S.O.
12/11/2014

S.O.(Sci.)

UNIVERSITY OF DELHI

No. CNC-I/A.C.(3)Res/2014/

Dated: 1st August, 2014

Enclosed please find herewith the following Academic Council Resolution for information and necessary action at your end.

A.C. Res. No. 6 and 9 dated 21.06.2014

Yours faithfully,

1/8/14

Section Officer (Council-I)

The Dean
Faculty of Science,
University of Delhi,
Delhi-110007

O/C

CNC-I/533
6/8/14

FOS-539
16/3/15

Mr. Ajay
16/3/15

Forwarded to the Head, Deptt. of Anthropology for information and further necessary action in this regard.

16/3/15

Personally received on 13/3/15

FOS 2/TK-699
16/3/15

S.O. (Science) 16/3/15

University of Delhi

E.C. Resolution No. 14(1)
Dated: 14.08.2014

14/ Resolved that the following recommendations to the Executive Council by the Academic Council made at its meetings held on 21st June and 19th July, 2014 be approved:

1. Resolved that the following draft amendment in Ordinance V(1), Appendix II to Ordinance V(2) and VII of the Ordinances of the University regarding introduction of a new M.Sc. in Forensic Science recommended for consideration by the Executive Council by the Academic Council be approved. **(Appendix-2).**

Add the Courses/Syllabi/Scheme of the Examination of the following:

1. M.Sc. in Forensic Science two year full time Programme.

UNIVERSITY OF DELHI

ACADEMIC COUNCIL
RESOLUTION NO. 6
DATED : 21.06.2014

Resolution No. 6

6/ The Council considered the following recommendations of the Standing Committee on Academic Matters made in its meeting held on June 20, 2014 and resolved as follows:

Recommendations of the Standing Committee on Academic Matters of the Academic Council	Resolution of the Academic Council
Resolved that the following recommendations Faculty of **Commerce and** Business made in its meeting held on 10th May, 2014 regarding syllabi of the following courses be accepted with minor changes be accepted and recommended to the Academic Council for approval:	
i) #Revised syllabus of Master of Commerce (M.Com.)	i) Revised syllabus of Master of Commerce (M.Com) be approved. # (Six members dissented) **(Appendix-1)**
ii) Revised syllabus of Master of Business Administration(International Business) /MBA (IB)	ii & iii) Revised syllabus of Master of International Business (MIB) approved. **(Appendix-2)**
iii) Revised syllabus of Master of Business Administration (Human Resource & Organizational Development)/MBA (HR & OD)	Revised syllabus of Master of Human Resource and Organizational Development (MHROD) be approved. **(Appendix-3)**
	Revised nomenclature of MIB as Master of Business Administration (International Business)/MBA not approved.

परिषद शाखा / Council Branch
दिल्ली विश्वविद्यालय/University of Delhi
दिल्ली/Delhi-110007

	Revised nomenclature of MHROD as Master of Business Administration (Human Resource & Organizational Development)/MBA (HR & OD) not approved.
iv) *Revised syllabus of B.Com. (Hons.) Semester- II, Paper No. – CH 2.4; Corporate Laws.	iv) Revised syllabus of B.Com. (Hons.), Paper No. – CH 2.4; Corporate Laws be approved.* **(Appendix-4)**
v) *Revised syllabus of B.Com. Semester-III, Paper No.– CP 3.2: Company and Compensation Laws.	v) Revised syllabus of B.Com. Paper No. – CP 3.2: Company and Compensation Laws be approved.* **(Appendix-5)**
vi) *Revised syllabus of Four Year Undergraduate Programme Commerce Semester–IV– DC 1 – 8: Corporate Laws	vi & vii) Deferred.
vii) **Syllabus of Undergraduate Programme with multiple degree options DC-II-OMSP.	
#The exiting examination rules of the University will apply. *Students already admitted will continue to appear in examination for old papers. **Option of English/Hindi in paper 5.1 & 6.1 should be provided from the academic session 2015-2016.	#The exiting examination rules of the University will apply. *Students already admitted will continue to appear in examination for old papers.
Resolved that the following recommendations of the Empowered Committee, constituted by the Vice-Chancellor, made in its meeting held on 15.6.2014, with regard to syllabus of following six skill based Applied Courses under Four Year Undergraduate Programme be accepted and recommended to the Academic Council for approval: 1. IT-ITeS 2. BFSI (Banking Financial Securities and Insurance) 3. Telecom 4. Healthcare 5. Media & Entertainment 6. Automotive	Deferred

