Shri Vaishnav Vidyapeeth Vishwavidyalaya

M.Sc. (Forensic Science)

SEMESTER I / VII (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
MSFS101	**Introduction to Forensic Science and Police Administration**	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:

1. Organizational set up of a Forensic Science Laboratory.
2. Report writing and crime scene Management.
3. Different types of offences and Indian Penal system.
4. Organizational structure of police station and duties of police.

UNIT I : Forensic Science

Introduction, Need, Scope, Concepts and Significance of Forensic Science, History and Development of Forensic Science, Laws and Basic principles of Forensic Science, Branches of forensic science, Organizational set-up of a Forensic Science Laboratory. Investigative strategies. Expert testimony and eye-witness report.

UNIT II: Crime Scene Management

Crime scene investigations, protecting and isolating the crime scene. Documentation, sketching, field notes and photography. Searching, handling and collection, preservation and transportation of physical evidences. Chain of custody and Reconstruction of scene of crime. Report writing.

UNIT III: Criminal Law I

Introduction to Indian Penal Code, IPC sections-240, 53, 63, 73, 76-79,84-86, 95-106, 279, 299-309, 375-377, 390-402, 420.

Introduction to Criminal Procedure Code, CrPC sections-2, 6-35, 41-60, 61-90,154-176, 293-294.

UNIT IV: Criminal Law II

Bailable /non-bailable offences, cognizable/ non-cognizable, summon case and warrant cases. Indian Evidence Act: sections- 3, 24-30, 45, 135-138, 141, Expert testimony.

NDPS Act, Food and Adulteration Act, Drugs and Cosmetic Act, Arms Act, Explosives Act.

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UNIT V: Police Administration

History and development of police administration, Police duties, responsibilities and powers, Organizational structure of police station, maintenance of crime records and accountability of police to law, NCRB and BPR&D, People and society, Custodial deaths, Police and Human Rights.

Reference Books:

1. Houck, M.M & Siegel, J.A; Fundamentals of Forensic Science, Acadamic Press, London, 2006.
2. Sharma, B.R; Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, 2003
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. James, S.H and Nordby, J.J; Forensic Science- An Introduction to Scientific and Investigative Techniques, CRC Press, USA, 2003.
5. Saferstein; Criminalistics- An Introduction of Forensic Science, Prentice Hall Inc, USA,2007.
6. Barry, A.J. Fisher; Techniques of Crime Scene Investigation, 7th Ed, CRC Press, NewYork, 2003.
7. Mordby, J. & Reckoning, D; The Art of Forensic Detection, CRC Press NewYork, 2003.
8. G.R. Chatwal; Analytical Spectroscopy 2nd Edn, Himalaya Publishing House New Delhi,2002.
9. Aitken and Stoney; The Use of Statistics in Forensic Science, Ellis Horwood, New York, 1991.
10. Robertson and Vignaux; Interpreting Evidence, John Wiley, New York, 1995.
11. H.L. Blitzer and J.Jacobia; Forensic Digital Imaging and Photography, Academic Press, London, 2002
12. David R.Redsicker; The Practical Methodology of Forensic Photography- 2nd Ed. CRC Press, New York, 2001.
13. R.E.Jacobson, S.F.Ray, G.G.Attridge; The Manual of Photography- Photographic and Digital Imaging , N.R. Oxford.
14. Collection, packing, labeling, forwarding of physical evidences from scene of crime to forensic science laboratory.

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Course Code	Course Name	TEACHING & EVALUATION SCHEME (THEOTY)						
		End Sem University Exam	Two Term Exam	Teachers Assessment*	L	T	P	Credit
MSFS 102	**Instrumental Techniques (Physical)**	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. Basic Concept of Spectroscopy, Atomic and Molecular Spectra.
2. Forensic application of UV-Vis. and IR Spectrophotometry.
3. Principle and working of Atomic Absorption/Emission and X-Ray Spectrometry:
4. Basic concept of Radiochemical Techniques

UNIT I: Basic Concept of Spectroscopy

Basic Concept of Spectroscopy: General idea on spectroscopy, electromagnetic spectrum, various source of radiation their utility and limitation. Interaction of radiation with matter - reflection, absorption, fluorescence etc. Detection of radiation i.e. photographic, photoelectric etc. Forensic application of spectroscopy.

