

टिप्पणी एवं आदेश

Summary

Minutes of BOS - Forensic Science

Date - 25th June, 2022.

On dated 25th June, 2022 at 2-00 pm, the Board of Studies meeting was conducted and the following members were present in the meeting

1. Prof. R.K. Saini, Dean Science / convenor
2. Dr. Harsh Sharma, Former Director / SFSL - (Online Attendee)
3. Sh. Bhooji Singh, Director Incharge, RFSL, Thauri
4. Dr. Anu Singh, Head, Forensic Deptt.
5. Dr. Nijay Yadav, Assistant Professor
6. Mr. Sarwansh Saxena, Student (Alumni)
7. Mr. Kavita Yadav, Alumni.

The following decisions were taken in the meeting

- I. In accordance with the letter of State Govt. of Uttar Pradesh, letter no. 401/70-3-2022, Dated 09/02/2022 regarding implementation of NEP-2020 in UG, PG Courses; in the BOS of Forensic Science Deptt. the syllabus of B.Sc (H) Forensic Science and M.Sc Forensic Science was approved and it was decided to ^(CBCS) ~~start~~ implement this from 2022 session.
- II B.Sc(H) Forensic Science, M.Sc Forensic Science and PG Diploma Courses 'Examiners' Panel' was approved
- III It was also decided in the meeting to start DSE Courses (Biotech, Chemistry, Toolwork, Bioinformatics, Physics, etc) in the department only.

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**Dr. A. P.J. Abdul Kalam Institute of Forensic Science and Criminology
Bundelkhand University, Jhansi-284128**

**Syllabus
of
PG Diploma in Forensic Science
(PGDFS)**

PROGRAM OUTCOMES (POs)

At the end of the program the student will be able to:

PO1	Apply theoretical knowledge of principles and concepts of Forensic Science to practical problems.
PO2	Develop approaches with a concern for accuracy and precision in significance to science and technology.
PO3	Understand, identify, and apply appropriate tools and techniques with an understanding of its merits and limitations.
PO4	Investigate various problems and ways to solve which will be very beneficial to society.
PO5	Apply ethical principles and commit to professional ethics and responsibilities and norms of the forensic practices
PO6	Understand and analyze the impact of forensic solutions to the society and criminal justice setup.
PO7	Recognize the need for, and have the preparation and understanding of broad spectrum of Forensic Science

Program Specific Outcomes (PSOs)

PSO 1: Acquaint students with fundamental principles of Forensic Science and its application in solving legal issues.

PSO 2: Examine and analyze different crime scenarios and legal issues and make decisions according to existing laws.

PSO 3: Acclimatize them with working of Forensic Science Laboratories and handling of various crime scene exhibits.

PG Diploma in Forensic Science
Paper 1
General Forensic Science and Criminalistics
(Theory)

Subject: Forensic Science	Year: First	Semester: First
Course Code: DFSC-101	Course Title: General Forensic Science and Criminalistics (Theory)	
Course Objectives: This course would introduce the students to Forensic science and its various aspects in the investigation process. The students would be acquainted with the fundamentals of Forensic science, its historical development and applications as well as duties of Forensic Scientist. They would further learn about criminological aspects along with functions of investigative agencies and collection and evaluation of certain physical evidences.		
Course Outcomes: CO1: The significance of Forensic Science to human society. CO2: To understand about Forensic Science, various Laboratories and their Set-Up CO3: Significance of Forensic Science in Criminal Investigation & Indian Police System. CO4: To understand the nature, collection, analysis and preservation of Physical evidences. CO5: To understand Psychological Deception Detection (PDD) in investigation of crime.		

Units	Topics
I	Forensic Science: Definition, History and Development, Scope & Need, Basic Principles. Forensic Science Laboratories: Organizational setup of CFSL, FSL, GEQD, FPB, NICFS, CDTS, NCRB, NPA. Mobile Forensic Science Laboratory. Duties of Forensic Scientist
II	Branches of Forensic Science, Tools and Techniques of Forensic Science. Crime & Criminals: Definition, Types, Causes & Prevention. Police Organization: Organization of Police Station, Role & Function of Police Organization in the State & Centre, Police and Forensic Scientist Relationship with reference to Crime Investigation.
III	Tool Marks: Location, Collection & Evaluation of various types of Tool Marks Trace Evidences: Paint, Soil, Glass, Detective dyes, GSR, latent fingerprints etc. Narco Analysis: History, Method of investigation, Importance as an investigative tool.
IV	Counterfeit Currency: Importance, nature, identification & examination. Polygraphy: Principle of Polygraphy, Method & Significance. Voice Identification: Introduction, Significance, and Theory of generation of Voice Characteristics

Suggested Readings:

1. Nanda, B.B. and Tiwari, R.K. *Forensic Science in India- A Vision for the Twenty First Century*. Select Publisher: New Delhi. (2014).

2. Saferstein, R. & Roy, T. *Criminalistics -An Introduction to Forensic Science*. 13th ed. Pearson: USA. (2021).
3. Seigel, J.A., Saukko, P.J. & Knupfer, G.C. *Encyclopedia of Forensic Science vol. I, II& III*. Academic Press: United States; (2000).
4. Sharma, B.R. *Forensic Science in Criminal Investigation and Trails*. 6th ed. Universal Law Publishing. (2019).
5. Bridges, B.C. *Criminal Investigation, Practical Fingerprinting, Thumb Impressions, Handwriting Expert Testimony, Opinion Evidence*. University book Agency: Allahabad. (2000).
6. Deb, R. *Criminal Justice*. The Law Book Co. Pvt. Ltd: Allahabad. (1998).
7. Morris, E.K. and Braukmann, C.J. *Behavioural Approaches to Crime and Delinquency: A Handbook of Application, Research and Concepts*. Plenum Press: USA. (1987).
8. Veeraraghavan, V. *Handbook of Forensic Psychology*. 2nd ed. Selective & Scientific Books: India.
- 9.

Reference Books

1. Bell, W.R. *Practical Criminal Investigation in Correctional Facilities*. CRC Press: London. (2001).
2. Kleiner, M. *Handbook of Polygraph Testing*. Academic Press. San Diego. (2002).
3. Lyman M.D. *Criminal Investigation- The Art and the Science*. Pearson Education: India. (2013).
4. Nicharrs, J. *Investigative Forensic Hypnosis*: CRC Press LLC; (1999).

E-books (Kindle Edition)

1. Harris, H.A. & Lee, H.C. *Introduction to Forensic Science and Criminalistics*. 2nd Ed. CRC Press. (2019).
2. *An Introduction to Crime and Criminology*. The Open University. (2019).

