Shri Vaishnav Vidyapeeth Vishwavidyalaya

M.Sc. (Forensic Science)

SEMESTER IV / X (M.Sc. / B.Sc.+M.Sc.)

Course Code	Course Name	TEACHING & EVALUATION SCHEME (THEORY)						
		End Sem University Exam	Two Term Exam	Teachers Assessment*	L	T	P	Credit
MSFS 401	**Emerging Trends in Forensic Science.**	60	20	20	4	1	0	5

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

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

Learning Objectives: After studying this Paper the Students will Know-

1. DNA and its Role in Identification
2. Techniques used for Lie detection
3. Importance of Biometrics in personal identification
4. Importance of Environmental Forensics
5. Concept of Bioterrorism and Bio security

Unit I: DNA and its Role in Identification

Structure of DNA, Techniques in DNA typing, RFLP, PCR, Factors affecting DNA, Damage to DNA, Variation in DNA, DNA as excellent polymorphic marker, Basis of DNA typing, Introduction to touch DNA- its future prospectus.

Unit II: Techniques used in Detection of Deception

Basics of Narco analysis and its significance in forensic science, Brain fingerprinting and its use in the criminal identification, Polygraph analysis , Voice production theory-vocal anatomy, Speech signal processing & pattern recognition- basic factors of sound in speech, acoustic characteristics of speech signal, Basic introduction to computers forensics.

Unit III: Biometrics in Personal Identification

Introduction, Concepts of Biometric Authentication, Role in person Identification, Techniques and Technologies (Finger Print Technology, Face Recognition, IRIS, Retina Geometry, Hand Geometry, Cheiloscopy, Rugoscopy, Poroscopy, Ridgeology, Signature Verification , Gait pattern analysis and other forensic related techniques).

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UnitIV:Environmental Forensics and Geo Forensics

Introduction to Environmental forensics: Definition, Historical perspective, application. Generic Forensic techniques for contaminant age dating and source identification.
Geo-forensics,: Introduction to Geo-Forensics, Applications of Geo-forensic, major evidences in Geo-Forensics.
GPS and GIS: Basic principles and applications of GPS and GIS

Unit V: Bioterrorism

Definition, Concepts of Biosecurity and microbial forensics, Weapons of mass destruction (WMD), mass-casualty weapons (MCW), Concept of NBC(Nuclear Biological and Chemical) and CBRNE (Chemical, Biological, Radiological, Nuclear, and high yield Explosives), Dirty Bombs, Methods for detection of Botulinum Neurotoxins, Bacillus Spores, Staphylococcal Enterotoxins B. Diagnostic Bioterrorism Response Stategies.

Reference Books:

1. B.R. Sharma: Forensic Science in Criminal Investigation and Trials, Universal Law Publishing; Fourth edition 2013.
2. James, S.H and Nordby, J.J.: Forensic Science: An introduction to scientific and investigative techniques 3rd edit. CRC Press, USA.
3. Nanda, B.B. and Tewari, R.K.: Forensic Science in India: A vision for the twenty first century Select Publisher, New Delhi (2001)
4. Richard Saferstein. Criminalistics: An Introduction to Forensic Science. 10th edit Prentice-Hall, New Jersey.
5. Deforest, Gansellen&Lee : Introduction to Criminalistics..
6. H. James, Wouldiam G. Eckert (1999) Interpretation of Blood stain evidence at Crime Scene, 2nd edition, CRC Press.
7. R.M. Morgan, P.A. Bull : Forensic Geoscience and Crime Detection (2007).
8. N. Gilbert (1993) Criminal Investigation; Third edition, Macmillan Publishing company.
9. Bernard Robertson and G.A. Vignaur (1995) Interpreting evidence John Wiley and Sons Ltd.
10. Kirk (1953) Criminal Investigation Interscience Publisher Inc. New York.
11. Ioana Gloria Petrisor: Environmental Forensics Fundamentals: A Practical Guide 1st Edition
12. Donald A. Henderson and Thomas V: Bioterrorism: Guidelines for Medical and Public Health Management.
13. Ernest P. M.D. J.D. Chiodo : Bioterrorism

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Course Code	Course Name	TEACHING & EVALUATION SCHEME (THEORY)						
		End Sem University Exam	Two Term Exam	Teachers Assessment*	L	T	P	Credit
MSFS 402	Scientific Investigation of Crime	60	20	20	4	1	0	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT I: Physical patterns

Introduction- Physical patterns in identification, individualization and reconstruction.

Pattern due to blood, Pattern on glass, firearms related patterns, patterns in arson and fires served articles and physical matches, comparison of imprints, indentation, striation, typical presentations, Gait patterns, Bite patterns.Modus operandi, portrait parley.

UNIT II: Death Investigation

Cause of death (Natural and Unnatural), Determination of nature of death and general characteristics of suicides, murder and accidents.

Impression of body at scene of crime, inspection of scene of crime.Role of skeletal remains in investigation. Forensic investigation in firearm related cases. Forensic investigation in asphyxia deaths. Forensic investigation in poisoning cases.

UNIT III:Motor Vehicle Investigation

Identification and search of physical evidences. Involvement of vehicle in crime, theft investigation. Investigation in hit and run cases. Role of skid marks, scuff marks etc. Inspection of Vehicles, glass fracture analysis, paint chip examination. Motor Vehicle Claim Investigation.

UNIT IV:Investigation in offences against properties

Criminal Tress Pass, House Breaking and Theft (HBT), Burglary and Robbery, Investigation in fire and Arson Cases, Investigation in cases of Mass Disaster, Investigation in explosive related cases. Investigation in Bank Frauds.

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UNIT V: DNA in Police Work

Role of DNA in sexual offence, disputed paternity, child swapping, identity in dead and living person, civil immigration. Veterinary and wild life and agriculture cases. Legal standards of admissibility of DNA Profiling

Reference Books:

1. B.R. Sharma: Forensic Science in Criminal Investigation and Trials, Universal Law Publishing; Fourth edition 2013.
2. James, S.H and Nordby, J.J.: Forensic Science: An introduction to scientific and investigative techniques 3rd edit. CRC Press, USA.
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4. Richard Saferstein. Criminalistics: An Introduction to Forensic Science. 10th edit Prentice-Hall, New Jersey.
5. Deforest, Gansellen&Lee : Introduction to Criminalistics.
6. Kirk (2000) Vehicular Accident investigation and reconstruction.
7. H. James, Wouldiam G. Eckert (1999) Interpretation of Blood stain evidence at Crime Scene, 2nd edition, CRC Press.
8. N. Gilbert (1993) Criminal Investigation; Third edition, Macmillan Publishing company.
9. Bernard Robertson and G.A. Vignaur (1995) Interpreting evidence John Wiley and Sons Ltd.
10. Kirk (1953) Criminal Investigation Interscience Publisher Inc. New York.
11. B. R. Sharma (1980) Footprints, Tracks and Trials. Central Law Agency. Allahabad.
12. Koblinsky et al. (2005) DNA -Forensic and Legal Implications.

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SEMESTER IV / X (M.Sc. / B.Sc.+M.Sc.)

Course Code	Course Name	TEACHING & EVALUATION SCHEME (Dissertation)					
		End Sem University Exam	Teachers Assessment*	L	T	P	Credit
MSFS405	Dissertation	150	100	0	0	16	8

Dissertation

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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