UNIT II: Basic Concept of Atomic and Molecular Spectra

Basic Concept of Atomic and Molecular Spectra: Atomic spectra – Energy level, quantum number and designation of states, selection rule. Molecular Spectra – Quantitative discussion of molecular bindings, molecular orbital, type of molecular energies, discussion of rotational, vibrational and electronic spectra.

UNIT III: Ultraviolet-visible and Infrared Spectrophotometry

Ultraviolet-visible and Infrared Spectrophotometry: Basic principle, instrumentation, qualitative and quantitative analysis, interpretation of spectra etc. Forensic application of UV-Vis and IR Spectrophotometry.

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UNIT IV: Atomic Absorption/Emission and X-Ray Spectrometry

Atomic Absorption/Emission and X-Ray Spectrometry: Basic principle, instrumentation, qualitative and quantitative analysis, interpretation of spectra and its forensic application.

UNIT V: Radiochemical Techniques

Radiochemical Techniques: Basic principles and theory, introduction about nuclear reactions and radiations, Neutron sources, Neutron Activation Analysis (NAA), Nuclear Magnetic Resonance Spectroscopy (NMR). Application of Radiochemical techniques in forensic science.

Reference Books:

1. Robinson, J.W; Atomic Spectroscopy, 2nd Ed. Revised & Expanded, Marcel Dekkar, Inc, New York, 1996.
2. Workman, J; Art Springsteen; Applied Spectroscopy- A compact reference for Practitioners, Academic Press, London, 1997.
3. Subrahmanyam, N. & Lal B; A text Book of Optics, S. Chand & Company, New Delhi, 2004.
4. Willard, H.H. Lynne L. Merrett, J. Dean, A. Frank, A. Settle. J; Instrumental Methods of Analysis, 7th Edn. CBS pub. & Distributors, New Delhi, 1986.
5. Khandpur, R.S; Handbook of Analytical Instruments, Tata McGraw Hill Pub. Co. New Delhi, 2004.
6. Thomson, K.C. & Renolds, R.J; Atomic Absorption Fluorescence & Flame Emission Spectroscopy, A Practical Approach, 2nd Edn. Charles Griffith & Company, New South Wales, 1978.
7. Dudley, H. Williams & Fleming, I; Spectroscopic Methods in Organic Chemistry, 4th Edn, Tata McGraw- Hill Publishing Company, New Delhi, 1994.

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Course Code	Course Name	TEACHING & EVALUATION SCHEME (THEOTY)						
		End Sem University Exam	Two Term Exam	Teachers Assessment*	L	T	P	Credit
MSFS103	**Forensic Physics**	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. Types of glass and their composition.
2. Forensic aspects of fibre examination.
3. Photographic examination of tool marks.

Unit I: Soil, Cement and Concrete

Types and composition of soil, sample preparation, removal of contaminants, colour, molecular particle size distribution, turbidity test, pH measurements, microscopic examination, density gradient analysis, ignition-loss test, elemental analysis, interpretation of soil evidence. Cement Analysis- bromoform test, fineness test, ignition-loss test. Identification of adulterated cement. Mortar and concrete analysis.

Unit II: Paint and Fibre

Types of paint and their composition, macroscopic and microscopic analysis of paint pigments, pigment distribution, micro-chemical analysis- solubility test, pyrolysis gas chromatography, TLC, colorimetric analysis, IR spectroscopy and X-ray diffraction. E lemental analysis, mass spectrometer, interpretation of paint evidence. Types of fibres, forensic aspects of fibre examination. Difference between natural and man-made fibres.

Unit III: Glass

Composition and types of glasses -soda-lime, boro-silicate, safety glass, laminated, light-sensitive, tampered/ toughened, wire glass, coloured glass. Matching and comparison. Forensic examinations of glass fractures- rib marks, hackle marks, cone fracture, wavy, backward

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fragmentation, concentric and radial fractures. Colour, fluorescence, physical measurements, refractive index, density gradient, becke-line, specific gravity examination and elemental analysis of glass evidence.