PG Diploma in Forensic Science
Paper 2
Forensic Ballistics
(Theory)

Subject: Forensic Science	Year: First	Semester: First
Course Code: DFSC-102	Course Title: Forensic Ballistics (Theory)	
Course Objectives: The objective of this course is to introduce students with types, characteristics and identification of different firearms that may be encountered in a forensic investigation. The course will help student learn about linkage of a firearm with ammunitions and examination of GSR. Students will also gain knowledge about internal, external and terminal ballistics. The course will further apprise students with structure and chemistry of explosives as well as their chemical examination.		
Course Outcomes: CO1: To understand the historical development and basic concepts of Firearms and Ammunition. CO2: To understand the various aspects of Internal, External and Terminal Ballistics. CO3: To identify the various identification marks on cartridges cases and bullets which are used to link firearms with ammunitions. CO4: To identify components of primer and propellant in GSR. CO5: To understand various aspects of explosives and their laboratory examination.		

Units	Topics
I	Firearms: history of firearms, the earliest firearms, the fifteenth century Match lock, sixteenth & seventeenth century small arms, The age of the Flint lock, the percussion lock firearms. Modern firearms: Classification & Characteristics of modern firearms. Ammunition: Types, Cartridge Components (Cartridge case primer propellant, Bullets, Pellets and wads).
II	Internal Ballistics: Definition, Ignition of the propellant, manner of burning, Shape and Size of the propellant, theory of recoil. External Ballistics: Definition-trajectory drop in the flight of the projectiles force of gravity, drag, Yaw, Shape of bullets, effective range, extreme range. Terminal Ballistics: Definition, behavior of various types of bullets on hitting the target, remaining velocity, stopping power, Ricochet.
III	Gun Shot Residues (GSR): Importance. Nature, location, collection & examination of GSR. Matching of Bullets and cartridge cases: Identification of Bullets, pellets & wads fired including country made firearms. Determination of Range & time of fire.
IV	Explosives: Types, Classification, Composition and Characteristics of explosives. Laboratory examination of explosives using chemical and instrumental techniques. Improvised Explosive devices: Types, characteristics & examination.

Suggested Readings:

Text Books

1. Hatcher, J.S., Jury, F.J. and Weller, J. *Firearms Investigation, Identification and Evidence*. Ray Riling Arms Books: Philadelphia. (2006).
2. Heard, B.J. *Handbook of Firearms and Ballistics*. 2nd ed. Wiley: England. (2011).
3. Johari, M. *Identification of Firearms, Ammunition and Firearms Injuries*. BPR&D: New Delhi. (1980).
4. Mathew, J.H. *Firearms Identification*. Springfield: Illinois. (1973).
5. Sellier, K.G. and Kneubuehl, B.P. *Wound Ballistics and the Scientific Background*. Elsevier: London. (1994).
6. Sharma, B.R. *Firearms in Criminal Investigations and Trials*. 5th ed. Universal Law Publishing. (2017).
7. Working Procedure Manual; Chemistry, Explosives and Narcotics, BPR&D Publications: New Delhi. (2000).
8. Working Procedures Manual: Ballistics. BPR&D: New Delhi. (2000).
9. Yinon, J., Zitrin, S., & Belcher, R. *The Analysis of Explosives*. Pergamon. (2013).

Reference Books

1. Boudreau, J.F., Kwan, Q.Y., Faragher, W.E. and Denault, G.C. *Arson and Arson Investigation: Survey & Assessment*. National Institute of Law Enforcement, Dept. of Justice, US Govt. Printing Press: USA. (1977).
2. Dehaan, J.D. & Icove, D.J. *Kirk's Fire Investigation*. 7th ed. Prentice Hall. (2011).
3. DiMaio, M.D. *Gunshot Wounds*. CRC Press: Washington DC. (1999).
4. Evans-Nguyen, K. & Hutches, K. *Forensic Analysis of Fire Debris and Explosives*. 1st ed. Springer. (2019).
5. Sinha, J.K. *Forensic Investigation of Unusual Firearms: Ballistic and Medico-Legal Evidence*. 1st ed. CRC Press. (2021).
6. Warlow, T. *Firearms, The Law and Forensic Ballistics*. Taylor& Francis: London. (1996).

E-books (Kindle Edition)

1. Dodd, M.J. *Terminal Ballistics: A Text and Atlas of Gunshot Wounds*. CRC Press. (2005).
2. Davis, T.L. *The Chemistry of Powder and Explosives*. Hauraki Publishing. (2016).

PG Diploma in Forensic Science
Paper 3
Questioned Document Examination
(Theory)

Subject: Forensic Science	Year: First	Semester: First
Course Code: DFSC-103	Course Title: Questioned Document Examination (Theory)	
Course Objectives: The objective of this course is to acquaint students with different types of questioned documents and their forensic and legal aspects. The students will be acquainted with collection of questioned and standard specimens of handwriting and signatures and also learn to compare writings and signatures using class and individual characteristics.		
Course Outcomes: CO1: Students will understand the legal and forensic aspects of document in question and gain knowledge about handling, collection and preservation of documents. CO2: Students will learn to identify various class and individual characteristics in handwriting. CO3: Students will learn about various types of alterations and their examination. CO4: Students will be acquainted with decipherment of secret writings and examination of printed, typewritten and Xeroxed documents		

Units	Topics
I	Document in General: Importance, Classification& Preliminary Examination. Handling & Preservation of Documents. Basic tools needed for Forensic Document Examination and their use.
II	Writing instruments and their influence on writing. Examination of Paper and Ink. Handwriting: Basic Principle of Handwriting Identification, Handwriting characteristics- General and Individual. Comparison of Handwriting, Standard for Comparison. Signatures: Characteristics of genuine and forged signatures and their Examination.
III	Forgery & Disguise: Definition, types, Characteristics and their detection. Alteration in the Document: Examination of erasures, additions, overwriting and Obliteration. Decipherment of Secret writing, Indented and Invisible writing, Charred documents. Examination of seal impression and other mechanical impressions.
IV	Type writing: Working of type writer, various types of typewriting devices, Identification of type Scripts& Typist. Printed matter: Various type of printing processes, Examination of various types of Printed Matter. Preparation of detailed report with reasons and illustrative charts, Use of standard Terminology.

Suggested Readings:

Text Books

1. Bisesi, M.S., Kelly, J.S. and Lindblom, B.S. *Scientific Examination of Questioned Documents-Forensic and Police Science Series*. CRC Press. (2006).
2. Ellen, D., Day, S. and Davies, C. *Scientific Examination of Documents-Methods and Techniques* 4th ed. CRC Press. (2018).
3. Harrison, W.R. *Forgery Detection-A Practical Guide*. Praeger. (1964).
4. Harrison, W.R. *Suspect Documents – Their Scientific Examination*. Burnham Publishing. (1958).
5. Hilton, O. *Scientific Examination of Questioned Documents*. CRC Press: Boca Raton. (1993).
6. Osborn, A.S. *Questioned Documents*. 6th ed. Law & justice Publishing Co.: India. (2020).

