Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Semester-II (B.Sc. / B.Sc.-M.Sc.)
Name of Program B.Sc. / B.Sc.-M.Sc. (Forensic Science)

Course Code	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 *				
BSFS201	Forensic Psychology	60	20	20	30	20	3	1	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 overview of forensic psychology and its applications.
2. The legal aspects of forensic psychology.
3. The significance of criminal profiling.
4. The importance of psychological assessment in gauging criminal behaviour.
5. The tools and techniques required for detection of deception.

Unit 1:Basics of Forensic Psychology
Definition and fundamental concepts of forensic psychology and forensic psychiatry. Psychology and law. Ethical issues in forensic psychology, Assessment of mental competency, Mental disorders and forensic psychology.

Unit 2:Psychology of evidence
Psychology of evidence–eyewitness testimony, confession evidence, Criminal profiling. Psychology in the courtroom, with special reference to Section 84 IPC.

Unit 3:Psychology and Criminal Behaviour
Psychopathology and personality disorder, Psychological assessment and its importance, Serial murderers, Psychology of terrorism, Biological factors and crime– social learning theories, psycho-social factors, abuse, Juvenile delinquency– theories of offending(social cognition ,moral reasoning),Child abuse (physical, sexual, emotional),juvenile sex offenders, legal controversies.

Unit 4: Detection of Deception
Tools for detection of deception–interviews, non-verbal detection, statement analysis, voice stress analyzer, hypnosis, Polygraphy–operational and question formulation techniques, ethical and legal aspects, the guilty knowledge test.

Unit 5: Norco analysis and Brain Finger printing
Norco analysis and brain electrical oscillation signatures–principle and theory, ethical and legal issues, Brain Finger printing- Principle and technique, Legal standard of Brain fingerprinting. Case study.

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LIST OF PRACTICALS

1. To cite a crime case where legal procedures pertaining to psychic behaviour had to be invoked.
2. To prepare a report on relationship between mental disorders and forensic psychology.
3. To study a criminal case in which hypnosis was used as a means to detect deception.
4. To prepare a case report on thematic appreciation test.
5. To prepare a case report on Minnesota multi phasic personality inventory test.
6. To prepare a case report on thematic appreciation test.
7. To prepare a case report on word association test.
8. To prepare a case report on Bhatia's battery of performance test of intelligence.

Suggested Readings:

1. A.A. Moenssens, J. Starrs, C.E. Hendersonand F. E. Inbau, *Scientific Evidencein Civiland CriminalCase s*,4th Edition,TheFoundationPress,Inc., NewYork(1995).
2. R. Saferstein,*Criminalistics*,8th Edition,PrenticeHall,NewJersey(2004).
3. J.C.DeLaduranteyandD.R.Sullivan,*CriminalInvestigationStandards*,Harper&Row,NewYork(1980).
4. J.Niehaus,*InvestigativeForensicHypnosis*,CRC Press, Boca Raton(1999).
5. E.Elaadin*EncyclopediaofForensicScience, Volume2*,J.A.Siegel,P.J.Saukkoand
6. G.C. Knupfer(Eds.),Academic Press,London (2000).

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BSFS202	**Criminal Law**	60	20	20	30	20	4	1	0	5

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Learning Objectives: After studying this paper the students will know –

1. Elements of Criminal Procedure Code related to forensic science.
2. Acts and provisions of the Constitution of India related to forensic science.
3. Acts governing socio-economic crimes.
4. Acts governing environmental crimes.

Unit-I: Criminal law and Indian Penal Code

Definition. Development of modern criminal law in India. Classification of cases- Civil, Criminal. Mental elements and their significance in criminal law- Intention, Motive, Mens- Rea, Knowledge, Innocence, Mistake of fact, Mistake of law.

Offences pertaining to life- Sec-299, 300, Difference between culpable homicide and murder, Sec-301, 302, 304, 304A, 304B, 307, 308, 309, 319, 320, 323, 324, 325, 326, 350, 351, 352, 375, 376, 377.