Unit IV: Tool marks

Types of tool marks- compression marks, striated marks, combination of compression and striated marks, repeated marks, class characteristics and individual characteristics, tracing and lifting of marks, Photographic examination of tool marks and cut marks on clothes and walls etc. Restoration of erased / obliterated marks- Method of making-cast, punch, engrave; methods of obliteration, method of restoration- etching (etchings for different metals), magnetic, electrolytic etc., recording of restored marks – restoration of marks on wood, leather, polymer etc.

Unit V: Forensic Photography

Basic principles of Photography, Techniques of black & white and color photography, cameras, lenses, shutters, depth of field, film; exposing, development and printing techniques; Different kinds of developers and fixers; UV, IR, fluorescence illumination guided photography; Modern development in photography- digital photography, working and basic principles of digital photography; Surveillance photography. Videography and Crime Scene &laboratory photography.

Suggested Readings:

1. Caddy, B; Forensic Examination of Glass and Paint Analysis and Interpretation, CRC Press, New York, 2001.
2. Shaw, D; Physics in the Prevention and Detection of Crime, Contem Phys. Vol.17, 1976.
3. Saferstein, R; Forensic Science Handbook. Vol. I,II, (Ed.), Prentice Hall, New Jersey, 1988.
4. Working Procedure Manual; Physics BPR&D Publication, 2000.
5. Sharma, B.R; Forensic Science in Criminal Investigation and Trials (3rd Ed.), Universal Law Publishing Co., New Delhi, 2001.
6. Working Procedure Manual- Physics, BPR&D Publication. 2000
7. Hess, K.P; Textile Fibers and their Use, 6th Edn, Oxford and IBH Publishing Co., 1974.

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Course Code	Course Name	TEACHING & EVALUATION SCHEME (THEOTY)						
		End Sem University Exam	Two Term Exam	Teachers Assessment *	L	T	P	Credit
MSFS104	Advanced Forensic Ballistics	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:

1. The examination and identification of fire arms and their constructional features.
2. Ignition, shape and size of propellants.
3. Methods of measurement of wound ballistics parameters, post-mortem and antimortem fire arm injuries.

Unit-I: Introduction to Forensic Ballistics

History and development of firearms, their classification and characteristic features. Significance of forensic ballistics in criminal investigation. Smooth bore and rifled firearms. **Rifling in firearms**: Characteristics of rifling, types of rifling and methods to produce rifling. Components of small arms. Automatic and semi-automatic guns. Techniques of dismantling/ assembling of firearms.

Ammunition: Classification of cartridges and their constructional features. Types of primers and priming composition, Propellants and their composition. Projectile: Types and their characteristic features. Improvise ammunition and safety. Constructional features of smooth bore and rifled firearm cartridges.

Improvised weapons: Country- made / imitative firearms, their constructional features, identification of origin. Recent advancements in firearms and ammunitions.

Unit-II: Internal Ballistics

Definition, Shape and size of propellants. Mechanism of action of firearms, trigger pull and firing mechanism. Cartridge firing mechanism. Ignition and burning of propellants. Theory of recoil, factors responsible for recoiling, methods for the measurement of recoil. Various factors affecting internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting.

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Unit-III: External ballistics

Definition. Motion of projectile and formula for its calculation. Principal problems of exterior ballistics, Vacuum trajectory, effect of air resistance on trajectory, base drag, yaw, shape of projectile and their effects. Trajectory and its determination. Trajectory computation. Ballistics coefficient and limiting velocity, ballistics tables, measurement of trajectory prarameters. Introduction to automated system of trajectory computation and automated management of ballistics data.

Unit-IV: Terminal and wound ballistics

Terminal ballistics: Effect of projectile hitting the target: function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullet, effect of instability of target, effect of intermediate targets, influence of range, ricocheting. Wound ballistics: Cavitation- temporary and permanent. Effect of ricocheting. Threshold velocity for penetration of skin, flesh and bones. Preparation of gel block, penetration of projectiles in gel block and other targets. Nature of wounds of entry and exit, initial track with various ranges and velocity with various types of projectiles. Explosive wounds. Evaluation of injuries caused due to shot- gun, rifle, handguns and country-made firearms. Methods of measurements of wound ballistics parameters. Post mortem and ante mortem firearm injuries.