Reference Books

1. Bates, B.P. *I.S.Q.D.-Identification System for Questioned Documents*. Charles C. Thomas. (1970).
2. Bates, B.P. *Typewriting Identification I.S.Q.T.* Charles C. Thomas. (1971).
3. Bradford, R.R. & Bradford, R.B. *Introduction to Handwriting Examination and Identification*. Rowman & Littlefield. (1992).
4. Convey, V.P. *Evidential Documents*. Charles C. Thomas Publishing. (1978).
5. Gupta, A.K. *Examination of Questioned Documents Forgery Detection & Legal Aspects*. Selective & Scientific Books. (2021).

E-books (Kindle Edition)

1. Olomu, E. *Questioned Document Examination for Investigators*. Kindle Edition. (2022).
2. Harris, H.A. & Lee, H.C. *Introduction to Forensic Science and Criminalistics*. 2nd Ed. CRC Press. (2019).

PG Diploma in Forensic Science
Paper 4
Forensic Ballistics & Criminalistics
(Practical)

Subject: Forensic Science	Year: First	Semester: First
Course Code: DFSC-104	Course Title: Forensic Ballistics & Criminalistics (Practical)	
Course Objectives: The objective of this course is to give students a practical knowledge and exposure to physical and chemical examination of various physical evidences. They will learn to identify firearms, compare cartridge cases, bullets and determine range of fire. The students will also learn to perform chemical tests on GSR residues and explosives for the identification of composition.		
Course Outcomes: CO1: To develop the art of collection, packaging, preservation & analysis of trace evidences. CO2: Discriminate between different types of firearms. CO3: Demonstrate and Practice the various methods of identification of firearms, fired bullets/cartridge cases. CO4: To collect and analyze GSR.		

S. No.	Practicals
I	Determination of density via density gradient tube techniques
II	Examination & Comparison of Soils and glass.
III	Miscellaneous Examination (Cloth, Bangles, threads etc.)
IV	Lifting of prints and impressions by caste and replicas.
V	Identification of firearms, cartridges, bullets, gunpowder, etc.
VI	Examination and comparison of fired bullets – Calibre, rifling characteristics, probable type of firearms.
VII	Examination and Comparison of fired Cartridge cases (Calibre, firing pin, breech face, Extractor/ ejector marks etc.)
VIII	Determination of Shot number from size and weight of shots.
IX	Determination of range and time of firing.
X	Identification of propellants.
XI	Chemical tests for powder residues (Walker's test) and Barrel wash

Suggested Readings:

Text Books

1. DFS Manual, 2005
2. Mozayani, A. and Noziglia, C. *The Forensic Laboratory Handbook Procedures and Practice*. 2nd ed. Humana Press: India;(2011)
3. Teotia, A.K. and Pal, R. *Practical Aspects of Forensic Chemistry*. Selective & Scientific Books: New Delhi; (2013).

Reference Books

1. Dave, N.N. *Forensic Chemistry*. 1st ed. Notion Press. (2021).
2. Khan, J.I., Kennedy, T.J. & Christian D.R. *Basic Principles of Forensic Chemistry*. Humana Press. (2012).

PG Diploma in Forensic Science
Paper 5
Questioned Document Examination
(Practical)

Subject: Forensic Science	Year: First	Semester: First
Course Code: DFSC-105	Course Title: Questioned Document Examination (Practical)	
Course Objectives: Develop an understanding on procedure adopted for examination of different types of questioned documents, the types of forgeries, disguise and their examination along with giving appropriate conclusion on the basis of findings.		
Course Outcomes: CO1: To identify class and individual characteristics of handwriting and signatures. CO2: To detect and analyse various kinds of forgeries. CO3: To detect and examine alteration in documents.		

S. No.	Practicals
I	Identification of Handwriting General Characteristics.
II	Study of Disguised in handwriting.
III	Comparison of Signatures
IV	Comparison of handwriting.
V	Detection of Simulated forgery.
VI	Detection of traced forgery
VII	Examination of erasures, additions, overwriting and Obliteration.

Suggested Readings:

Text Books

1. Hilton, O. *Scientific Examination of Questioned Documents*. CRC Press: Boca Raton. (1993).
2. Johary, C.K. *Forensic Science: Identification of Fingerprints*. Asia Law House. (2018).
3. Kelly, J.S. & Angel, M.A. *Forensic Document Examination in the 21st Century*. 1st ed. CRC Press. (2020).
4. Mohammed, L.A. *Forensic Examination of Signatures*. Academic Press. (2019).
5. Osborn, A.S. *Ink and Questioned Documents*. Forgotten Books.

Reference Books

1. Bates, B.P. *I.S.Q.D.-Identification System for Questioned Documents*. Charles C. Thomas. (1970).
2. Bates, B.P. *Typewriting Identification I.S.Q.T.* Charles C. Thomas. (1971).

3. Bisesi, M.S., Kelly, J.S. and Lindblom, B.S. *Scientific Examination of Questioned Documents-Forensic and Police Science Series*. CRC Press: (2006).
4. Bleay, S.M., Croxton, R.S. & Puit, M.D. *Fingerprint Development Techniques: Theory and Application*. 1st ed. Wiley. (2018).
5. Bradford, R.R. & Bradford, R.B. *Introduction to Handwriting Examination and Identification*. Rowman & Littlefield. (1992).
6. Harralson, H.H. and Miller, L.S. *Huber and Headrick's Handwriting Identification-Facts and Fundamentals*. 2nd ed. CRC Press: (2017).
7. Osborn, A.S. *The Problem of Proof: Especially as Exemplified in Disputed Documents Trails (Professional/Technical Series)*. Burnham Publishing. (1975).
8. Reinhardt, M. *Guide to Fingerprint Identification and Classification*. 2nd ed. Online Business Education. (2016).

PG Diploma in Forensic Science
Paper 6
Fingerprint Examination
(Theory)

Subject: Forensic Science	Year: First	Semester: Second
Course Code: DFSC-106	Course Title: Fingerprint Examination (Theory)	
Course Objectives: The objective of the course is to impart knowledge of fingerprints as important physical evidence at the scene of crime. The student would be acquainted with various patterns of fingerprint in humans. The students would be able to study the manner in which it is developed, identified, classified, collected, packed and forwarded to the Fingerprint Bureau.		
Course Outcomes: CO1: Gain knowledge about fingerprints, their formation, types and methods of development. CO2: Learn classification of fingerprints using different systems. CO3: Gain understanding of collection, preservation and examination of latent and patent prints. CO4: Learn about Automated Fingerprint Identification System (AFIS).		

