND IMPRESSIONS

COURSE CODE: FS-Ma2-2251(1)

TIME: 2HRS/WEEK

SEMESTER - II

MARKS: 50

OBJECTIVES

- To practically understand the patterns and classification of fingerprints.
- To develop practical skills in examination and collection of various impressions like lip prints and foot prints.
- To explore techniques for practically detecting various types of fingerprints.

COURSE OUTCOMES

At the end of the course, the student will be able to

CO1: Acquire the practical knowledge related to patterns and classification of fingerprints.

CO2: Understand the techniques to develop different types of fingerprints through practically.

CO3: Analyse the various collection and examination of different types of impressions like lip prints and foot prints.

LIST OF EXPERIMENTS:

1. To record plain and rolled fingerprints and identify different types of fingerprint patterns in a given fingerprint.
2. To locate and identify type line, core and delta in a given fingerprint.
3. To carry out ridge tracing, ridge counting and ridge density of fingerprints.
4. To locate, identify, develop and preserve the fingerprint impression by using physical methods of fingerprint detection.
5. To locate, identify, develop and preserve the fingerprint impression by using chemical methods of fingerprint detection.

6. To extract the fingerprint minutiae from a given fingerprint sample.
7. To compare and opine whether two given fingerprints are or not.
8. To carry out ten-digit classification of fingerprints.
9. To carry out the forensic analysis of given lip print impression.
10. To carry out the forensic analysis of given foot print impression.

REFERENCE TEXT BOOKS:

1. J.E. Cowger, Friction Ridge Skin, first edition, CRC Press, Boca Raton (1983).
2. D.A. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis, first edition, CRC Press, Boca Raton (2000).
3. C. Champod, C. Lennard, P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin Impressions, first edition, CRC Press, Boca Raton (2004).
4. Lee and Gaensleen's, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).

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