Unit-V: Examination and Identification

Class and Individual characteristics of firearms and cartridges. Different types of marks produced on cartridges and bullets during the process of firing; firing pin marks, breech face marks, chamber marks, extractor and ejector marks, striation marks on cartridges and land and grooves marks, no and direction of lands and grooves on bullets. Identification of various parts of firearms, techniques for obtaining test material from various types of weapons and their linkage with fired ammunition. Characteristics of firearm injuries; burning, scorching, blackening, tattooing and metal fouling, shot dispersion. Determination of range of firing, time of firing- different methods and their limitations. Examination by Stereo & comparison microscope. Automatic bullet and cartridge comparison system. GSR; Mechanism of formation of GSR and distribution, source and collection, Spot test and chemical test, Identification of shooter, Instrumental methods of GSR analysis. Management and reconstruction of ballistics crime scene; suicide, murder and accidental and self defense cases.

Reference Books:

1. Sharma, B.R.; Firearms in Criminal Investigation & Trials, 4th Ed, Universal Law Publishing Co Pvt Ltd, New Delhi, 2011.
2. Mathews, J.H; Firearms Identification, Vol I, II and III, Charles C. Thomas, USA, 1977.
3. Hatcher, Jury and Weller; Firearms Investigation, Identification and Evidence, Stackpole Books, Harrisburg, Pennsylvania,1997.
4. Heard, B.J; Handbook of Firearms and Ballistics, John Wiley, England, 1997.

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5. Warlow, T.A.; Firearms, The Law and Forensic Ballistics, Taylor and Francis, London,1996.
6. Schooeble, A.J. and Exline, L.D; Current methods in Forensic Gunshot Residue Analysis, CRC Press, New York, 2000.
7. Wilber; Ballistic Science for the Law Enforcement Officer, Charles C. Thomas, USA.
8. Carlucci, D.E & Jacobson, S.S; Ballistics, CRC Press, London, 2008.
9. Sellier, K.G; Wound Ballistics and the Scientific Background, Elsevier Pub. Co., London, 1994.
10. Jauhari M; Identification of Firearms, Ammunition, & Firearms Injuries, BPR&D, New Delhi.
11. Ordog, G.J; Management of Gunshot wounds, Elsevier Pub. Co., New York, 1983.
12. Schooeble, A.J. and Exline, L.D; Current methods in Forensic Gunshot Residue Analysis, CRC Press, NewYork, 2000.
13. Wilber; Ballistic Science for the Law Enforcement Officer, Charles C. Thomas, USA, 1977.
14. Di Maio, JM; Gunshot Wounds, CRC Press, New York, 1999.

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Course Code	Course Name	TEACHING & EVALUATION SCHEME (THEOTY)						
		End Sem University Exam	Two Term Exam	Teachers Assessment*	L	T	P	Credit
MSFS 1051	**Essential of Forensic Biology**	60	20	20	3	1	0	4

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

1. The importance of different biological organism in forensic science.
2. Their significance in solving crime where they are found as evidence.
3. To understand how plants and animals invertebrates are illegally traded.
4. The collection and preservation of plants and animal evidences.

Unit I: Protists, Fungi and Plants in Forensic Science

Introduction, Protists as forensic indicators, Fungi as forensic indicators, Plants as forensic indicators, Wood, Pollen and spores, Fruit, seeds and leaves, Plant secondary metabolites as sources of drugs and poisons, Illegal trade in protected plant species.

Unit II: Invertebrates in Forensic Science

Introduction, Invertebrates as forensic indicators in cases of murder or suspicious death, Invertebrates attracted to dead bodies, Detritivores, Carnivores, Parasitoid insects, Coprophiles. Invertebrates leaving dead bodies, Invertebrates accidentally associated with dead bodies, Invertebrates as a cause of death, Invertebrates as forensic indicators in cases of neglect and animal welfare, The role of invertebrates in food spoilage and hygiene litigation, Invertebrates as a cause of nuisance, Invertebrates as a cause of structural damage, Illegal trade in protected species of invertebrates.