Units	Topics
I	History and development of finger prints as a science for personal identification. Basics & Principles of Fingerprints: Plain and rolled prints, devices and material for recording prints. Classification of finger Prints: pattern types, pattern area, Henry& Chatterjee system of classification
II	Scene of Crime Finger Prints: Latent prints, plastic prints & visible prints. Causes of formation of fingerprints. Composition of sweat
III	Development of latent finger prints: Conventional methods- powders (Black, grey, white, magnetic powder). Fuming methods: Iodine and cyanoacrylate methods. Chemical methods: Ninhydrin and its analogue silver nitrate. Enhancement of latent prints, application of laser technologies.
IV	Preserving and lifting of finger prints. Photography of Finger Prints. Comparison of finger prints: basis of comparison, types of ridge characteristics. Automated Finger Print Identification system (AFIS) and its variants, digital Image processing of finger prints and their enhancement. Presentation of expert report on finger prints for presentation in court

Suggested Readings:

Text Books

1. Bridges, B.C. *Criminal Investigation, Practical Fingerprinting, Thumb Impressions, Handwriting Expert Testimony, Opinion Evidence*. University book Agency: Allahabad. (2000).
2. Champod, C., Lennard, C.J., Margot, P. & Stoilovic, M. *Fingerprints and Other Ridge Skin Impressions*. 2nd ed. CRC Press. (2016).

3. Chatterjee, S.K. *Speculation in Fingerprint Identification*. Calcutta. (1981).

Reference Books

1. Ashbaugh, D.R. *Quantitative-Qualitative Friction Ridge Analysis: An Introduction to Basic and Advanced Ridgeology*. CRC Press. (1999).
2. Bleay, S.M., Croxton, R.S. & Puit, M.D. *Fingerprint Development Techniques: Theory and Application*. 1st ed. Wiley. (2018).
3. Daluz, H.M. *Courtroom Testimony for Fingerprint Examiners*. 1st ed. CRC Press. (2021).
4. Hoover, J.E. & Grossman, G. *FBI Guide to Fingerprint Identification*. Magic Lamp Press. (2015).
5. Nanda, B.B. and Tiwari, R.K. *Forensic Science in India- A Vision for the Twenty First Century*. Select Publisher: New Delhi. (2014).
6. Sharma, B.R. *Forensic Science in Criminal Investigation and Trails*. 6th ed. Universal Law Publishing. (2019).

E-books (Kindle Edition)

1. Perkins, D.G. *The Forensic Analysis, Comparison and Evaluation of Friction Ridge Skin Impressions*. Wiley. (2022).

PG Diploma in Forensic Science
Paper 7
Forensic Chemistry
(Theory)

Subject: Forensic Science	Year: First	Semester: Second
Course Code: DFSC-107	Course Title: Forensic Chemistry (Theory)	
Course Objectives: The students would be able to understand the various types of drugs commonly abused along with their presumptive and instrumental analysis. They would learn about various types of poisons and management of person intoxicated with poisons. They would further learn the analysis of arson and fire related evidences.		
Course Outcomes: CO1: Forensic Chemistry and Toxicology, Role of Forensic Chemist and Forensic Toxicologist. CO2: Drug of abuse, commonly abused substances, their sign and symptoms. CO3: The presumptive and instrumental methods of analysing commonly abused drugs. CO4: The method of searching, collecting, preserving the evidences in fire scene investigation. CO5: The methods of analysing trace amounts of petroleum products in fire scene evidence.		

Units	Topics
I	Forensic Chemistry: Introduction, Types of cases which require chemical analysis, presumptive tests (colour/spot tests), Instrumental Examination. Examination of contact Traces: Introduction to cosmetics and detective dyes, collection, sampling and analysis. Arson: Introduction, chemistry of fire, scientific investigation and evaluation of clue materials, collection and preservation, analysis of flammable residues.
II	Drugs of abuse: Introduction, classification of drugs of abuse, Depressants, stimulants, Hallucinogens, Identification, Field tests and laboratory tests. Drug abuse in sports: Introduction, common prohibited substances, analytical approach.
III	Forensic Toxicology: Role of the toxicologist, significance of toxicological findings Poisons: definition, classification on the basis of their origin, physiological action and chemical nature, poisons and poisoning in India.
IV	Management of Toxicological cases in the hospital: Signs and symptoms of common poisons, antidotes. Collection and preservation of viscera for various types of poisons: Choice of preservatives, containers and storage.

Suggested Readings:

Text Books

1. Chalmers, J.M., Edwards, H.G.M., Hargreaves, M.D. *Infrared & Raman Spectroscopy in Forensic Science*. 1st ed. Wiley. (2012).
2. Dave, N.N. *Forensic Chemistry*. 1st ed. Notion Press. (2021).

3. Khan, J.I., Kennedy, T.J. & Christian D.R. *Basic Principles of Forensic Chemistry*. Humana Press. (2012).
4. Maehly, A. and Stromberg, L. *Chemical Criminalistics*. Springer. (1981).
5. Siegel, J.A. *Forensic Chemistry-Fundamental and Applications*. 1st ed. Wiley-Balckwell. (2015).

Reference Books

1. Brown, W. *Drinking, Drugs & Driving Drunk: How Different Drugs Affect the Driving Experience*. 2nd ed. William Gladden Foundation Press: (2011).
2. Clarke, E.G.C. and Moffat, A.C. *Clarke's Isolation and Identification of Drugs: In Pharmaceuticals, Body Fluids and Post Mortem Material*. Pharmaceutical Press: (1986).
3. Crown, D.A. *The Forensic Examination of Paints and Pigments*. Thomas. (1968).
4. Winger, G., Woods, J.H. & Hoffman, F.G. *A Handbook on Drug and Alcohol Abuse*. 4th ed. Oxford University Press: London. (2004).

E-books (Kindle Edition)

1. Grossman, M. *Forensic Chemistry: Fundamentals*. DeGruyter Texbooks. (2021).
2. Elkins, K.M. *Introduction to Forensic Chemistry*. CRC Press. (2018).
3. King, L.A. *Forensic Chemistry of Substance Misuse; A Guide to Drug Control*. Royal Society of Chemistry. (2022).

PG Diploma in Forensic Science
Paper 8
Forensic Biology
(Theory)

Subject: Forensic Science	Year: First	Semester: Second
Course Code: DFSC-108	Course Title: Forensic Biology (Theory)	
Course Objectives: The students would learn the different aspects of Forensic Biology and some allied areas like Forensic Medicine and Anthropology. The students shall also study about examination of various biological evidences and body fluids. The students will also learn about anatomy, complete and partial identification from a skeleton and various kind of injuries.		
Course Outcomes: CO1: To understand the nature and importance of biological evidences in Forensic Science. CO2: To understand the various aspects of Forensic Botany, types of Botanical Evidences and their examination. CO3: Importance of Forensic Anthropology in Personal Identification. CO4: Different Techniques of Facial Reconstruction and their Forensic Importance. CO5: Interpretation of different type of Injuries and their examination. CO6: Medicolegal aspects of death.		