Offenses against property- Sec- 378, 379, 405, 406, 415, 417, 420. Offences relating to documents and to property marks- Sec- 464, 465, 470, 489A, 499, 500.

Unit-II: Criminal Procedure Code

Bailable and Non Bailable Offences. Cognizable and Non Cognizable Offences, Complaint, Police Report, Inquiry, Investigations, Judicial Proceeding. Constitution and Hierarchy of Criminal Courts- Sec-6, 23. Sec-26, 27, 28, 29, 62, 63, 64, 65, 66, 67, 68, 69. What is warrant case, how warrant is executed- Sec-70, 71, 72. Sec- 154, 155, 156, 157, 158, 159, 164, 165, 173. How a trial before Court of Session is conducted (sec-225 to sec-236). Trial of warrant case by Magistrate (sec-238 to sec-250). Trial of Summon case by Magistrate (sec-251 to sec-255). Report of certain Government Scientific Experts (sec-293). Power to examine material evidence (sec-311).

Unit-III: The Indian evidence Act

Interpretation of- Fact, Fact in issue, Document, Evidence (Sec-3). Detailed study of- Sec-32, 45, 45A, 46, 47, 47A, 56, 58, 59, 61, 62, 63, 64, 65, 65B, 67, 67A, 73, 73A.

Witnesses: sections- 118, 119.

Examination of witnesses: sections- 135, 136, 137, 138, 139, 140, 141, 142, 143, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 159, 160, 163, 164.

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Unit-IV: Indian Constitution

Preamble. Fundamental rights- article 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35). Fundamental duties- article 51A. Directive principle of states- article 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50 and 51. Official language- article 343, 344, 345, 346, 347, 348, 349, 350 and 351.

Unit-V: Minor Acts

A General Study of- The Juvenile Justice (Care and protection of Children) Act. The protection of children from sexual offences act. The Information Technology Act. The Lokpal and Lokayuktas Act, 2013. Negotiable Instruments Act. The Police Act. The Arms Act. The Protection of Civil Rights Act, 1955. The Protection of Human Rights Act. Narcotic Drug and Psychotropic Substances Act. Drug and Cosmetics Act. Explosive Act. Presentation of Food Adulteration Act. Prevention of Corruption Act.

Suggested Readings:

1. Ratan Lal & Dheeraj Lal, Indian Penal Code, Lexis Nexis Publication, Mumbai.
2. Batuk Lal, The Code of Criminal Procedure, Central law Agency.
3. (Chief Justice) M. Monir, law of Evidence, Universal Law Publishing Co. Pvt. Ltd, N. Delhi.
4. D.A. Bronstein, Law for the Expert Witness, CRC Press, Boca Raton.
5. Durga Das Basu, Introduction to the Constitution of India, Lexis Nexis Publication, Mumbai.

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BSFS203	**Physics**	60	20	20	30	20	3	1	2	5

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Learning Objectives: After studying this paper the students will know –

1. Properties of mechanics and acoustic
2. Reflection & refraction of Light
3. Interference of Light
4. Properties & applications of Laser
5. Phenomenon of Radioactivity

Unit 1: Mechanics & Acoustics

Concept of force, Inertia, Newton's first law of motion; Momentum , Newton's second law of motion; Impulse; Newton's third law of motion, Law of conservation of linear momentum, Static and kinetic friction, Laws of friction.

Velocity of sound, echo , absorption coefficient, introduction to ultrasonic, production of ultrasonic waves, applications of ultrasonic waves, Generation of sound, amplitude, Vibration, Physical properties of vibrating systems .

Unit 2: Wave Optics -I

Reflection of light, Refraction of light, Total internal reflection and its applications, Diffraction of light, types of diffraction, Diffraction of light in a single slit, Aberrations in images and types of aberrations.

Principle and applications of some optical instruments: Simple Microscope, Compound Microscope, Polarizing Microscope, Stereomicroscope, Comparison Microscope, Electron Microscope, Simple table spectrometer.