Unit III: Vertebrates in Forensic Science

Introduction, Vertebrate scavenging of human corpses, Vertebrates causing death and injury, Neglect and abuse of vertebrates, Vertebrates and drugs, Vertebrates and food hygiene, Illegal trade in protected species of vertebrates.

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Unit IV: Collection of Animal and Plant Material for Forensic Studies I

Introduction, The importance of scientific rigour and safety issues when collecting biological material, Collecting and preserving diatoms and algae for forensic analysis,

Unit V: Collection of Animal and Plant Material for Forensic Studies II

Collecting and preserving testate amoebae for forensic analysis, Collecting and preserving plant material for forensic analysis, Collecting invertebrates for forensic analysis.

Suggested Readings:

1. Stryer, Biochemistry, 3rd Edition, W.H. Freeman and Company, New York (1988).
2. R.K. Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell, Harper's Biochemistry,
3. APPLETON & Lange, Norwalk (1993).
4. S. Chowdhuri, Forensic Biology, BPRD, New Delhi (1971).
5. R. Saferstein, Forensic Science Handbook, Vol. III, Prentice Hall, New Jersey (1993).
6. G.T. Duncan and M.I. Tracey, Serology and DNA typing in, Introduction to Forensic
7. Sciences, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).

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Course Code	Course Name	TEACHING & EVALUATION SCHEME (THEOTY)						
		End Sem University Exam	Two Term Exam	Teachers Assessment*	L	T	P	Credit
MSFS 1052	**Quality Management & Research methodology**	60	20	20	3	1	0	4

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. Quality management System.
2. Basics of research methodology.
3. How to select Research Problem and prepare research proposals and report writing.
4. How to collect sample and to study types of sampling.
5. Basics of statistics: Mean, Mode, Median, Standard deviation, correlation and regression analysis.

Unit 1: Quality Management System

Quality Management System: Quality, Total Quality, Quality assurance, Quality Control, Quality Planning, and Quality Audit: Internal and External Audit, Accreditation, NABL, ISO, IEC, BIS. **Technical Requirements for testing and calibration of laboratories**: Test and calibration methods and their validation, measurements, standards and reference material, traceability, sampling.

Unit 2: Introduction to research methodology

Meaning of Research, Objectives Of Research, Types Of Research, Significance Of Research, Problems Encountered By Researchers In India.

Research problem: Definition, Necessity and Techniques of Defining Research Problem, Research Proposal, Literature Search, Hypothesis, Report Writing.

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Unit 3: Research Design

Meaning, Need and Features Of Good Research Design, Types Of Research Design, Basic Principles of Experimental Designs, Design Of Experiments, Synopsis Design For Research Topic.

Sampling Design: Sample Design, Census And Sample Surveys, Types Of Sampling Design, Sampling Errors Characteristics Of Good Sample Design.

Unit 4: Descriptive Statistics

Types Of Data, Basic Concepts Of Frequency Distributions, Measure Of Central Tendency, Mean, Median And Mode, Measure Of Dispersion, Range, Mean Deviation And Standard Deviation. Correlation and Regression Analysis.

Unit 5: Methods of data collection

Collection of Primary Data, Observation Method, Interview Method, Collection of Data through Questionnaire and Schedules, Other Methods. Collection Of Secondary Data, Selection Of Appropriate Method For Data Collection, Case Study Method , Guidelines For Developing Questionnaire, Successful Interviewing , Survey V/S Experiment.