Units	Topics
I	Biological evidence: Importance, nature, location, collection and evaluation. Hair and Fibers: Importance, nature, location, collection, evaluation and tests for their identification. Importance and identification of Botanical evidence such as Pollen grains, wood, leaves and seeds.
II	Blood: Composition and functions, collection and tests for identification. Blood group determination from fresh blood. Grouping from stains of blood by Absorption-inhibition, Absorption-elution and mixed agglutination techniques. Semen: Forensic significance, location, collection, evaluation and tests for identification Forensic significance of other body fluids like saliva, sweat, milk etc. Their collection and identification.
III	Identification and examination of human skeletal remains. Comparative Anatomy. Determination of Age & sex from Skeletal remains. Facial reconstruction.
IV	Forensic Medicine: Medico legal aspects of Death, causes of Death (asphyxial death, starvation, electrocution, Accidents). Determination of time since death by various methods including, histopathological methods. Determination of age of living person, medico-legal investigation of sexual offences, including examination of victim and suspect.

Injuries: Types and classification of injuries, anti-mortem and post-mortem injuries, aging of injuries, artificial injuries.

Suggested Readings:

Text Books

1. Budowle, B., Schutzer, S. & Breeze, R. *Microbial Forensics*. Academic Press: (2005).
2. Gunn, A. *Essential Forensic Biology*. 3rd ed. Wiley. (2019).
3. Li, R. *Forensic Biology*. 2nd ed. CRC Press. (2015).
4. Linacre, A. *Forensic Science in Wildlife Investigations*. CRC Press: Boca Raton. (2009).
5. Sharma, H. & Singal, K. *Handbook of Forensic Biology & Forensic Serology*. 1st ed. Selective & Scientific Books. (2022).

Reference Books

1. Coyle, H.M. *Forensic Botany: Principles and Applications to Criminal Casework*. 1st ed. CRC Press. (2004).
2. James, S.H. and Nordby, J.J. & Bell, S. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 4th ed. CRC Press: USA. (2015).
3. Mozayani, A. and Noziglia, C. *The Forensic Laboratory Handbook: Procedures and Practice (Forensic Science and Medicine)*. Humana: (2007).
4. Saferstein, R. & Roy, T. *Criminalistics -An Introduction to Forensic Science*. 13th ed. Pearson: USA. (2021).
5. Sharma, B.R. *Forensic Science in Criminal Investigation and Trails*. 6th ed. Universal Law Publishing. (2019).

E-books (Kindle Edition)

1. Krishnan, S. *Topics in Forensic Biology*. Kindle Edition. (2020).
2. Stevens, C.D. *Clinical Immunology & Serology: A Laboratory Perspective*. 3rd ed. F.A. Davis Company. (2009).

PG Diploma in Forensic Science
Paper 9
Fingerprint Examination
(Practical)

Subject: Forensic Science	Year: First	Semester: Second
Course Code: DFSC-109	Course Title: Fingerprint Examination (Practical)	
Course Objectives: Students will develop an understanding and application on Practical aspects of Fingerprints. They will be apprised with identification, analysis and examinations of various kinds of fingerprints impressions that are encountered on crime scenes. They will also learn to collect and classify fingerprints using ten digits fingerprint classification and single digit fingerprint classification system.		
Course Outcomes: CO1: Students will understand collection of plain and rolled fingerprints and identification of patterns. CO2: Learn development, lifting and examination of latent prints using physical and chemical methods. CO3: Classification of fingerprints using different systems.		

S. No.	Practicals
I	To identify the given fingerprint pattern.
II	To compare the given fingerprints.
III	To classify the ten-digit fingerprints.
IV	To classify the single digit fingerprint.
V	To develop and examine the latent fingerprint by physical methods.
VI	To develop and examine the latent fingerprints by chemical methods.

Suggested Readings:

Text Books

1. Champod, C., Lennard, C.J., Margot, P. & Stoilovic, M. *Fingerprints and Other Ridge Skin Impressions*. 2nd ed. CRC Press. (2016).
2. Cowger, J.F. *Friction Ridge Skin: Comparison and Identification of Fingerprints*. CRC Press. (1992).
3. Daluz, H.M. *Fundamentals of Fingerprint Analysis*. 2nd ed. CRC Press. (2021).
4. Harrison, W.R. *Suspect Documents – Their Scientific Examination*. Burnham Publishing. (1958).
5. Hawthorne, M. *Fingerprints: Analysis & Understanding*. 1st ed. CRC Press. (2017).

Reference Books

1. Bleay, S.M., Croxton, R.S. & Puit, M.D. *Fingerprint Development Techniques: Theory and Application*. 1st ed. Wiley. (2018).
2. Daluz, H.M. *Courtroom Testimony for Fingerprint Examiners*. 1st ed. CRC Press. (2021).
3. Reinhardt, M. *Guide to Fingerprint Identification and Classification*. 2nd ed. Online Business Education. (2016).
4. Hoover, J.E. & Grossman, G. *FBI Guide to Fingerprint Identification*. Magic Lamp Press. (2015).

PG Diploma in Forensic Science
Paper 10
Forensic Chemistry and Biology
(Practical)

Subject: Forensic Science	Year: First	Semester: Second
Course Code: DFSC-110	Course Title: Forensic Chemistry and Biology (Practical)	
Course Objectives: The objective of the course is to give practical exposure to the students regarding the different aspects of analysis of drugs, detective dyes, biological samples and body fluids. Students will also learn to analyze various types of fibers and blood grouping.		
Course Outcomes: CO1: The students will gain hands-on experience in the analysis of various drugs. CO2: To develop the practical knowledge about Thin Layer Chromatography and its application in drug analysis. CO3: To analyze, identify, evaluate & individualize the biological Fluids (urine, semen, saliva, sweat). CO4: To analyze, identify, evaluate & individualize the hair and fiber samples.		

S. No.	Practicals
I	Colour/spot tests for common drugs of abuse.
II	TLC separation of drugs of abuse.
III	Analysis of phenolphthalein in trap cases.
IV	To prepare slides of scale patterns of human hair.
V	To identify blood stains & determine its origin.
VI	To identify semen stains.
VII	To identify saliva stains.
VIII	To identify various type of fibers.
IX	To determine blood group from fresh blood and blood stains.
X	Determination of Sex from skull and pelvis.
XI	Determination of Age from skull.
XII	Identification of long bones and their side identification.

