KURUKSHETRA UNIVERSITY KURUKSHETRA

Syllabus of 3rd and 4th Semester

for

M.Sc. (5-Year Integrated) Forensic Science

w.e.f. session 2024-25

Under Multiple Entry-Exit, Internship and CBCS-LOCF in accordance to NEP-2020

M.SC. (5-YEAR INTEGRATED) FORENSIC SCIENCE: SEMESTER-3								
Course Type	**Course Code**	**Name of the Course**	**Credit**	**Contact Hours/ Week**	**Internal Assessment marks**	**End Term Marks**	**Max. Marks**	**Exam Duration**
CC-3 MCC-4 4 credit (Scheme A,B&C)	**B23-FSC-301**	**Questioned Document and Report Writing**	**3**	**3**	**20**	**50**	**70**	**3 hrs.**
		Practical	**1**	**2**	**10**	**20**	**30**	**4 hrs.**

Level of the course: 200-299

Pre-requisite for the course (if any): Any Science Subject at 4.0 Level (Class XII)

Course Learning Outcomes (CLOs): At the end of the course the student should be able to:

1. The importance of examining questioned documents in crime cases.
2. The tools required for examination of questioned documents.
3. The significance of comparing handwriting samples.
4. The importance of detecting frauds and forgeries by analyzing questioned documents.
5. The examination of questioned documents.

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

UNIT	TOPICS	CONTACT HOURS
I	**Introduction of Questioned Documents** Nature and Scope of Questioned Documents - Definition of questioned documents - Types of questioned documents. Preliminary examination of documents.	**12**
II	**Tools** Basic tools needed for forensic documents' examination – ultraviolet, visible, infrared and fluorescence spectroscopy, photomicrography, microphotography, visible spectral comparator, and electrostatic detection apparatus - Determining the age and relative age of documents.	**11**
III	**Document Examination** Comparison of Documents - Comparison of handwriting. Development of individuality in handwriting. Natural variations and fundamental divergences in handwriting. Class and individual characteristics - Merits and demerits of exemplar and non-exemplar samples during comparison of handwriting. Standards for comparison of handwriting - Comparison of paper, ink, printed documents, typed documents, Xeroxed documents.	**11**
IV	**Forgery Detection** Forgeries - Alterations in documents, including erasures, additions, over-writings, and obliterations. Indented and invisible writings. Charred documents. Examination of counterfeit Indian currency notes, passports, visas, and stamp papers. Disguised writing and anonymous letters.	**11**
V **Practical**	**Practical** 1. Decipher secret writing. 2. Examination of a forged signature. 3. Decipher mechanically erased writing. 4. Identification of Handwriting General and individual characteristics. 5. Detection of various types of forgery.	**30**

	6. Identification of Indented and Invisible Writing. 7. Identification of typescripts and printing matter. 8. Study of natural variations in handwriting. 9. To perform an examination of Indian currency. 10. To perform a chromatographic examination of ink. 11. Preparation of Questioned document Examination Report.	

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	➢ **Theory** • Written Examination: 50 ➢ **Practicum** Practical Examination: 20

Learning Resources

1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton (1982).
2. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).
3. R.N. Morris, Forensic Handwriting Identification: Fundamental Concepts and Principles, Academic Press, London (2000).
4. E. David, The Scientific Examination of Documents – Methods and Techniques, 2nd Edition, Taylor & Francis, Hants (1997).
5. Harrison, W.R; Suspect Documents Their Scientific Examination, Universal Law Publication, Delhi, 2001.
6. Sheila, K; Graphotypes a new Plant on Handwriting Analysis, Crown Pub. Inc., USA, 1983.
7. Lerinson, J; Questioned Documents, Academy Press, London, 2001.
8. Katherine, M. K; CDE-Forensic Document Examination-Humana Press, New Jersey, 2007.