Suggested Readings:

1. Aitken and D.A Stoney; The use of statistics in Forensic Science, Ellis Horwood Limited, England 1991.
2. Visweswara Rao. K: Biostatistics, A Manual of Statistical Methods for Use in Health, Nutrition & Anthropology.
3. Sokal, R.R & Rolf, F.J: Biometery, Principles & Practices of Statistics in Biological Research 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. Rao, C. R Advanced Statistical Methods in Biometric Research.
4. Saferstein R. Forensic Science Handbook I, II, III.
5. William L. Duncan: Total Quality, Key Terms and Concepts.
6. Murray S. Cooper: Quality control in the Pharmaceutical Industry.
7. John T. Rabbitt, Peter A Bergh: The ISO 9000 Book.
8. Willard Merritt, Dean & Settle: Instrumental Methods of Analysis.
9. NABL -113
10. NABL -113A

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Course Code	Course Name	TEACHING & EVALUATION SCHEME (THEOTY)						
		End Sem University Exam	Two Term Exam	Teachers Assessment*	L	T	P	Credit
MSFS 1053	Computer Forensic and bioinformatics	60	20	20	3	1	0	4

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 origin and programming of Computer Technology.
2. The role of web technologies in various fields.
3. The classification and legal frame work of cyber space.
4. The classification of Cyber Crime.

UNIT I: Evolution of Computer Technology & Cyberspace

History of Digital Computer, Generation of Computers, Basics of Computer, Recent Trends in Computer Technology Computer Programming: Programming Cycle, Basics of Programming, Interpreter, and Compiler, Various programming languages and their special features, Programming in C, Object Oriented Programming, Java programming, JSP and Servlet.

Internet & Web Technologies: Role of Networking in IT, Evolution and Impact of Internet, Internet Services, Internet Process Concept of World Wide Web, History of World Wide Web, Purpose of Web, Functioning & Mechanism of Web, Web Hosting & Development, Website Legal Issues HTML (Elements, Attributes, Headings, Paragraphs, Formatting, Fonts, Styles, Links, Images, Tables, Lists, Forms, Frames, Iframes, Colors, Colornames, Colorvalues, Layout, Doctypes, CSS, Head, Meta , Scripts, Entities, URLs, URL Encode, Webserver) XML, PHP, Installing PHP on wamp server PHP(Syntax, Variables, String, Operators, If...Else, Switch, Arrays, While Loops, For Loops, Functions, ,forms, GET, POST, Date, Include, PHP File, File Upload, Cookies, Sessions, E-mail, Secure E-mail, Error, Exception Filter)

Cyberspace: Concept of Cyberspace, Emergence of Cyberspace, Nature & Meaning of Cyberspace, Attributes of Cyberspace, Classification of Cyberspace, Legal Framework for Cyberspace.

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UNIT II: Image Processing

Image Processing Fundamentals, Digital Image Processing and Computer Graphics Understanding Digital Image Processing, Origins of Digital Image Processing, Examples of fields that Use Digital Image Processing, Steps in Digital Image Processing, Components of an image Processing System. Image File Forensic: Understanding various image formats (Vector and Raster), and File Compression, Locating and recovering image files. Various Image

Enhancement Techniques: Image Enhancement in the Spatial Domain (Gray level transformations, Histogram processing, Arithmetic and logic operations, Spatial filtering: Smoothing and sharpening filters) Image Enhancement in the Frequency Domain (Frequency domain filters: Smoothing and Sharpening filters Homomorphic filtering)

UNIT III: Wireless Networks and Internet Forensics

Wireless Networks: Wireless Infrastructure, Difference between wired and wireless networks. Wireless Transmission, Telecommunication Systems

Wireless LAN: IEEE 802.11 (Architecture Physical Layer MAC Layer Addressing mechanism) Cellular Telephony: Frequency reuse principal, Transmitting- Receiving Handoff roaming, First Second and Third Generation. Satellite Networks: Orbits, Footprints, three categories of satellites (GEO, MEO, LEO)

UNIT IV: Internet Forensic

Obfuscation: Anatomy of URLS, IP Addresses in URLS, Usernames in URLS, Encoding the Entire Message, Similar Domain Names, Making a form look like a URL, Bait and Switch-URL Redirection, JavaScript, Browsers and Obfuscation

Websites:

Capturing Web Pages, Viewing HTML Source, Comparing Pages, Non-Interactive Downloads Using wget, Mapping out the entire website, Hidden Directories, In Depth Example- Directory Listing, Dynamic WebPages, Filling Out Forms, In depth Example-Server side Database, Opening the Black Box.