Suggested Readings:

Text Books

1. Bhasin, M.K. & Chahal, S.M.S. *A Laboratory Manual for Human Blood Analysis*. Kamla-raj Enterprises. (1996).
2. Byers, S.N. *Forensic Anthropology Laboratory Manual*. 4th ed. Routledge. (2016).
3. Dunsford, I. and Bowley, C. *Blood Grouping Techniques*, Oliver & Boyd, London. (1967).
4. Eckert, W.G., & James S.H., *Interpretation of bloodstain evidence at crime scene*, CRC Press, Florida, 1989.
5. Li, R. *Forensic Biology*. 2nd ed. CRC Press. (2015).
6. Sharma, H. & Singal, K. *Handbook of Forensic Biology & Forensic Serology*. 1st ed. Selective & Scientific Books. (2022).
7. DFS Manual, 2005
8. Mozayani, A. and Noziglia, C. *The Forensic Laboratory Handbook Procedures and Practice*. 2nd ed. Humana Press: India;(2011)
9. Teotia, A.K. and Pal, R. *Practical Aspects of Forensic Chemistry*. Selective & Scientific Books: New Delhi; (2013).

Reference Books

1. James, S.H. and Nordby, J.J. & Bell, S. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 4th ed. CRC Press: USA; (2015).
2. Kirk, P.L., *Introduction in crime investigation* (2nd), John Wiley and, New York, 1974.
3. Langley, N.R. & Tersigni-Tarrant, M.A. *Forensic Anthropology: A comprehensive Introduction*. 2nd ed. CRC Press. (2017).
4. Saferstein, R. & Roy, T. *Criminalistics -An Introduction to Forensic Science*. 13th ed. Pearson: USA. (2021).
5. Tripathi, A & Dwivedi, A.K. *Forensic Serology & Blood Examination*. Selective & Scientific Books. (2012).
6. Dave, N.N. *Forensic Chemistry*. 1st ed. Notion Press. (2021).
7. Khan, J.I., Kennedy, T.J. & Christian D.R. *Basic Principles of Forensic Chemistry*. Humana Press. (2012).
8. Siegel, J.A. *Forensic Chemistry-Fundamental and Applications*. 1st ed. Wiley-Balckwell. (2015).
9. Stuart, B.H. *Forensic Analytical Techniques*. 1st ed. Wiley. (2013).

SYLLABUS P.G. DIPLOMA Ist SEMESTER

Paper No/Code	Title	Marks
1. DFSC 101	General Forensic Science & Criminalistics	100(70+30)
2. DFSC 102	Forensic Ballistics	100(70+30)
3. DFSC 103	Questioned Document Examination	100(70+30)
4. DFSC 104	Practical- Forensic Ballistics	100 (70+30)
5. DFSC 105	Practical - Questioned Document Examination	100(70+30)

DFSC 101- GENERAL FORENSIC SCIENCE & CRIMINALISTICS

Unit A

1. **Forensic Science:** Definition, History and Development, Scope & Need, Basic Principles
2. **Forensic Science Laboratories:** Organizational setup of CFSL, FSL, GEQD, FPB, NICFS, CDTS, NCRB, NPA. Mobile Forensic Science Laboratory.
3. Duties of Forensic Scientist

Unit B

1. Branches of Forensic Science, Tools and Techniques of Forensic Science.
2. **Crime & Criminals:** Definition, Types, Causes & Prevention.
3. **Police Organization:** Organization of Police Station, Role & Function of Police Organization in the State & Centre, Police and Forensic Scientist Relationship with reference to Crime Investigation.

Unit C

1. **Tool Marks:** Location, Collection & Evaluation of various types of Tool Marks
2. **Trace Evidences:** Paint, Soil, Glass, Detective dyes, GSR, latent fingerprints etc.
3. **Narco Analysis:** History, Method of investigation, Importance as an investigative tool.

Unit D

1. **Counterfeit Currency:** Importance, nature, identification & examination.
2. **Polygraphy:** Principle of Polygraphy, Method & Significance.
3. **Voice Identification:** Introduction, Significance, and Theory of generation of Voice Characteristics

Suggested Readings:

1. Nanda, B.B. & Tiwari, R.K. ; Forensic science in India- A vision for the twenty first century, Select Publisher, New Delhi (2001)
2. James, S.H. and Nordby, J.J.; Forensic science: An introduction to scientific and investigative techniques, CRC press, USA (2003)
3. Saferstein, R.: Criminalistics -An introduction to Forensic Science, Prentice Hall Inc. USA(1998).
4. Kleiner, Murray; Handbook of Polygraph Testing Academic Press (2002)
5. W.W. Bennett & Karen M. Hass- Criminal Investigation; wordsworth Thompson Learning 6th ed. (2001)
6. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003)
7. Mordby, J.Deed Rrckoning- The art of Forensic Detection- CRC Press LLC, Boca Raton FL CRC Press (2000)
8. Sharma B.R.; Forensic Science in Criminal Investigation and Trails; Universal Pub. Co. (2003)
9. J.A. Seigel, R.J Sukoo and G.C Knupfer; Encyclopaedia of Forensic Science vol. I, II& III, Academic Press (2000)
10. Bennet, waynew; Criminal Investigation, Wordsworth Pub. Co. (2000)
11. Gross, Dr. Hans; Criminal Investigation- A Practical textbook for Magistrates, Police Officers and Lawyers; Universal Pub. Co. (2000)
12. Lyman M.D; Criminal Investigation- The art and the Science, Prentice Hall (2002)

DFSC 102 - Forensic Ballistics

Unit A

1. **Firearms** : history of firearms, the earliest firearms, the fifteenth century Match lock, sixteenth & seventeenth century small arms, The age of the Flint lock, the percussion lock firearms.
2. **Modern firearms**: Classification & Characteristics of modern firearms
3. **Ammunition**: Types, Cartridge Components (Cartridge case primer propellant, Bullets, Pellets and wads).

Unit B

1. **Internal Ballistics**: Definition, Ignition of the propellant, manner of burning, Shape and Size of the propellant, theory of recoil.
2. **External Ballistics**: Definition-trajectory drop in the flight of the projectiles force of gravity, drag, Yaw, Shape of bullets, effective range, extreme range.
3. **Terminal Ballistics**: Definition, behavior of various types of bullets on hitting the target, remaining velocity, stopping power, Ricochet.

Unit C

1. **Gun Shot Residues (GSR)**: Importance. Nature, location, collection & examination of GSR.
2. **Matching of Bullets and cartridge cases**: Identification of Bullets, pellets & wads fired including country made firearms.
3. Determination of Range & time of fire.