M.SC. (5-YEAR INTEGRATED) FORENSIC SCIENCE: SEMESTER-3								
Course Type	**Course Code**	**Name of the Course**	**Credit**	**Contact Hours/ Week**	**Internal Assessment marks**	**End Term Marks**	**Max. Marks**	**Exam Duration**
MCC-5 4 credit (Scheme B&C)	**B23-FSC-302**	**Analytical Techniques used in Forensic Science-I**	**3**	**3**	**20**	**50**	**70**	**3 hrs.**
		Practical	**1**	**2**	**10**	**20**	**30**	**4 hrs.**

Level of the course: 200-299

Pre-requisite for the course (if any): Any Science Subject at 4.0 Level (Class XII)

Course Learning Outcomes (CLOs): At the end of the course the student should be able to:

1. To understand the basics of microscopy and its uses in Forensic Science.
2. To understand the working and significance of electron microscopes such as SEM & TEM.
3. To acquire knowledge about basic and advanced techniques of Photomicrography.
4. To study the principles, theory & significance of different Radio Chemical Techniques.
5. The instrumental analysis of various substances used in forensic science.

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

UNIT	TOPICS	CONTACT HOURS
I	**Fundamentals of Microscopy** Introduction, History, Basic Principles, Structures, Working and Forensic Applications of Following Microscopes: • Compound Microscope • Comparison Microscope • Fluorescence Microscope • Polarized Microscope • Stereomicroscope • Infra-red Microscope	**12**
II	**Electron Microscopy** Introduction, Historical Review, Types of Electron Microscopes. Scanning Electron Microscope (SEM): Theory & Principle, Specific Features, Instrumentation, Sample Preparation, Specimen Interaction, Specimen Interaction Volume, Signal Produced by Specimen & Forensic Applications. Transmission Electron Microscope (TEM): Theory and Basic Principles, Instrumentation, Recent Advancements and Applications in Forensic Science.	**11**
III	**Photography** Photography, Microscope, Camera, Light System, Film, Filters, Photographic Papers, Photo Capture, Development of Film, Positive Photograph Preparation, Developer, Stop- Bath, Fixing. Ultra- Violet Photography, Infra-Red Photography, Microphotography and Photomicrography.	**11**
IV	**Radiochemical Techniques** Basic Principles and Theory, Introduction to Nuclear Reactions and Radiations, Neutron Sources, Neutron Activation Analysis (NAA). Thermal Analysis Methods: Basic Principles and Theory, Differential Scanning Colorimetry and Differential Analysis, Thermogravimetry, Forensic Applications.	**11**

V **Practical**	**Practical** 1. To study the working of digital camera. 2. Identification of ethyl alcohol and methyl alcohol by colour tests and microcrystal examination. 3. Working on Stereo and Comparison microscope for visualizing the materials of Forensic interest. 4. Working on a Compound microscope for visualizing the materials of Forensic interest. 5. Microscopic examination of human hair. 6. Microscopic examination of human epithelial cell. 7. Microscopic examination of plant products (flower, seed, bark, leaves).	**30**

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	➢ **Theory** • Written Examination: 50 ➢ **Practicum** Practical Examination: 20

Learning Resources

1. John C. Lindon, George E. Tranter & John L. Holmes; Encyclopedia of Spectroscopy & Spectrometry, Academic Press (2000).
2. Dudley H, Williams & Ian Fleming; Spectroscopic Methods in Organic Chemistry, 4th ed. Tata McGraw-Hill Pub Co. New Delhi, (1994).
3. Colin N. Banwell& Elaine M, Mc. Cash; Fundamentals of Molecular Spectroscopy 4th ed. McGraw-Hill Pub Co. New Delhi, (1995).
4. R. Murugeshan; Optics & Spectroscopy, S. Chand & co. (1998).
5. Jack L Koeing; Spectroscopy of Polymers, 2nd ed. Elsevier pub. Co. (1999).
6. D.A. Skoog, D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 6th Edition, Saunders College Publishing, Fort Worth (1992).

M.SC. (5-YEAR INTEGRATED) FORENSIC SCIENCE: SEMESTER-3								
Course Type	**Course Code**	**Name of the Course**	**Credit**	**Contact Hours/ Week**	**Internal Assessment marks**	**End Term Marks**	**Max. Marks**	**Exam Duration**
MDC-3 3 credit (Scheme A,B&C)	**B23-FSC-303**	**Basic Forensic - III**	**2**	**2**	**15**	**35**	**50**	**3 hrs.**
		Practical	**1**	**2**	**5**	**20**	**25**	**4 hrs.**

Level of the course: 200-299

Pre-requisite for the course (if any): Any Science Subject at 4.0 Level (Class XII)

Course Learning Outcomes (CLOs): At the end of the course the student should be able to:

1. Learn the basic concepts of the crime.
2. Study of different types of crimes.
3. Understand the effect of crimes on society.
4. Acquire knowledge about different type of offences.
5. Learn about the offences affecting human body.