Resolved that the following recommendations of the Faculty of Social Sciences made in its meeting held on 21st May, 2014 be accepted with minor changes* and recommended to the Academic Council for approval: i) M.Phil Course/Syllabus/Scheme of Examination in the Department of Adult Continuing Education & Extension w.e.f. academic year 2014-2015. *Reservation rules of the University will be followed.	Approved (One member dissented) (Appendix-6)
Resolved that the following recommendations of the Faculty of Science made in its meeting held on 17th June, 2014 be accepted and recommended to the Academic Council for approval: 1) Syllabus of M.Sc. in Forensic Science two year full time programme. ii) Syllabus of B.Tech. in Forensic Science (under Four Year Undergraduate Programme).	(Appendix-7) i) Approved with minor changes. ii) Deferred.
Resolved that the Recommendations of the Faculty of Education made in its meeting held on held on 11th June, 2014 be accepted and recommended to the Academic Council for approval: Introduction of the following M.Ed. optional papers IV and V(X) – Information and Communication Technologies in Education: i) Syllabus of paper 4.5. X .1: Information and Communication Technologies in Education. (Optional Paper), ii) Syllabus of paper 4.5X2: Web Technologies and E-learning. iii) Syllabus of B.Ed. paper IV(i) Teaching of Mathematics – A level.	Approved (Appendix-8) Approved (Appendix-9) Approved (Appendix-10)
*Resolved that the recommendations of the Faculty of Law made in its meeting held on 16.6.2014 to	Approved (Appendix-11)

परिषद् शाखा
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दिल्ली/Delhi-110007

amend Ordinance II, Ordinance V(1), Appendix to Ordinance V(2) and Ordinance VII as recommended by the Faculty of Law be accepted and recommended to the Academic Council for approval. *Proposed amendment is approved and effective date will be decided by the Faculty in consultation with the University authorities.	
Resolved that the recommendations of the Empowered Committee constituted by the Vice-Chancellor, made in its meeting held on 18.6.2014 regarding ELPC Applied Courses on FYUP Semesters 3,4,5 and 6, structure and syllabi be accepted and recommended to the Academic Council for approval.	Deferred

परिषद शाखा-I / Council Branch-I
दिल्ली विश्वविद्यालय / University of Delhi
दिल्ली-110007 / Delhi-110007

UNIVERSITY OF DELHI

MASTER OF SCIENCE

(FORENSIC SCIENCE)

M.Sc. IN FORENSIC SCIENCE

(Two year full time Programme)

[Rules, Regulations and Course contents]

(Four-Semester Course)

attested
Sharma
28/12/2022

अध्यक्ष / Head
मानव विज्ञान विभाग
Department of Anthropology
दिल्ली विश्वविद्यालय, दिल्ली-110007
University of Delhi, Delhi-110007

DEPARTMENT OF ANTHROPOLOGY
FACULTY OF SCIENCE
UNIVERSITY OF DELHI
DELHI-110007

MASTER OF SCIENCE

(FORENSIC SCIENCE)

TWO YEAR FULL-TIME PROGRAMME

AFFILIATION

The proposed programme shall be governed by the Department of Anthropology, Faculty of Science, University of Delhi-110007.

ELIGIBILITY

Any student who has completed B.Sc Chemistry, Physics, Botany, Zoology, Anthropology, Bio-Chemistry, Bio-Physics, Mathematical Sciences, Bio-Tech, Genetics, Microbiology or B.Pharma, B.Tech, MBBS, BDS or life sciences with minimum 55% marks from a UGC recognized University.

PROGRAMME STRUCTURE

The M.Sc. Programme is divided into two Parts as under. Each Part will consist of two Semesters.