Unit D

1. **Explosives**: Types, Classification, Composition and Characteristics of explosives,
2. Laboratory examination of explosives using chemical and instrumental techniques.
3. **Improvised Explosive devices**: Types, characteristics & examination

Suggested Readings:

1. Howard Mathews; Charles C. Thomas, Firearms identification, vols. 1,2 & 3; Springfield, Illinois; (1973)
2. Hatcher, Jury and Weller: Firearms Investigation, Identification and Evidence; Stackpole Books, Harrisburg, PA; (1977)
3. Vincent Di Maio, Gunshot Wounds; CRC press, Washington, DC; (1999)
4. Brain J. Heard; Handbook of Firearms and Ballistics; Jhon Willey, England; (1997)
5. Karl G. Sellier et al; Wound Ballistics and the scientific Background; Elsevier, London; (1994)
6. M. Johari, Identification of Firearms, Ammunition and Firearms Injuries; BPR& D, New Delhi; (1980)
7. I.V. Hogg; The Cartridges Guide- A small arms Ammunition Identification manual; The Stackpole co. Harrisburg, PA (1982)
8. Gray J. Ordog, Management of Gunshot Wounds; Elseiver, New York (1983)
9. Working Procedures Manual: Ballistics, BPR & D pub. (2000)
10. Yinon Jitrin; Modern & Application in Analysis of Explosives, john Wiley & Sons, England (1993)
11. Working Procedure Manual; Chemistry, Explosives and Narcotics, BPR& D Pub. (2000)

DFSC 103 - Questioned Document Examination

Unit A.

1. **Document in General:** Importance, Classification& Preliminary Examination.
2. Handling & Preservation of Documents.
3. Basic tools needed for Forensic Document Examination and their use.

Unit B.

1. Writing instruments and their influence on writing. Examination of Paper and Ink.
2. **Handwriting:** Basic Principle of Handwriting Identification, Handwriting characteristics- General and Individual. Comparison of Handwriting, Standard for Comparison.
3. **Signatures:** Characteristics of genuine and forged signatures and their Examination.

Unit C.

1. **Forgery & Disguise:** Definition, types, Characteristics and their detection.
2. **Alteration in the Document:** Examination of erasures, additions, overwriting and Obliteration.
3. Decipherment of Secret writing, Indented and Invisible writing, Charred documents. Examination of seal impression and other mechanical impressions.

Unit D

1. **Type writing:** Working of type writer, various types of typewriting devices, Identification of type Scripts& Typist.
2. **Printed matter:** Various type of printing processes, Examination of various types of Printed Matter.
3. Preparation of detailed report with reasons and illustrative charts, Use of standard Terminology.

Suggested readings

1. Huber, A. R. and Headrice, A.M. (1999) : Handwriting identification : facts and fundamental CRC LLC
2. Ellen, D (1997) : The scientific examination of Documents, Methods and techniques. 2nd ed., Taylor & Francis Ltd.
3. Morris (2000) : Forensic Handwriting Identification (fundamental concepts and Principals)
4. Manning, C.A (1999) : Financial Investigations and Forensic Accounting CRC Press.
5. Harrison, W.R.(1966) : Suspect Documents & their Scintific Examination, Sweet & Maxwell Ltd., London.
6. Hilton, O (1982) : The Scientific Examination of Questioned Document, Elsaevier North Holland Inc., New York.
7. Brewster, F(1932) : Contested Documetns and Foregeries, The Eastern Law House, Calcutta.
8. Mehta, M. K.(1970) : The identification of Handwriting & Cross Examination of Experts, N.M. Tripathi, Allahabad.
9. Sulner, H.F.(1966) : Dispatd Documents, Oceana Publications Inc., New York.
10. Saxena's : Saxena's Law & Techniques Relating to Finger Prints, Foot Prints & Detection of Forgery, Central Law Agency, Allahabad (Ed. A.K. Singla).
11. Osborn, A. S.(1929) : Questioned Documents , Boyd Printing Co., Chicago.

DFSC- 104: PRACTICAL- FORENSIC BALLISTICS & CRIMINALISTICS

1. Determination of density by density gradient tube techniques.
2. Examination & Comparison of Soils and glass.
3. Miscellaneous Examination (Cloth, Bangles, threads etc.)
4. Lifting of prints and impressions by caste and replicas.
5. Identification of firearms, cartridges, bullets, gunpowder, etc.
6. Examination and comparison of fired bullets – Calibre, rifling characteristics, probable type of firearms.
7. Examination and Comparison of fired Cartridge cases (Calibre, firing pin, breech face, Extractor/ ejector marks etc.)
8. Determination of Shot number from size and weight of shots.
9. Determination of range and time of firing.
10. Identification of propellants.
11. Chemical tests for powder residues (Walker's test) and Barrel wash

DFSC-105: PRACTICAL- QUESTIONED DOCUMENT EXAMINATION

1. Identification of Handwriting General Characteristics.
2. Study of Disguised in handwriting.
3. Comparison of Signatures
4. Comparison of handwriting.
5. Detection of Simulated forgery.
6. Detection of traced forgery.
7. Examination of erasures, additions, overwriting and Obliteration.

SYLLABUS P.G. DIPLOMA IInd SEMESTER

Paper No/Code	Title	Marks
1. DFSC 106	Fingerprint Examination	100(70+30)
2. DFSC 107	Forensic Chemistry	100(70+30)
3. DFSC 108	Forensic Biology	100(70+30)
4. DFSC 109	Practical - Fingerprint Examination	100 (70+30)
5. DFSC110	Practical- Forensic Chemistry & Biology	100(70+30)

DFSC: 106 Fingerprint Examinations

Unit A

1. History and development of finger prints as a science for personal identification.
2. Basics & Principles of Fingerprints: Plain and rolled prints, devices and material for recording prints.
3. **Classification of finger Prints:** pattern types, pattern area, Henry& Chatterjee system of classification

Unit B

1. **Scene of Crime Finger Prints:** Latent prints, plastic prints & visible prints.
2. Causes of formation of fingerprints.
3. Composition of sweat.

Unit C

1. **Development of latent finger prints:** Conventional methods- powders (Black, grey, white, magnetic powder). Fuming methods: Iodine and cyanoacrylate methods.
2. **Chemical methods:** Ninhydrin and its analogue silver nitrate.
3. Enhancement of latent prints, application of laser technologies.

Unit D

1. Preserving and lifting of finger prints. Photography of Finger Prints.
2. **Comparison of finger prints:** basis of comparison, types of ridge characteristics.
3. Automated Finger Print Identification system (AFIS) and its variants, digital Image processing of finger prints and their enhancement. Presentation of expert report on finger prints for presentation in court.