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

UNIT	TOPICS	CONTACT HOURS
I	**Basic of Crime** Definition of Crime, Nature of Crime, Essentials of Crime, Criminals and society Classification of crime, cognizable and non-cognizable offence, bailable and non-bailable offence, compoundable, non-compoundable offences and punishments.	**8**
II	**Various types of Crime** Various types of crime under IPC, Crime against State, Crime against Army, Navy, and Air Force, Crime against public Tranquility, Crime relating to public servant, Offences relating to election, False evidence and offence against public justice, Offence relating to Coin and Government stamps, Offence relating to weight and measures, Offence relating to Religion.	**8**
III	**Special type of Crime** Professional crimes, Organized crimes, White collar crimes, Economic crimes, Political crime , Cybercrime, Environmental crime, and De-notified tribes; along with criminal tribes and ex-notified tribes. Types of Criminals: Violent criminals, Property offenders, Offenders of public morality, Career and occupational criminals.	**7**
IV	**Offence affecting Human Body** Culpable homicide, Murder, Dowry Death, Attempt to Murder, Causing Miscarriage, Causing Miscarriage without woman's consent, Hurt, Grievous hurt, Wrongful restraint and wrongful confinement, Force, Criminal force, Assault, Assault or Criminal force to women with intent to outrage her modesty, Kidnapping, Abduction, Sexual offence, Rape, Unnatural offence, Cruelty by husband or relative of husband.	**7**
V Practical	**Practical** 1. Writing a forensic report on a criminal case from a case study. 2. Examine the latest report of NCRB and study the data pertaining to murder cases in India using digital pie charts and graphs for depiction. 3. To cite examples of criminal cases in which the media acted as a pressure group. 4. To review crime cases where criminal profiling assisted the police to apprehend the accused.	**30**

	5. To evaluate how rising standards of living affect the crime rate. 6. To review the recommendations on the modernization of police stations and evaluate how far these have been carried out in different police stations.	

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory** • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.: 4 • Mid-Term Exam: 7 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam: NA	➢ **Theory** • Written Examination: 35 ➢ **Practicum** • Practical Examination: 20

Learning Resources

1. Brenner, J. C. (2004). Forensic Science: an Illustrated Dictionary. CRC Press. Eckert, W. G. (1997).
2. Introduction to Forensic Sciences (2nd Edition). CRC Press. James, S. H., Nordby, J. J., Bell, S. (2014).
3. Forensic Science: An Introduction to Scientific and Investigative Techniques (4th Edition). CRC Press.
4. Nabar, B. (2017). Forensic Science in Crime Investigation. Asia Law House. S Nath, R. C. (2013).
5. Forensic Science and Crime Investigation: Abhijeet Publications. Saferstein, R. (2017).
6. Criminalistics: An Introduction to Forensic Science. Pearson. Sharma, B. R. (2019).
7. Forensic Science in Criminal Investigation & Trails. Universal Law Publishing Company. Yount, L. (2006).

M.SC. (5-YEAR INTEGRATED) FORENSIC SCIENCE: SEMESTER-4								
Course Type	**Course Code**	**Name of the Course**	**Credit**	**Contact Hours/ Week**	**Internal Assessment marks**	**End Term Marks**	**Max. Marks**	**Exam Duration**
CC-4 MCC-6 4 credit (Scheme A,B&C)	**B23-FSC-401**	**Forensic Medicine**	**3**	**3**	**20**	**50**	**70**	**3 hrs.**
		Practical	**1**	**2**	**10**	**20**	**30**	**4 hrs.**

Level of the course: 200-299

Pre-requisite for the course (if any): Any Science Subject at 4.0 Level (Class XII)

Course Learning Outcomes (CLOs): At the end of the course the student should be able to:

1. The duties of the first responding officer who receives a call on homicide or suicide case.
2. The steps involved in processing the death scene.
3. The importance of ascertaining whether the crime was staged to appear as suicide or accident.
4. The importance of autopsy.
5. Providing scientific facts of death to determine the cause and nature of Death.

