



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Forensic Science

M.Sc. (Forensic Science) SEMESTER III 2024-2026

MSFS301 Questioned Documents and Counterfeit Currency

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
|-------------|----------|-----------------------------------------------|------------------------------|---------------|----------------------|-------------------------|----------------------|---|---|---|---------|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MSFS301 | DC | Questioned Documents and Counterfeit Currency | 60 | 20 | 20 | 30 | 20 | 4 | 0 | 2 | 5 |

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

The course aims to provide the students with basic knowledge and skills in forensic document examination.

1. To introduce the basics and challenges of forensic document examination.
2. To understand handwriting and signature identification principles.
3. To learn tools and techniques used in document analysis.
4. To detect forgeries in handwritten and printed documents.
5. To study the examination of typewritten, printed, and security documents.

Course Outcomes

On successful completion of the course, students will be able to:

1. Identify and classify various forensic documents.
2. Analyze handwriting and detect disguises and forgeries.
3. Use instruments like VSC and ESDA in document analysis.
4. Examine and differentiate genuine and forged signatures.
5. Assess typewritten, printed, and photocopied documents.

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UNIT I: Introduction to Document Examination

Nature and problems of document examination, principles of handwriting identification, classification of forensic documents, specimen/admitted writings/type writings etc: handling, preservation and marking of documents, importance of natural variations and disguise in writing, various types of forensic documents genuine and forged documents

UNIT II: Tools and Techniques of document Examination

Video Spectral Analysis (VSC), Electrostatic Detection Apparatus (ESDA), Stereomicroscope, Spectroscopic techniques related to document analysis, UV/Visible/Infrared lights and their application in document examination.

UNIT III: Handwriting Examination

Various writing features and their estimation, general characteristics of handwriting, individual characteristics of handwriting, , various types of forgeries and their detection

UNIT IV: Signature Examination

Examination of signatures – characteristics of genuine and forged signatures, identification of forger, identification of writer of anonymous letters and sequence of strokes.

UNIT V: Typewritten and Printed Documents

Identification of typescripts-identification of typist, various types of printing processes, identification of printed matter including printing of security documents and currency notes, , dot matrix, inkjet and laser jet printers, examination of black and white and color photocopies.

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Practicals

1. To study natural variation of handwriting.
2. To perform traced signature for analysis.
3. To perform simulated signature forgery analysis.
4. To perform transplanted signature forgery analysis.
5. To study class characteristics of handwriting.
6. To study individual characteristics of handwriting.
7. To study sequence of stroke of suspected signature.
8. To perform typewriter comparison.
9. To perform printed document comparison.
10. To perform color copies examination.
11. Any other related to the course.

SUGGESTED READINGS:

1. Hilton, O; Scientific Examination of Questioned Documents. Revised Edition, Elsevier, New York, 1982.
1. Osborn, A.S; Questioned Documents, 2nd Ed., universal Law Publications, Delhi, 1998.
2. Osborn, A.S; The Problem of Proof, 2nd Ed., Universal Law Pub. Delhi, 1998.
3. Thomas, C.C; Identification System for Questioned Documents, Billy Prior Bates Springfield, Illinois, USA, 1971.
4. Harrison, W.R; Suspect Documents Their Scientific Examination, Universal Law Publication, Delhi, 2001.
5. Morris, R.N; Forensic Handwriting Identification, Academy Press, London, 2001.

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MSFSN302 FORENSIC BIOLOGY AND DNA PROFILING

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
|-------------|----------|------------------------------------|------------------------------|---------------|----------------------|-------------------------|----------------------|---|---|---|---------|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MSFSN302 | DC | Forensic Biology and DNA Profiling | 60 | 20 | 20 | 30 | 20 | 4 | 0 | 2 | 5 |

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit.

***Teacher Assessment** shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

The course aims to provide students with knowledge of biological evidence and its forensic applications.

1. To study the forensic significance of blood, semen, saliva, and other body fluids.
2. To understand forensic analysis of hair, bones, and teeth for identification.
3. To learn about immunology and serogenetic markers used in forensic science.
4. To explore forensic botany, entomology, and microbial forensics.
5. To understand DNA structure, profiling techniques, and their legal relevance.

Course Outcomes:

On successful completion of the course, students will be able to:

1. Identify and examine various biological fluids and stains in forensic investigations.
2. Analyze hair, bones, and teeth for personal and forensic identification.
3. Apply immunological and genetic markers in crime and paternity cases.
4. Evaluate botanical, entomological, and microbial evidence in forensic cases.
5. Understand and use DNA profiling methods for forensic and legal purposes.

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UNIT I:

Blood

Composition, histology, examination of blood and blood stains, Identification of lochial and menstrual stains by various methods.

Semen

Composition, Structure of spermatozoa, Forensic method of detection and identification of semen and seminal stain examination.

Saliva

Salivary glands, Composition and Forensic examination of saliva

Identification and examination of other body fluids/ stains-

vaginal, urine, pus, faeces, vomit, milk, sweat and tears etc.

UNIT II:

Forensic Trichology

Structure, Forensic examination of Hair including determination of origin race, sex, etc.

Forensic Odontology Definition pattern, structure of teeth, age determination- identification of person, role in mass disaster, disease of teeth and their significance in personal identification.