Suggested Readings

1. Cummins & Midlo : Finger Prints, Palms and Soles, 1943, The Blakiston office London.
2. Cherril, F.R. : The Finger Prints. System at Scotland Yard, 1954; Her Majesty's office, London.
3. Mehta, M. K. : Identification of Thumb Impression & Cross Examination of Finger Prints, 1980 N. M. Tripathi (P) Ltd. Bombay.
4. Moenssens : Finger Prints Techniques, 1975, Chitton Book Co., Philadelphia, New York.
5. Chatterjee S.K. and Hagne R.V. (1988) : Finger Print or Dactyloscopy and Ridgeoscopy.
6. Saxena's : Saxena's Law & Techniques Relating to Finger Prints, Foot Prints & Detection of Forgery, Central Law Agency, Allahabad (Ed. A.K. Singla).

DFSC: 107 FORENSIC CHEMISTRY

Unit A

1. **Forensic Chemistry:** Introduction, Types of cases which require chemical analysis, presumptive tests (colour/spot tests), Instrumental Examination.
2. **Examination of contact Traces:** Introduction to cosmetics and detective dyes, collection, sampling and analysis.
3. **Arson:** Introduction, chemistry of fire, scientific investigation and evaluation of clue materials, collection and preservation, analysis of flammable residues.

Unit B

1. **Drugs of abuse:** Introduction, classification of drugs of abuse, Depressants, stimulants, Hallucinogens, Identification, Field tests and laboratory tests.
2. **Drug abuse in sports:** Introduction, common prohibited substances, analytical approach.

Unit C

1. **Forensic Toxicology:** Role of the toxicologist, significance of toxicological findings
2. **Poisons:** definition, classification on the basis of their origin, physiological action and chemical nature, poisons and poisoning in India.

Unit D

1. **Management of Toxicological cases in the hospital:** Signs and symptoms of common poisons, antidotes.
2. **Collection and preservation of viscera for various types of poisons:** Choice of preservatives, containers and storage.

Suggested readings

1. Modi's: Medical Jurisprudence & Toxicology, M. M. Trirathi Press Ltd. Allahabd, 1988.
2. S.N. Tiwari: Analytical Toxicology, Govt. of India Publications, New Delhi, 1987.
3. Saferstein, R: Forensic Science Hand Book, Vol I, II and III, Pretince Hall, 1982.
4. Sharma, B.R.: Forensic Science in Criminal Investigation & Trials, 2003.
5. Maehly and Stromberg : Chemical Criminalistics, 1980.
6. Curry: Analytical Methods in Human Toxicology, Part II, 1986.
7. Casarett & Doll Toxicology : The Basic Science of poisons.
8. Curry, A.S. : Poison Detection in Human Organs, 1976.
9. Holfmann, F.G.: Handbook of Drug and Alchoho Abuse.
10. Froede, R.C.: The Laboratory Management of the Medico-Legal, Specimen Analytical Chemical Laboratory Sciences.
11. Text book of Forensic Medicine by Krishan Vij; B.I. Churchill Livingstone Pvt. Ltd. 2001.
12. Mukherjee, J.B.: Forensic Medicine & Forensic Toxicology.

DFSC: 108 FORENSIC BIOLOGY

Unit A

1. **Biological evidence:** Importance, nature, location, collection and evaluation.
2. **Hair and Fibers:** Importance, nature, location, collection, evaluation and tests for their identification.
3. Importance and identification of Botanical evidence such as Pollen grains, wood, leaves and seeds.

Unit B

1. **Blood:** Composition and functions, collection and tests for identification.
2. Blood group determination from fresh blood.
3. Grouping from stains of blood by Absorption-inhibition, Absorption-elution and mixed agglutination techniques.
4. **Semen:** Forensic significance, location, collection, evaluation and tests for identification
5. Forensic significance of other body fluids like saliva, sweat, milk etc. Their collection and identification.

Unit C

1. Identification and examination of human skeletal remains. Comparative Anatomy.
2. Determination of Age & sex from Skeletal remains.
3. Facial reconstruction.

Unit D

1. **Forensic Medicine:** Medico legal aspects of Death, causes of Death (asphyxial death, starvation, electrocution, Accidents).
2. Determination of time since death by various methods including, histopathological methods.
3. Determination of age of living person, medico-legal investigation of sexual offences, including examination of victim and suspect.
4. **Injuries:** Types and classification of injuries, anti-mortem and post-mortem injuries, aging of injuries, artificial injuries.

Suggested Readings

1. Robertson, J. (1996): Forensic Examination of Hair. Taylor and Francis, USA.
2. Modi, J.K. (1988): Medical Jurisprudence and Toxicology, N.M. Tripathi Pvt. Ltd.
3. Fraser, Roberts J.A (1965): An introduction to Medical Genetics.
4. Chatterjee, C. C- (1975): Human Physiology.
5. Boorman, K. E: Blood Group Serology, Churchill, and Lincoln, P. J. (1988)
6. Race, R. R. and Sangar, R. (1975): Blood Groups in Man. Blackwell Scientific, Oxford.
7. Saferstein, R. (1982): Science Handbook, Vol. I, II and III, Prentice Hall, New Jersey.
8. Barris, H. and Hopkinson, D. A. (1976): Handbook of Enzyme, Electrophoresis, Elsevier, North, Holland, New York.
9. Gilblet, E. (1969): Marker's in Human Blood, Davis, Pennsylvania.
10. Culliford, B. E. (1971), The examination and Typing of Blood Stains, US Deptt. of Justice, Washington.
11. Chowdhuri, S. (1971): Forensic Biology, B P R & D, Govt. of India.
12. Dunsford, I. and Bowley, C. (1967): Blood Grouping Techniques, Oliver & Boyd, London.
13. Eckert, W. G. & James, S.H. (1989): Interpretation of Blood Stain, Evidence, Elsevier, New York.

DFSC: 109 PRACTICAL FINGERPRINT EXAMINATION

1. To identify the given fingerprint pattern.
2. To compare the given fingerprints.
3. To classify the ten digit fingerprints.
4. To classify the single digit fingerprint.
5. To develop and examine the latent fingerprint by physical methods.
6. To develop and examine the latent fingerprints by chemical methods.

DFSC: 110 PRACTICAL FORENSIC CHEMISTRY AND BIOLOGY

1. Colour/spot tests for common drugs of abuse.
2. TLC separation of drugs of abuse.
3. Analysis of phenolphthalein in trap cases.
4. To prepare slides of scale patterns of human hair.
5. To identify blood stains & determine its origin.
6. To identify semen stains.
7. To identify saliva stains.
8. To identify various type of fibers.
9. To determine blood group from fresh blood and blood stains.
10. Determination of Sex from skull and pelvis.
11. Determination of Age from skull.
12. Identification of long bones and their side identification.