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

UNIT	TOPICS	CONTACT HOURS
I	**Death and Its Types** Death: Signs of death and changes after death. Somatic death, molecular death, early changes after death - Algor mortis, rigor mortis, cadaveric spasm, heat stiffening, cold stiffening, changes in blood, chemical changes in cerebrospinal fluid, changes in the vitreous humour, post mortem lividity, fluidity of blood, Late changes – putrefaction- external and internal changes. Adipocere, mummification, gastric content and bladder content and time of death from growth of hair and nails destruction of body and tissues by maggots and other insects, rodents, fish and crabs, moulds. Sudden death, post-mortem demonstration of myocardial infarction.	**12**
II	**Medico-legal aspects of Death** Medico legal aspects of death- Asphyxia, syncope, coma, death by starvation, drowning, hanging and strangulation. Causes and mechanism of traumatic death, manner of death. Classification of traumatic deaths.	**11**
III	**Injuries and Investigations** Mechanical Injuries: Abrasions, Bruises, Lacerations, Incised wounds, Stab wounds, Firearm injuries, Defence injuries, fabricated injuries. Traffic accident injuries: vehicular injuries, railway injuries and aircraft injuries. Thermal injuries: Burn and scalds, Lightning, Electricity, Explosions. Chemical trauma. Injuries- Accidental, self-inflicted, or inflicted by others. Ante-mortem and post-mortem, artificial injuries and aging of injuries. Fractures, Dislocations Secondary causes of death Regional injuries- wound of the scalp- incised, contusions, lacerations, firearm injuries. Fractures of the skull from direct & indirect impact.	**11**
IV	**Forensic Entomology** Forensic Entomology- History, significance, determination of time since death Diptereanlarval development & successional colonization of body, determining whether the body has been moved, body disturbance, presence and position wounds, linking suspect to the scene, identification of drugs and toxins from the insects and larvae feeding on the body, entomology	**11**

	as an evidentiary tool in child and senior abuse cases and animal abuse cases, collection of entomological evidence.	
V **Practical**	**Practical** 1. Recording of Bite marks by Photography & Casting. 2. To prepare slides of scale patterns of human hair. 3. To examine human hair for cortex and medulla. 4. To identify various types of fibers. 5. Study of pollen grains of forensic significance. 6. Identification of diatoms. 7. To identify blood stains. 8. To identify semen stains. 9. To identify saliva stains. 10. To determine species of origin from blood. 11. To determine blood group from fresh blood and blood stains. 12. Identification of insects of forensic interest.	**30**

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	➢ **Theory** • Written Examination: 50 ➢ **Practicum** Practical Examination: 20

Learning Resources

1. Modi JS: medical jurisprudence and Toxicology.
2. Taylor: Medical jurisprudence.
3. Parikh CK: Chikitsa Nyaya Shastra Aur Vish Vigyan.
4. Keith Simpsen & Bernard Knight: Forensic Medicine.
5. Poison, CJ, DJ Gee, B. Knight: Forensic Medicine.
6. Reddy: Forensic Medicine.

M.SC. (5-YEAR INTEGRATED) FORENSIC SCIENCE: SEMESTER-4								
Course Type	**Course Code**	**Name of the Course**	**Credit**	**Contact Hours/ Week**	**Internal Assessment marks**	**End Term Marks**	**Max. Marks**	**Exam Duration**
MCC-7 4 credit (Scheme B&C)	**B23-FSC-402**	**Forensic Chemistry and Toxicology**	**3**	**3**	**20**	**50**	**70**	**3 hrs.**
		Practical	**1**	**2**	**10**	**20**	**30**	**4 hrs.**

Level of the course: 200-299

Pre-requisite for the course (if any): Any Science Subject at 4.0 Level (Class XII)

Course Learning Outcomes (CLOs): At the end of the course the student should be able to:

1. The significance of toxicological studies in forensic science.
2. The classification of poisons and their modes of action.
3. The absorption of poisons in body fluids.
4. The classification and characteristics of the narcotics, drugs and psychotropic substances.
5. To detect and examine the type of drugs and poisons.