		Semester-Odd	Semester-Even
Part I	First Year	Semester – 1	Semester – 2
Part II	Second Year	Semester – 3	Semester – 4

The schedule of papers prescribed for various semesters shall be as follows:

Part I – Semester 1

Theory

Paper 1: Forensic Science, Photography, Crime Scene Management
Paper 2: Criminology, Criminal Law and Police Administration
Paper 3: Forensic Physics
Paper 4 : Forensic Dermatoglyphics and other impressions

Practical

Paper I Crime scene management and criminology
Paper II Forensic physics and forensic impressions

Part I – Semester 2

Theory

Paper 5: Forensic Chemistry and Toxicology
Paper 6: Forensic Ballistics
Paper 7: Instrumental Techniques
Paper 8: Quetioned Documents

Practical

Paper III Forensic Chemistry and Instrumentation
Paper IV Ballistics and Questioned Documents

Part II- Semester III

Theory

Paper 9: Forensic Anthropology
Paper 10: Forensic Biology and DNA profiling
Paper 11: Forensic medicine and psychology
Paper 12: Digital Forensics and Cyber crime

Practical
Paper V Anthropology, Biology and DNA
Paper VI Digital Forensics

Part II – Semester IV

1. Dissertation
2. Project Work
3. Field visits
4. Out-house training

SCHEME OF EXAMINATION

1. English shall be the medium of instructions and examination.
2. Examination shall be conducted at the end of each Semester as per the Academic Calendar notified by the University of Delhi.
3. Each course will carry 100 marks and will have two components:
   (i) Internal Assessment 30 marks
   (ii) End Semester Examination
      (a) Theory Examination 70 marks
      (b) Practical Examination 100 marks
   (iii) Dissertation 150 marks
   (iv) Project work 150 marks
   (v) Field Visit Evaluation 150 marks
   (vi) Out-house Training/ Attachment with any FSL, CFSL and crime branch etc. 150 marks

PASS PERCENTAGE

Minimum marks for passing the examination in each semester shall be 40% in each paper and 45% in aggregate of a semester.

COURSE CONTENT FOR EACH COURSE

Attached.

M.Sc (FORENSIC SCIENCE)

SEMESTER –I

Paper 1: Forensic Science, Photography, Crime Scene Management

Unit 1

Forensic Science Unit

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

Unit 2

Tools and techniques in Forensic Science

Basic principles of microscopy, spectroscopy, chromatography. Electrophoresis, Enzyme-Linked Immunosorbent Assay (ELISA), Radio Immuno Assay (RIA). Measuring and optical instrumenmts. Research methodologies. Formation of research design on a specific problem. Central tendency and Dispersion. Test of significance. Analysis of variance. Correlation and Regression.

Unit 3

Forensic Photography

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

Unit 4

Crime Scene Management

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

Suggested Readings

1. Houck, M.M & Siegel, J.A; Fundamentals of Forensic Science, Acadamic Press, London, 2006.

2. Sharma, B.R; Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, 2003

3. Nanda B.B and Tewari, R.K; Forensic Science in India- A vision for the Twenty First Century, Select Publisher, New Delhi, 2001.

4. James, S.H and Nordby, J.J; Forensic Science- An Introduction to Scientific and Investigative Techniques, CRC Press, USA, 2003.

5. Saferstein; Criminalistics- An Introduction of Forensic Science, Prentice Hall Inc, USA,2007.

6. Barry, A.J. Fisher; Techniques of Crime Scene Investigation, 7th Ed, CRC Press, NewYork, 2003.

7. Mordby, J. & Reckoning, D; The Art of Forensic Detection, CRC Press NewYork, 2003.

8. G.R. Chatwal; Analytical Spectroscopy 2nd Edn, Himalaya Publishing House New Delhi,2002.

9. Aitken and Stoney; The Use of Statistics in Forensic Science, Ellis Horwood, New York, 1991.

10. Robertson and Vignaux; Interpreting Evidence, John Wiley, New York, 1995.

11. H.L. Blitzer and J.Jacobia; Forensic Digital Imaging and Photography, Academic Press, London, 2002

12. David R.Redsicker; The Practical Methodology of Forensic Photography- 2nd Ed. CRC Press, New York, 2001.

13. R.E.Jacobson, S.F.Ray, G.G.Attridge; The Manual of Photography- Photographic and Digital Imaging , N.R. Oxford

Paper 2: Criminology, Criminal Law and Police Administration

Unit 1

Crime

Definition, concept and scope of crime. Types of crime. Causes, effects, control and prevention of crime. Recent developments.

Unit 2

Criminology and criminal anthropology

Aim and scope of criminology; Criminal behavior and theories of criminal behavior: classic, positivist, sociological. Organized crimes, white collar crime. Juvenile delinquency. Role of correctional institutions. Criminal profiling and modus operandi, portrait parley, voice stress analysis. Victimology.

Unit 3

Criminal Law

Indian Penal Code: sections-23, 24, 25,39,44,52,76-79,84-86.