Unit 3:Wave Optics-II

Wave front and Huygens's principle, Huygen's theory of secondary wavelets, Introduction to interference, Interference in thin films, Michelson's Interferometer, Coherent sources, Polarisation, Plane polarised light, Brewsters' law, Malus law.

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Unit 4: Electronics and LASER

Conductors, semi-conductors & Insulators, Types of semi-conductors, Conduction in N-type and P-type semi-conductors, Diode, Bias, Rectifier, Transistors, Emitter characteristic curve, Collector characteristic curve, Tran conductance, Amplifier.

Production of LASER, Types of LASER, Properties of Laser, applications of LASER, Optical fibres, Propagation of light through optical fibre, Angle of acceptance and numerical aperture.

Unit 5: Nuclear Physics

Composition and size of nucleus, atomic masses, isotopes, isobars, isotones, Nuclear forces, fission, fusion, nuclear properties and half life, Radioactive decays, alpha, beta & gamma rays, Applications of Radio Isotopes, counters and detectors- giger-muller counter, scintillation counter.

Practicals:

1. Standard Operating Procedures for using Vernier Caliper, Micrometer Screw Gauge ,
2. Standard Operating Procedures for using Travelling Microscope, Comparision Microscope
3. Standard operating Procedure for using Abbes Refractrometer, Stereo Microscope.
4. Determination of refractive index of given liquid using Abbes refractrometer (Four Liquid).
5. Determination of refractive index of material of prism using Spectrometer.
6. To identify the fibre using stereo microscope.
7. To determine the wavelength of Sodium lamp using Newton's Ring Experiment
8. To study the 'n'diffraction pattern using spectrometer.
9. To study Forward and Reverse characteristics of Zener diode.
10. Measurement of wavelength of LASER light source using diffraction grating.

Suggested Readings:

1. Applied Fluid Mechanics, by- Mott Robert, Pearson Benjamin Cummir, VI Edition, Pearson Education/Prentice Hall International, New Delhi
2. Atomic and Nuclear physics, by- N. Subramanyam, Brijlal.
3. Fundamental of Acoustics 4th Edition, by- Kinsler , John Wiley and Sons
4. Mechanics, by- D. S. Mathur, S Chand.
5. Nuclear Physics, by- S. N. Ghoshal.
6. Optics, by- Brijlal and Subramayam.
7. Physics for Degree Students B.Sc.-Part-I, by- C. L. Arora, Dr. P. S. Hemne, S Chand & Company.
8. The Physics of waves and oscillation, by- N. K. Bajaj, Tata McGraw-Hill, publishing co. ltd.
9. Waves and oscillation, by- N. Subrahmanuam and Brijlal.
10. Laser and Optical fiber communication, by- P.Sarah.
11. LASERS- Theory and Applications, by- Thyagarajan and A. K. Ghatak

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BSFS204	**Biology**	60	20	20	30	20	3	1	2	5

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Learning Objectives: After studying this paper the students will know –

1. Cell Biology
2. Human Anatomy and Physiology
3. Plant Anatomy and Physiology

Unit 1: Biology of Cell

History of Cellular Biology, Modern Cell Theory. Types of Cells: Prokaryotic and Eukaryotic Cells, Animal and plant cell. Chemical composition of cells. Ultra structure of cell. Cell cycle (Mitosis and Meiosis)

Unit 2: Human Anatomy And Physiology I

Anatomy and Physiology of Musculoskeletal system, Nervous system, Circulatory system and Respiratory system

Unit 3: Human Anatomy And Physiology II

Anatomy and Physiology of Digestive system, Reproductive system, Endocrine system and Excretory System.

Unit 4: Plant Anatomy

Structure and functions of: Roots, Stems, Leaves. Plant tissues: Meristematic, Dermal, Ground and Vascular Tissue (Xylem & Phloem).Flower, Fruits.

Unit 5: Plant Physiology:

Transport in plants, Photosynthesis, Respiration, Plant growth and development: Phase of growth, and Plant Growth regulator. Photoperiodism and flowering.