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

UNIT	TOPICS	CONTACT HOURS
I	**Introduction** Basics of Toxicology - Significance of toxicological findings. Techniques used in toxicology. Toxicological analysis and chemical intoxication tests - Postmortem Toxicology. Human performance toxicology - Dose-response relationship. Lethal dose 50 and effective dose 50 **Poisons** Poisons - Classification of poisons. Physio-chemical characteristics and mode of action of poisons. Accidental, suicidal, and homicidal poisonings - Signs and symptoms of common poisoning and their antidotes.	**12**
II	**Poison Identification** Collection and preservation of viscera, blood, and urine for various poison cases - Identification of biocides and metal salts in body fluids. Metabolism and excretion of poisons. Application of immunoassays in forensic work. Animal poisons. Snake venom. Mode of action. Carbon monoxide - poisoning. Vegetable poisons. Poisonous seeds, fruits, roots, and mushrooms. Beverages. Alcoholic and non-alcoholic illicit liquors. Analysis and identification of ethyl alcohol. Estimation of ethyl alcohol in blood and urine. Proof spirit. Crime scene management in illicit liquor cases.	**11**
III	**Classification of Drugs** Narcotics, Drugs, and Psychotropic Substances - Definition of narcotics, drugs, and psychotropic substances. Broad classification – Narcotics, stimulants, depressants, and hallucinogens. General characteristics and common examples of each classification. Natural, synthetic, and semi-synthetic narcotics, drugs, and psychotropic substances - Designer drugs. Tolerance, addiction and withdrawal symptoms of narcotics, drugs, and psychotropic substances.	**11**
IV	**Analysis of Narcotics Drugs** Analysis of narcotics, drugs and psychotropic substances in breast milk, saliva, urine, hair and antemortem blood - Drugs and driving. Dope tests - Analysis of narcotics, drugs, and psychotropic substances in postmortem blood. Postmortem changes affecting the analysis of narcotics, drugs, and psychotropic substances.	**11**

V **Practical**	**Practical** 1. Analysis of alcoholic liquor as per BIS specifications. 2. Determination of methanol and ethanol in alcoholic liquors. 3. Systematic identification of Narcotic Drugs and Psychotropic Substances (opiates, cannabis and barbiturates, benzodiazepines, and amphetamines) by spot colour tests. 4. Thin layer chromatographic analysis of the above NDPS. 5. UV/Vis and IR spectroscopic analysis of barbiturates, benzodiazepine, and amphetamines. 6. Systematic extraction and identification of acidic and basic drugs from viscera (simulated sample). 7. Detection of metallic poisons (arsenic and mercury) in viscera and foodstuff (simulated samples).	**30**

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	➢ **Theory** • Written Examination: 50 ➢ **Practicum** Practical Examination: 20

Learning Resources

1. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
2. F.G. Hofmann, A Handbook on Drug and Alcohol Abuse, 2 nd Edition, Oxford University Press, New York (1983).
3. S.B. Karch, The Pathology of Drug Abuse, CRC Press, Boca Raton (1996).
4. A. Poklis, Forensic toxicology in, Introduction to Forensic Sciences, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
5. A.W. Jones, Enforcement of drink-driving laws by use of per se legal alcohol limits: Blood and/or breath concentration as evidence of impairment, Alcohol, Drug and Driving, 4, 99 (1988).
6. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).

M.SC. (5-YEAR INTEGRATED) FORENSIC SCIENCE: SEMESTER-4								
Course Type	**Course Code**	**Name of the Course**	**Credit**	**Contact Hours/ Week**	**Internal Assessment marks**	**End Term Marks**	**Max. Marks**	**Exam Duration**
MCC-8 4 credit (Scheme B&C)	**B23-FSC-403**	**Forensic Psychology**	**3**	**3**	**20**	**50**	**70**	**3 hrs.**
		Practical	**1**	**2**	**10**	**20**	**30**	**4 hrs.**

Level of the course: 200-299

Pre-requisite for the course (if any): Any Science Subject at 4.0 Level (Class XII)

Course Learning Outcomes (CLOs): At the end of the course the student should be able to:

1. 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 behavior.
5. The critical assessment of advanced forensic psychological techniques.

