Shri Vaishnav Vidyapeeth Vishwavidyalaya

M.Sc. (Forensic Science)

SEMESTER IV 2021-2023

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*				
MSFSN401	DC	**Forensic Toxicology and Pharmacology**	**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 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. The classifications of poison
2. The extraction and isolation procedure of different types of poison.
3. The analysis different types of poison.
4. The absorption distribution metabolism and elimination of poison

Learning Outcomes: After studying this paper-

1. The student will be able to define poison and different forms of poison
2. They will be able to understand analyse the nature of poison and its effect on body
3. They will be familiar with the extraction and isolation procedure of different types of poison.
4. They will be able to examine poison and its metabolite in viscera.
5. They will be able to understand the absorption,distribution,metabolism and elimination of poison

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UNIT I: Forensic Toxicology

Definition and branches of Toxicology.Concept and Significance of Forensic Toxicology.Medico legal aspects of poison.Toxicological exhibits in fatal and survival cases- their preservation. Extraction and identification of commonly used poisons.Treatmentin cases of poisoning, sign & symptoms of poisoning, Analysis report.Forensic analysis of different Pesticides, Insecticides, Biocides and Fertilizers.

UNIT II:Extraction, Isolation and clean- up procedures

Non- Volatile organic poison, Stas-otto, Dovbriey Nickolls (Ammonium Sulphate) method, acid digest and Valov (Tungstate) methods, solid phases micro extraction techniques, solvent extraction method.
Volatile Poisons : Industrial solvent acid and basic Distillation
Toxic Cations : Dry Ashing and Wet digestion process
Toxic Anion : Dialysis method total alcoholic extract

UNIT – III:General Study and Analysis-I

Barbiturates, methaqualone, Hydromophine. Methadone, Meprrobamate, Mescaline, Amphetamines, LDS, Heroin, Cannabinoids, Phinothiazines

Insecticides : Types, General methods for their Analysis. Analysis of Alcohol in Blood & Urine, illicit Liquor, Methanol

Alkaloids : Definition, classification, Isolation, and general characterization.

UNIT – IV:General Study and Analysis-II

Metallic Poisons : Arsenic, Mercury, Lead, Bismuth, Antimony,Copper, Aluminum, Iron , Barium, Cadmium, Phosphorus etc.

Chemical Poisons: Acetone, Chloroform, Phenol, Chloral Hydrate, Irrespirable gases.

UNIT V:Forensic Pharmacological studies

Absorption, Distribution, Metabolism, Pathways of drug metabolism, General studies and Analysis of some vegetable poisons, Opium, Ratti, Dhatura, marking nuts, Nux-vomica, Oleander and Aconite and Cynanogenetic glycosides. General studies and Analysis of some Animal poison-Snake venom, Toxins and Toxalbumins, types of Toxins.

Suggested Readings:

1. Stolemen: Progress in Chemical Toxicology: Acad. Press, New York, (1963).
2. Cravey, R.H., Baselt, R.C.: Introduction to Forensic Toxicology, Biochemical publications, Davis C A, (1981).
3. Curry, A.S.: Poison Detection in Human Organs, C. Thomas Springfield, Illinois USA, (1963).
4. Gleason, M.N. et.al: Clinical Toxicology of Commercial products, Williams and Williams, Baltimore, USA, (1969).
5. Sunshine, I.: Guidelines for Analytical Toxicology Programme, Vol. I, CRC Press, USA, (1950).
6. Sunshine: Methods of Analytical Toxicology, CRC Press USA, (1975).
7. Working Procedure Manual – Toxicology, BPR&D Publication, (2000).
8. Saferstein: Forensic Science Handbook, Vols. I, II; (Ed); Prentice Hall, Eglewood Cliffs, NJ; (1988)
9. Modi, Jaishing P.: Textbook of Medical Jurisprudence & Toxicology, M.M. Tripathi Pub., (2001).
10. Parikh C.K. Textbook of Medical Jurisprudence, Forensic Medicines and Toxicology. CBS Pub. New Delhi (1999)
11. Tiwari, S.N.: Analytical Toxicology, Govt. of India Publications, New Delhi, (1987)
12. Clark, E.G.C., Isolation and identification of Drugs, Vol. I and Vol. II, Academic Press, (1986).
13. Goutam M.P. and Goutam Shubhra, “Analysis of Plant Poison” SSB, New Delhi 2006
14. Reddy K.S. Narayan and Murty O.P. “The Essentials of Forensic Medicine and Toxicology”

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Practicals

1. Analysis of volatile liquid i.e alchohol and denatured sprit.
2. Identification of poisonous salts.
3. Preliminary test for metallic poison.
4. Identification of different vegetable poison by colour test, chromatography etc.
5. Identification of insecticides and pesticides by TLC/ colour test.
6. Extraction and identification of drugs from biological matrix and their detection.
7. Any other related to the course

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MSFSN402	DC	Digital Forensic and Cyber Crime	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 following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Learning Objectives: After studying this paper, student will know-

1. The fundamental and forensic examinations of digital evidence.
2. The legal and privacy issues of digital evidence.
3. The tools of cyber forensics.
4. The types of cybercrime.