Criminal Procedure Code: sections-2, 6-35, 41-60, 61-90,154-176, 293, 294. Charges: bailable/non-bailable offences, cognizable/ non-cognizable, summon case and warrant cases.

Indian Evidence Act: sections- 3, 24-30, 45, 135-138, 141. Expert testimony.

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

Unit 4

Police Administration

History and development of police administration; Police duties, responsibilities and powers. Organization and structure of police station; maintenance of crime records and accountability of police to law. People and society. Custodial deaths, Police and Human Rights.

Suggested Readings

1. Swansan, C.R, Terrbles, L & Taylor,R.W; Police Administration, Prentice Hall, USA, 1998.

2. Gross.H; Criminal Investigation- A Practical Textbook for Magistrates, Police Officers, and Lawyers; Universal Law Publishing Co., New Delhi, 2000.

3. Lyman, M.D; Criminal Investigation – The Art & the Science, Prentice Hall, New Jersey, 2002.

4. O'Hara CE & Osterburg, JW; An Introduction to Criminalistics., Indiana University. Press, London, 1972.

5. Swansson,C.R, Chamelin, N.C, & Territ, L; Criminal Investigator, McGrawhill, New York, 2000.

6. The Indian Evidence Act,(1872), Amendment Act (2002); Universal Law Publishing Co., 2003.

7. The Code of Criminal Procedure (1973) Amendment Act, (2001); Universal Law Publishing Co., 2002.

8. Rattan Lal & Dhiraj Lal; The Indian Penal Code, 28th Ed. Wadhwa & Co. Nagpur, 2002.

Paper 3: Forensic Physics

Unit 1

Soil, Cement and Concrete

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

Unit 2

Paint and Fibre

Types of paint and their composition, macroscopic and microscopic analysis of paint pigments, pigment distribution, micro-chemical analysis- solubility test, pyrolysis gas chromatography, TLC, colorimetric analysis, IR spectroscopy and X-ray diffraction, elemental analysis, mass spectrometer, interpretation of paint evidence.

Types of fibres, forensic aspects of fibre examination- fluorescence, optical properties, refractive index, birefringence, dye analysis. Physical fit and chemical testing. TLC, IR-micro spectroscopy, Py-MS. Difference between natural and man-made fibres.

Unit 3

Glass

Types of glass and their composition-soda-lime, boro-silicate, safety glass, laminated, light-sensitive, tampered/ toughened, wire glass, coloured glass. Matching and comparison: Forensic examinations of glass fractures- rib marks, hackle marks, cone fracture, wavy, backward fragmentation, concentric and radial fractures. Colour, fluorescence, physical measurements, refractive index, density gradient, becke-line, specific gravity examination and elemental analysis of glass evidence.

Unit 4

Toolmarks

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

Suggested Readings

1. Caddy, B; Forensic Examination of Glass and Paint Analysis and Interpretation, CRC Press, New York, 2001.

2. Shaw, D; Physics in the Prevention and Detection of Crime, Contem Phys. Vol.17, 1976.

3. Saferstein, R; Forensic Science Handbook. Vol. I,II, (Ed.), Prentice Hall, New Jersey, 1988.

4. Working Procedure Manual; Physics BPR&D Publication, 2000.

5. Sharma, B.R; Forensic Science in Criminal Investigation and Trials (3rd Ed.), Universal Law Publishing Co., New Delhi, 2001.

6. Working Procedure Manual- Physics, BPR&D Publication. 2000

7. Hess, K.P; Textile Fibers and their Use, 6th Edn, Oxford and IBH Publishing Co., 1974.

Paper 4: Forensic Dermatoglyphics and other impressions

Unit 1

Fingerprints and Palm prints

History and development of Dermatoglyphics , formation of ridges, pattern types, pattern area. Classification of fingerprints- Henry's system of classification, single-digit classification, Extension of Henry's classification, filing, searching and fingerprint bureau. Composition of sweat, development of chance, latent, visible and plastic prints. Conventional methods of development of latent prints- fluorescent methods, magnetic powder method, fuming method, chemical method etc. Application of laser and other radiations to develop latent fingerprints, metal deposition method and development of latent prints on skin. Taking of fingerprints from living and dead person, preserving and lifting of fingerprints, photography of fingerprints. Ridge counting and ridge tracing, class and individual characteristics, various types of ridge characteristics. Comparison of palm prints on the basis of individual ridge characteristics. Automated Fingerprint Identification System (AFIS). Modern methodologies in fingerprinting.