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

UNIT	TOPICS	CONTACT HOURS
I	**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. Psychology of evidence – eyewitness testimony, confession evidence. Criminal profiling. Psychology in the courtroom, with special reference to Section 84 IPC.	**12**
II	**Psychology and Criminal Behavior** 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.	**11**
III	**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. Narco analysis and brain electrical oscillation signatures – principle and theory, ethical and legal issues	**11**
IV	**Personality** Definition of Personality, Theories of Personality- Psychoanalytic Theory- Sigmund Freud, Jung and Adler, Behavioral Model, Social Cognitive model-Bandura's reciprocal determinism and self-efficacy, Humanistic ModelCarl Roger and self-concept, Trait theories of Personality-Allport's Theory, Cattell's Theory, The Big Five Model, Biological Model, Assessment of Personality	**11**
V Practical	**Practical** 1. To cite a crime case where legal procedures pertaining to psychic behavior had to be invoked.	**30**

	2. To prepare a report on the relationship between mental disorders and forensic psychology 3. To prepare a case report on the thematic appreciation test. 4. To prepare a case report on Minnesota multiphasic personality inventory test. 5. To prepare a case report on the thematic appreciation test. 6. To prepare a case report on the word association test. 7. To prepare a case report on Bhatia's battery of performance test of intelligence. 8. To cite a criminal case in which narco analysis was used to detect deception.	

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	➢ **Theory** • Written Examination: 50 ➢ **Practicum** Practical Examination: 20

Learning Resources

1. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, The Foundation Press, Inc., New York (1995).
2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
3. J.C. DeLadurantey and D.R. Sullivan, Criminal Investigation Standards, Harper & Row, New York (1980).
4. J. Niehaus, Investigative Forensic Hypnosis, CRC Press, Boca Raton (1999).
5. E. Elaad in Encyclopedia of Forensic Science, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

M.SC. (5-YEAR INTEGRATED) FORENSIC SCIENCE: SEMESTER-4								
Course Type	**Course Code**	**Name of the Course**	**Credit**	**Contact Hours/ Week**	**Internal Assessment marks**	**End Term Marks**	**Max. Marks**	**Exam Duration**
DSC-1 4 credit Select one option (Scheme B&C)	**B23-FSC-404**	**Basics of Forensic Anthropology**	**3**	**3**	**20**	**50**	**70**	**3 hrs.**
		Practical	**1**	**2**	**10**	**20**	**30**	**4 hrs.**

Level of the course: 200-299

Pre-requisite for the course (if any): Any Science Subject at 4.0 Level (Class XII)

Course Learning Outcomes (CLOs): At the end of the course the student should be able to:

1. Basic of forensic anthropology
2. Importance of forensic anthropology.
3. Different techniques of facial reconstruction and their forensic importance.
4. Significance of somatoscopy and somatometry.
5. Significance of Roentgenographic superimposition.

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

UNIT	TOPICS	CONTACT HOURS
I	**Introduction of Forensic Anthropology** Introduction and History of Forensic Anthropology. Significance of Forensic Anthropology- Scope of forensic anthropology. Study of human skeleton. Nature, formation, and identification of human bones. Determination of age, sex, stature from skeletal material.	**12**
II	**Personal Identification** Personal Identification – Somatoscopy and Somatometry - Somatoscopy – observation of hair on head, forehead, eyes, root of nose, nasal bridge, nasal tip, chin, Darwin's tubercle, ear lobes, supra-orbital ridges, physiognomic ear breadth, circumference of head. Scar marks and occupational marks. Somatometry – measurements of head, face, nose, cheek, ear, hand and foot, body weight, height-Indices - cephalic index, nasal index, cranial index, upper facial index.	**11**
III	**Facial Reconstruction** Portrait Parle/ Bertillon system. Photofit / identi kit. Facial superimposition techniques - Cranio facialsuper imposition techniques photographic super imposition, video super imposition	**11**
IV	**Roentgenographic superimposition** Use of somatoscopic and craniometric methods in reconstruction - Importance of tissue depth in facial reconstruction - Genetic and congenital anomalies – causes, types, identification and their forensic significance.	**11**
V Practical	**Practical** 1. To determine of age from skull and teeth. 2. To determine of sex from skull and pelvis. 3. To study identification and description of bones and their measurements. 4. To investigate the differences between animal and human bones. 5. To perform somatometric measurements on living subjects. 6. To carry out craniometric measurements of human skull.	**30**