Learning Outcomes:After studying this paper,

1. The student will be able to understand thefundamental and forensic examinations of digital evidence.
2. They will be familiar with legal and privacy issues of digital evidence.
3. They will be able to analyse the tools of cyber forensics.
4. They will be able to understand the different types of cybercrime.

UNIT I: Digital Forensic I

Cyber Crime and digital evidence, types of cybercrimes, digital evidence, Digital Vs Physical Evidence, Nature of Digital Evidence, Precautions while dealing with Digital Evidence. Introduction to Cyber forensic, Cyber forensic steps (Identification, Seizure, Acquisition, Authentication, Presentation, Preservation), Computer forensic expert, Cyber forensic investigation process, The goal of the forensic investigation, Theft of information, Violation of security policies or procedures, Intellectual property infractions, Electronic tampering), Determine the impact of incident, Auditing V/s Cyber forensic investigations.

UNIT II: Digital Forensic II

Seizure of suspected computer. Preparation required prior to seizure. Protocol to be taken at the scene.Extraction of information from the hard disk.Treatment of exhibits.Creating bitstream of the original media.Collection and seizure of magnetic media.Legal and privacy issues.Examining

forensically sterile media.Restoration of deleted files.Password cracking and E-mail tracking.Encryption and decryption methods.Tracking users.

UNIT III: Cyber Forensic Tools and Utilities

Introduction, Examining a Breadth of Products, Cyber Forensic Tools Good, Better, Best: What's the Right Incident Response Tool for Your Organization? , Tool Review Forensic Toolkit, EnCase, Cyber check suites, what is disk Imaging etc. Specifications for Forensic tools Tested.

UNIT IV: Evidence Collection and Analysis Tools

Volatile and Non-volatile Evidences collection (Safe back, Get time, FileList,Filecvt and Excel, Get free, Swap files and Get swap ,Get Slack, Temporary Files), Detailed Procedures for Obtaining a bit stream backup of hard drive, File System (Details of File system, Data Structure Of File System, Data Recovery in Different file system).

UNIT V: Cyber Crime

Definition and types of computer crimes.Distinction between computer crimes and conventional crimes.Reasons for commission of computer crimes.Computer virus, and computer worm – Trojan horse, trap door, super zapping, logic bombs.Types of computer crimes – computer stalking, pornography, hacking, computer terrorism.An overview of hacking, spamming, phishing and stalking.

Reference Books:

1. Digital Forensics: Digital Evidence in Criminal Investigations by *Angus McKenzie Marshall*
2. Cyber Forensic A Field Manual for Collecting, Examining and Preserving Evidence of Compute Crimes by *Albert J Menendez.* Auerbach Publications.
3. Cyber Forensic by *Marecella Menendez.*
4. Computer Forensic by *Newman*.
5. Cyber Crime Investigation Field Guide, by *B Middleton*
6. Incident Response and Computer Forensic by *Kelvin Mandia*, TMH Publication.

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Practicals

1. Identification , Seizure , Search of Digital media Evidence Collection
2. Demonstration of various Forensic tools like Partition magic, Encase etc.
3. Data Recovery, Deleted File Recovery viewing small Disk.
4. Demonstration of Concealment Techniques (Cryptography PGP)
5. Demonstration of Concealment Techniques (Stenography)
6. Demonstration of other Concealment Techniques to trace routes followed by e-mails & chats.
7. To identify the IP address of the sender of e-mails.
8. To demonstrate concealment techniques using cryptographic PGP
9. To acquire data from PCs/laptops/HDDs/USBs, pen drives, memory cards and SIM cards.
10. To use symmetric and asymmetric keys for protection of digital record.
11. To carry out imaging of hard disks from different software.
12. Networking commands- like ping, IP config. Etc.
13. Tracing E-mail, finding senders IP address, of received email, tracing route of email received using tool available on internet, e.g. Visual Trace Route etc.

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Chairperson	Chairperson	Controller of Examination	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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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*				
MSFSN403	DC	Emerging Trends in Forensic Science	60	20	20	0	0	4	0	0	4

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*__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).

Unit IV: 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 (Dissertation)					
		End Sem University Exam	Teachers Assessment*	L	T	P	Credit
MSFS404	Internship/Dissertation	120	80	0	0	0	10

Internship/Dissertation

Every student will carry out Internship in laboratory of one month under the supervision of Supervisor/(s) (Internal/External). Every student will be required to present seminar talk towards the end of the semester and should submit a report of the same presenting the work carried out by him/her in the semester.

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.