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Practicals

1. Study of construction and working of compound microscope.
2. Monochrome staining of prokaryotic cell (Bacterial cells).
3. Monochrome staining of eukaryotic cell (Yeast)
4. Gram staining of bacterial cells.
5. Detection of mitochondria by differential centrifugation.
6. Study of different stages of mitosis.
7. Study of different stages of meiosis.
8. Qualitative test for detection of DNA by diphenylamine method.
9. Qualitative test for detection of RNA by Orcinol method.
10. Staining of epithelial cells from oral cavity.
11. Study of permanent slides of muscular, bone tissues.
12. Osmosis – by potato osmoscope experiment.
13. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot embryos using permanent slides / Photographs.
14. Study of ovule types and developmental stages of embryo sac using permanent slides /Photographs.
15. Separation of plant pigments (chlorophyll) by chromatography.

Suggested Readings:

1. Gerald Karp, Cell Biology, Sixth Edition International , Wiley Publications,
2. Sherwood Lauralee Human Physiology : From Cells to Systems,
3. Lodish, H., Berk, A., Zipursky, S. L., Matsudaira, P., Baltimore, D. and James Darnell,
4. Karp, G. Cell and Molecular Biology: Concepts and Experiments. Wiley,
5. Morgan, David O. The Cell Cycle.
6. Hancock, J.T., Cell Signalling.
7. Gray H., Gray's anatomy.
8. Chaurasia B.D., Human Anatomy.
9. Chatterjee C.C., Human Physiology, Medical Allied Agency.
10. Drake R.L., Vogl A.W., Gray's Anatomy, Elsevier
11. Klein Jonathon, Plant Anatomy and Physiology

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ML301	Environment & Energy Studies	60	20	20	30	20	3	1	0	4

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Learning Objectives: After studying this paper the students will know –

1. Understand the various environment, culture and society.
2. To know the differences between the business and Government.
3. Contextualize the concepts of public sector in India.

Unit I: Environmental Pollution and Control Technologies:

1. Environmental Pollution & Control: Classification of pollution
2. Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards.
3. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil.
4. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management.
5. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary and Tertiary.

Unit II: Natural Resources:

1. Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts
2. Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources
3. Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, case studies

Unit III: Ecosystems:

1. Definition, Scope and Importance ecosystem.
2. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids.
3. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, devices and carrying capacity, Field visit

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Unit IV: Biodiversity and its Conservation:
Introduction - Definition: genetic, species and ecosystem diversity.
Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wild life conflicts; Conservation of biodiversity: In-situ and Exsitu conservation. National biodiversity act.

Unit V: Environmental Policy, Legislation & EIA:
Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan(EMP)

Suggested Readings:

1. Agarwal, K.C.,(latest edition).Environmental Biology, Bikaner :Nidi Pub. Ltd.,
2. Brunner R.C.(latest edition) Hazardous Waste Incineration, McGraw Hill Inc.
3. Clank R.S. .,(latest edition. Marine Pollution, Clanderson Press Oxford (TB).
4. Environmental Encyclopedia, Jaico Pub. Mumbai,
5. De A.K(latest edition) Environmental Chemistry, Wiley Wastern Ltd.
6. Erach Bharucha(2005).Environmental Studies for Undergraduate Courses by for University Grants Commission.
7. R. Rajagopalan (2006).Environmental Studies. Oxford University Press.
8. M. Anji Reddy(2006).Textbook of Environmental Sciences and Technology. BS Publication.
9. Richard T. Wright(2008).Environmental Science: towards a sustainable future PHL Learning Private Ltd. New Delhi.
10. Gilbert M. Masters and Wendell P. Ela .(2008).Environmental Engineering and science. PHI Learning Pvt Ltd.
11. Daniel B. Botkin & Edwards A. Keller(2008).Environmental Science Wiley INDIA edition.
12. Anubha Kaushik (2009). Environmental Studies. New age international publishers.

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