	7. To estimate stature from long bone length. 8. To conduct portrait parley using photofit identification kit.	

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	➢ **Theory** • Written Examination: 50 ➢ **Practicum** Practical Examination: 20

Learning Resources

1. M.Y. Iscan and S.R. Loth, The scope of forensic anthropology in, Introduction to Forensic Sciences, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
2. D. Ubelaker and H. Scammell, Bones, M. Evans & Co., New York (2000).
3. S. Rhine, Bone Voyage: A Journey in Forensic Anthropology, University of Mexico Press, Mexico (1998)

M.SC. (5-YEAR INTEGRATED) FORENSIC SCIENCE: SEMESTER-4								
Course Type	**Course Code**	**Name of the Course**	**Credit**	**Contact Hours/ Week**	**Internal Assessment marks**	**End Term Marks**	**Max. Marks**	**Exam Duration**
DSC-1 4 credit Select one option (Scheme B&C)	**B23-FSC-405**	**Digital Forensics**	**3**	**3**	**20**	**50**	**70**	**3 hrs.**
		Practical	**1**	**2**	**10**	**20**	**30**	**4 hrs.**

Level of the course: 200-299

Pre-requisite for the course (if any): Any Science Subject at 4.0 Level (Class XII)

Course Learning Outcomes (CLOs): At the end of the course the student should be able to:

1. The basics of digital forensics.
2. The cases which fall under the purview of digital crimes.
3. The types of digital crimes.
4. The elements involved in investigation of digital crimes.
5. Legal Prospective of Digital Forensic

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

UNIT	TOPICS	CONTACT HOURS
I	**Fundamentals and Concepts** Fundamentals of computers Hardware and accessories – development of hard disk, physical construction, CHS and LBA addressing, encoding methods and formats - Memory and processor. Methods of storing data. Operating system. Software. Introduction to network, LAN, WAN and MAN.	**12**
II	**Computer Crimes** Definition and types of computer crimes. Distinction between computer crimes and conventional crimes. Reasons for commission of computer crimes. Breaching security and operation of digital systems. Computer virus, and computer worm – Trojan horse, trap door, super zapping, logic bombs. Types of computer crimes – computer stalking, pornography, hacking, crimes related to intellectual property rights, computer terrorism, hate speech, private and national security in cyber space - An overview of hacking, spamming, phishing and stalking.	**11**
III	**Computer Forensics Investigations** 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.	**11**
IV	**Legal Prospective** Legal and privacy issues. Examining forensically sterile media. Restoration of deleted files. Password cracking and E-mail tracking. Encryption and decryption methods. Tracking users.	**11**
V Practical	**Practical** 1. To identify, seize and preserve digital evidence from crime scenes. 2. To detect deletions, obliterations and modifications of files using encase software. 3. To trace routes followed by e-mails and chats. 4. To identify the IP address of the sender of emails. 5. To demonstrate concealment techniques using cryptographic PGP. 6. To identify encrypted files.	**30**

	7. To identify hidden files. 8. To use digital signatures for securing e-mail and online transactions. 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.	

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	➢ **Theory** • Written Examination: 50 ➢ **Practicum** Practical Examination: 20

Learning Resources

1. R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, Computer Crimes and Computer Forensics, Select Publishers, New Delhi (2003).
2. C.B. Leshin, Internet Investigations in Criminal Justice, Prentice Hall, New Jersey (1997).
3. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004). 4. E. Casey, Digital Evidence and Computer Crime, Academic Press, London (2000).
4. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
5. John R.Vacca, "Computer Forensics", Cengage Learning, 2005.