Web Servers: Viewing HTTP Headers, Understanding Header Information, Cookies, Redirection, Web Server Statistics, Controlling HTTP Headers.

UNIT V: Cyber crimes and related offences and penalties

Introduction to Cybercrimes, Classification of cybercrimes., Distinction between cyber crime and conventional crimes, Reasons for commission of cyber crime

Types of cyber crimes: cyber stalking; cyber pornography; forgery and fraud; crime related to IPRs; Cyber terrorism; Spamming, Phishing, Privacy and National Security in Cyberspace, Cyber Defamation and hate speech, computer vandalism etc.

Relevant provisions under Information Technology Act, 2000, Indian Penal Code, 1860.]

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M.Sc. (Forensic Science)

SEMESTER I / VII (M.Sc. / B.Sc.+M.Sc.)

Reference Books:

1. Balguruswami, Programming with C
2. Balguruswami, Programming with JAVA
3. Michael Morrison, Faster Samrter HTML & XML, Microsoft Press
4. William McCarty, PHP 4: A Beginers Guide, McGraw Hill
5. Gonzalez & Woods, Digital Image Processing, Pearson Education Publication
6. Tinku Acharya and Ajay K Ray, Image Processing Principal and Application, Wile Publication
7. Computer Forensic Investigating Data and Image Files, EC Council Press
8. Forouzan Data Communication and Networking McGraw Hill
9. Jochen Schiller Mobile Communication Addison Wisely Pearson Eduction
10. Robert Jones, Internet Forensics Using Digital Evidence to Solve Computer Crimes
11. John R. Vacca, Network and System Security, Syngrees Publication
12. Stallings, "Cryptography And Network Security: Principles and practice"
13. C. P. Pfleeger, and S. L. Pfleeger, "Security in Computing", Pearson Education.
14. Matt Bishop, "Computer Security: Art and Science", Pearson Education.
15. Kevin Mandia, Chris Prosise and Matt Pepe, Incident response and computer forensics. McGraw Hill Publication.

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SEMESTER I / VII (M.Sc. / B.Sc.+M.Sc.)

Course Code	Course Name	TEACHING & EVALUATION SCHEME (Practical)					
		End Sem University Exam	Teachers Assessment*	L	T	P	Credit
MSFS106(P)	Practicals based on paper 1 & 2	60	40	0	0	4	2

List of Practical's:

1. Descriptive study of organizational structure of a forensic science laboratory.
2. Photography of crime scene using manual and digital camera.
3. Basics of crime scene sketching
4. To carry out sketching of indoor crime scene.
5. To carry out sketching of outdoor crime scene.
6. Methods for Searching of physical evidences at scene of crime.
7. To understand the working and measurement of λ max of various organic compounds by UV-Vis. Spectrophotometer.
8. To know the concentration of given liquid by colorimeter.
9. To verify Beer Lambert's law by colorimetric measurements.
10. Detailed study of Mass Spectrometer.

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SEMESTER I / VII (M.Sc. / B.Sc.+M.Sc.)

Course Code	Course Name	TEACHING & EVALUATION SCHEME (Practical)					
		End Sem University Exam	Teachers Assessment*	L	T	P	Credit
MSFS107 (P)	Practicals based on paper 3 & 4	60	40	0	0	4	2

List of Practical's:

1. Microscopic examination of Paint.
2. Physical matching of cloth sample.
3. Examination of glass.
4. Examination of glass fracture.
5. Comparison of tool marks and fired cartridge/ bullet using comparison microscope.
6. Identification of explosives and gunshot residue by chemical test
7. Identification of shell and pellets using vernier caliper and scew guage
8. To identify fired bullet and slug using vernier caliper
9. To examine various marks on cartridge and bullet using stereomicroscope
10. To collect and preserve gunshot residue from suspected hand.
11. Primary examination of gunshot residue by spot test.
12. Demonstration of comparison microscope
13. Classification and designation of ammunition using physical measurements
14. Estimation of Range.
15. Determination of velocity and energy of projectiles

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