Unit 2

Biometrics

Biometric evidences such as finger impressions, retina, iris pattern, voice, gait pattern, face recognition, 3D face recognition, automatic forensic dental identification, hand vascular pattern technology, Multibiometric systems, Recent developments, biometric databases.

Unit 3

Foot/ Footwear/Tyre impressions

Importance, Gait pattern, Casting of footprints in different medium, electrostatic lifting of latent footprints. Taking of control samples.Collection, tracing, lifting, casting of impressions, enhancement of footwear impressions, analysis and comparison of foot impressions, moulds, identification characteristics.

Unit 4

Lip prints, Ear prints and their significance

Nature, location, collection and evaluation of lip prints. Forensic Significance, photography, location, collection and evaluation, taking of control samples of footprints, lip prints and Ear prints for comparison. Modern techniques and developments.

Suggested Readings

1. Bridges, B.C; Criminal Investigation, Practical Fingerprinting, Thumb Impression, Handwriting expert Testimony, Opinion Evidence., Univ. Book Agency, Allhabad,2000

2. Mehta, M.K; Indentification of Thumb impression & cross examination of Fingerprints, N.M. Tripathi Pub. Bombay, 1980.

3. Chatterjee, S.K; Speculation in Fingerprint Identification, Jantralekha printing Works, Kolkata, 1981.

4. Cowger James F; Friction Ridge Skin- Comparison & Identification of Fingerprints, CRC Press, NY, 1993

5. Cossidy, M.J; Footwear Identification, Royal Canadian, Mounted Police, 1980.

6. Iannavelli, A.V; Ear Identification, Forensic Identification Series, Paramount,1989.

7. Henry, C.L. & Ganesslen, R.E; Advances in Fingerprint Technology, CRC Press, London,1991.

8. Jain, A.K., Flynn, P.& Ross A.A., Handbook of Biometrics, Springer, New York 2008

Practical- I

Paper 1 : Crime scene management and criminology

1. Descriptive study of organizational structure of a forensic science laboratory.
2. To carry out photography of indoor and outdoor crime scenes
3. Crime scene photographic processing and development in different light sources and using different filters.
4. To carry out digital photography of various forensic evidences
5. Mock crime scene investigation and writing a report on evaluation of crime scene.
6. Interpretation of crime scene notes, photos, sketches and reconstruction of crime scene
7. Microscopy of various physical evidences
8. Study the theories of crime
9. Criminal profiling
10. Portrait parley
11. Expert testimony in a mock court case scenario.

Paper II: Forensic physics and impression

1. Preliminary examination of glass, soil, fibre, paint and cloth evidences.
2. Examination of physical properties of glass, soil, fibre and paint evidences.
3. Develop latent fingerprints using different powder and chemical methods.
4. Comparison of fingerprints and palm prints by individual and class characteristics.
5. Restoration techniques of tool mark impressions and casting footprints.
6. Comparison and identification of individuals from lip print evidence.
7. Gait pattern recognition

Semester - II

Paper 5: Forensic Chemistry and Toxicology

Unit 1

Forensic Chemistry

Introductionto Forensic chemistry, sampling of chemical evidences, presumptive, screening (colour/ spot test), inorganic analysis. Detective dyes- cases and importance in trap cases. Arson Chemistry of fire, searching of fire scene, collection, preservation and examination of arson evidences.Adulteration in Petroleum products. Examination procedures involving standard methods and instrumental techniques, analysis of beverages- alcoholic and non-alcoholic, country made liquor and medicinal preparations containing alcohol as constituents. Significance of alcohol in breath and breath screening devices. Forensic analysis of Fertilizers/ insecticides/ pesticides/ biocides.

Unit 2

Explosives

Classification of explosives, synthesis and characteristics of Tri-nitro toluene (TNT), Pentaerythritol tetranitrate (PETN) and Research and Development Explosives (RDX). Explosion process, blast waves, searching of scene of explosion. Post blast residue collection and analysis, blast injuries and detection of hidden explosives. Improvised explosive devices.

Unit 3

Forensic Toxicology and Pharmacology

Definition, classification of poisons- organic, inorganic, metallic, non-metallic etc. Acute and chronic poisoning, Accidental, homicidal and suicidal poisoning, Extraction and identification of commonly used poisons. Dosage, Frequency, Route of administration, Absorption, distribution and metabolism and factors affecting metabolism and excretion. Toxicological techniques.