Forensic Osteology

Determination of Stature and sex from bones, Identification of burnt bones, recovery and identification of skeletal remains in accidental cases and mass disasters. Facial reconstruction.

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UNIT III

Immunology

Antigens, haptens and adjuvant, Immunoglobulin's, Structure and function. Antigen-Antibody reaction. Lectins and their forensic significance.

Serogenetic Marker

Blood group: History, Biochemistry and genetics of ABO, Rh, Mn and other systems, method of ABO blood grouping (absorption-inhibition. Mixed agglutination and absorption-elution) from blood stains and other body fluids/stains viz. menstrual blood, semen, saliva, sweat, tear pus, vomit, hair, bone, nail, etc. blood group specific ABH substance, determination of secretors/non secretor status, Lewis antigen, Bombay blood group.

Polymorphic enzymes typing: PGM, ESD, EAP, AK, etc., and their forensic significance, HLA typing.

Role of serogenetic *markers* in individualization, paternity disputes etc.

UNIT III:

Forensic Botany

Various types of wood, timber varieties, seeds and leaves – their identification and matching, Study and identification of pollen grains, identification of starch grains. Diatoms: Types, morphology, methods of isolation from different tissue and forensic significance in drowning cases.

Forensic Entomology

Significance of terrestrial and aquatic insects in forensic investigations and their role in crime detection, insect's succession and its relationship to determine time since death.

Microbial Forensics:

Isolation, Classification and Identification of Microorganism.

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UNIT V:

DNA Profiling

Concept of Sequence Variation: Structure of DNA, VNTRs, STRs, MiniSTRs, SNPs.

Detection Techniques: RFLP, PCR Analysis, Y-STR, mtDNA Analysis, PCR based typing methods such as HLA – DQA1, D1S80, Gender ID, Denaturation, Renaturation and Methylation, DNA sequencing and Hybridization.

Legal standard for admissibility of DNA profiling – procedural & ethical concerns, status of development of DNA profiling in India & abroad, DNA Database: uses and issues.

Forensic Significance and Case Studies: - Application in Kinship and parentage testing, Child Swapping, Missing person and Disaster Victims Identification, Civil Immigration, Veterinary and Wild Life and Agriculture Cases.

SUGGESTED READINGS:

1. Albert's, B, Bray, D, Lewis, J, Roberts K & Watson, J.D; Molecular Biology of cell, 2nd ed. Garland Pub. New York
2. Biology Methods manual; Metropolitan Police Forensic Science Laboratory, London.
3. Daniel L. Hartl & Elizabeth W. Jones; Genetics- Principle & Analysis, 4th Ed., Jones & Bartlett Pub.
4. E.J. Gardner, M.I. Simmons and D.P. Snustad; Principles of Genetics; John Wiley, New York.
5. Edwin, H. Mc Caney-Human Genetics, The Molecular Revolution, Jones & Bartlett Pub. London.
6. H.G. Greenish & E. Collin; An Anatomical Atlas of vegetable Powders; J&A Churchill, London
7. Herbert R. Mauersberger; Mathews Textile Fibers – their physical, Microscopic and chemical properties; John Wiley, New York.
8. Jaiprakash G. Shewale, Ray H. Liu Forensic DNA Analysis: Current Practices and Emerging Technologies, CRC Press.
9. John M Butler: Forensic DNA Typing. Elsevier Academic Press.
10. Keith Immen and Norah Rudus, An introduction to Forensic DNA Analysis. CRC Press, New York.
11. Kimball, John W; Biology; Arvind Publishing Co. New Delhi
12. Lee M.C. and Gaenesten, R.E: DNA and other Polymorphism in Forensic Science. Year book Medical Published.
13. P.L. Williams and R. Warwick; Gray's anatomy; Churchill Livingston, London.
14. R.P. Pandey, Plant Anatomy; S. Chand, new Delhi.
15. Richard Saferstein; Forensic Hand Book; Ed.; Prentic Hall, Englewood Cliff, New Jersey

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PRACTICALS:

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2. To Determine Species of Origin from Blood by Gel diffusion method
3. To determine the ABO and Rh factor of human blood.
4. Morphological examination of human and animal hairs
5. Preparation of slide for scale pattern study of hairs
6. Identification of species from the given hair sample.
7. Detection of salivary stains.
8. Identify the bones of the human body.
9. Determine age and sex from long bones and skull.
10. To isolate and examine diatoms and classify them.
11. Isolation of microbial from air.
12. Extracting DNA from different samples.
13. Any other related to the course

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MSFSN303 DISSERTATION

| Course Code | Course Name | TEACHING & EVALUATION SCHEME (Dissertation) | | | | | |
|-------------|--------------|---------------------------------------------|----------------------|---|---|---|--------|
| | | End Sem University Exam | Teachers Assessment* | L | T | P | Credit |
| MSFSN303 | Dissertation | 90 | 60 | 0 | 0 | 0 | 06 |

Every student will carry out dissertation under the supervision of Supervisor/(s) (Internal/External). The topic shall be approved by a Committee constituted by the Head of the concerned Institute. Every student will be required to present two seminar talks, first at the beginning of the Dissertation (Phase-I) to present the scope of the work and to finalize the topic, and second towards the end of the semester, presenting the work carried out by him/her in the semester.

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