Unit 4

Drugs of Abuse

Natural and synthetic drugs of abuse. Drug dependence, classification of drugs- Narcotics, Hallucinogens, Depressants, Stimulants, Anabolic steroids. Psychotropic and Psychedelic drugs of abuse. Field and laboratory tests of drugs of abuse. Instrumental methods of analysis, collection, preservation and transportation of drug evidences.

Suggested Readings

1. Niesink, RJM; Toxicology- Principles and Applications, CRC Press,1996
2. Modi, JP, Textbook of Medical Jurisprudence & Toxicology, N.M. Tripathi Pub,2001
3. Chadha, PV; Handbook of Forensic Medicine & Toxicology, Jaypee Brothers, New Delhi,2004
4. Parikh, C.K; Text Book of Medical Jurisprudence, Forensic Medicine & Toxicology, CBS Pub. New Delhi,1999
5. Morrison R.T and Boyd R. N;Organic Chemistry 6th Ed Prentice Hall, 2003
6. Laboratory Procedure Manual : Petroleum Products ,Directorate of Forensic Science, MHA, Govt. of India, 2005
7. Working Procedure Manual on Chemistry ; Directorate of Forensic Science MHA Govt. of India
8. Bureau of Indian Standard Specifications related to Alcohols and Petroleum Products.
9. Welcher F; Standard Methods of Chemical Analysis, 6th Ed.Van Nostrand Reinhold, New York, 1969
10. Watson C. A; Official and Standardised Methods of Analysis, Royal Society of Chemistry, UK,1994.
11. Central Excise Act ; Universal Law Publication.
12. Essential Commodity Act, 1955
13. Feigl, F; Spot Test in Inorganic Analysis , Elsevier Publ. New Delhi, 2005.
14. Curry A.S ; Analytical Methods in Human Toxicology : Part II ,CRC Press Ohio, 1986.
15. Curry, A.S : Poison Detection in Human Organs, C Thomas Spring field, CRC Press, Costa Rica, 1976
16. Clark E.G.C; Isolation and Identification of drugs, Academic Press, London, 1986
17. Sunshine I : Handbook of Analytical Toxicpology, CRC Press, Costa Rica,1969.

Paper 6: Forensic Ballistics

Unit 1

Forensic Ballistics-I

History and background of Firearms, their classification and characteristics, various components of small arms, smooth bore and rifled firearm, different systems and their functions, rifling – various class characteristics, types of rifling and methods to produce rifling. Trigger and firing mechanism, cartridge-firing mechanism. Projectile velocity determination, Theory of recoil, methods for measurement of recoil. Techniques of dismantling/assembling of firearm. Types of ammunitions, classification and constructional features of different types of cartridges, types of primers and priming composition, propellants and their compositions, velocity and pressure characteristics under different conditions, various types of bullets and compositional aspects, latest trends in their manufacturing and design, smooth bore firearm projectile, identification of origin, improvised ammunition and safety. Identification of origin, improvised/ country-made/ imitative firearms and their constructional features.

Unit 2

Internal and External Ballistics

Definition, ignition of propellants, shape and size of propellants, manner of burning; various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting, equation of motion of projectile, principal problems of exterior ballistics, vacuum trajectory, effect of air resistance on trajectory, base drag, yaw, shape of projectile and stability, trajectory computation, ballistics coefficient and limiting velocity; Ballistics tables, measurements of trajectory parameters, introduction to automated system of trajectory computation and automated management of ballistics data.

Unit 3

Terminal Ballistics

Effect of projectile on hitting the target: function of bullet shape, striking velocity, striking angle and nature of target, Tumbling of bullets, effect of instability of bullet, effect of intermediate targets, influence of range, Cavitation – temporary and permanent cavities, Ricochet and its effects, stopping power, Wound Ballistics; Threshold velocity for penetration of skin/flesh/bones, preparation of gel block, penetration of projectiles in gel block and other targets, nature of wounds of entry, exit, initial track with various ranges and velocities with various types of projectiles, explosive wounds, evaluation of injuries caused due to shot-gun, rifle, handguns and country made firearms, methods of measurements of wound ballistics parameters, post-mortem and anti-mortem firearm injuries.

Unit 4

Examination and identification

Firearms, ammunition and their components identification and examination, different types of marks produced during firing process on cartridge-firing pin marks, breech face marks, chamber marks, extractor and ejector marks and on bullet number/direction of lands and grooves, striation marks on lands and grooves, identification of various parts of

firearms, techniques for obtaining test material from various types of weapons and their linkage with fired ammunition, class and individual characteristics, determination of range of fire- burning, scorching, blackening, tattooing and metal fouling, shots dispersion and GSR distribution, time of firing – different method employed, and their limitations, stereo & comparison microscopy, automatic bullet and cartridge comparison system.

GSR analysis :Mechanism of formation of GSR, source and collection, spot test, chemical test, identification of shooter and instrumental methods of GSR Analysis, Management and reconstruction of crime scene; suicide, murder and accidental and self defence cases.

Suggested Readings

1. Sharma, B.R.; Firearms in Criminal Investigation & Trials, 4th Ed, Universal Law Publishing Co Pvt Ltd, New Delhi, 2011.
2. Mathews, J.H; Firearms Identification, Vol I, II and III, Charles C. Thomas, USA, 1977.
3. Hatcher, Jury and Weller; Firearms Investigation, Identification and Evidence, Stackpole Books, Harrisburg, Pennsylvania, 1997.
4. Heard, B.J; Handbook of Firearms and Ballistics, John Wiley, England, 1997.
5. Warlow, T.A.; Firearms, The Law and Forensic Ballistics, Taylor and Francis, London, 1996.
6. Schooeble, A.J. and Exline, L.D; Current methods in Forensic Gunshot Residue Analysis, CRC Press, New York, 2000.
7. Wilber; Ballistic Science for the Law Enforcement Officer, Charles C. Thomas, USA, 1977
8. Carlucci, D.E & Jacobson, S.S; Ballistics, CRC Press, London, 2008.
9. Sellier, K.G; Wound Ballistics and the Scientific Background, Elsevier Pub. Co., London, 1994.
10. Jauhari M; Identification of Firearms, Ammunition, & Firearms Injuries, BPR&D, New Delhi.
11. Ordog, G.J; Management of Gunshot wounds, Elsevier Pub. Co., New York, 1983.
12. Schooeble, A.J. and Exline, L.D; Current methods in Forensic Gunshot Residue Analysis, CRC Press, NewYork, 2000.
13. Beyer, J.C; Wound Ballistics, US. Printing Office, Washington, 1962.
14. Wilber; Ballistic Science for the Law Enforcement Officer, Charles C. Thomas, USA, 1977.
15. Di Maio, JM; Gunshot Wounds, CRC Press, New York, 1999.

Paper 7: Instrumental Techniques (Physical, Chemical, Biological)

Unit 1

Atomic & Molecular Spectroscopy

Spectroscopy, electromagnetic spectrum, sources of radiation, their utility and limitations. Conventional sources for UV, visible and infrared rays, sources for shorter wavelength radiations (X-ray tubes), radioactivity, Laser (He, Ne Argon, ion, dye lasers, semi conductor lasers) a source of radiation, interaction of radiation with matter:- reflection, absorption, transmission, fluorescence, phosphorescence and their forensic applications, radiation filters. Detection of radiations; photographic detectors, thermal detectors, photoelectric detectors etc. Atomic spectra, energy levels, quantum numbers and designation of states, selection rules, qualitative discussions of atomic spectra. Elements of X-ray spectrometry, fluorescence, energy dispersive X-ray analysis (EDX), wavelength dispersive X-ray analysis (WDX), X-ray diffraction, augur effect.

Unit 2

Physical instrumentation techniques

IR spectroscopy- correlation of infrared spectra with molecular structure, fourier transform, infrared (FTIR) and Raman spectroscopy, fluorescence and phosphorescence spectrophotometry, Ultra violet and visible spectrophotometry: Types of sources, filters-cells and sampling devices, detectors, resolution, qualitative and quantitative methods for detection. Fluorescence and phosphorescence spectrometry: Types of sources, structural factors, instrumentation, comparison of luminescence and UV-visible absorption methods. Atomic absorption spectrometry: Instrumentation and techniques, interference in AAS, background correction methods, quantitative analysis. Atomic emission spectrometry: Instrumentation and techniques, arc/spark emission, ICP-AES, comparison ICP vs AAS methods, quantitative analysis, applications.

Unit 3

Radiochemical and Nuclear techniques

Radiochemical techniques: Basic principles and theory, introduction about nuclear reactions and radiations, neutron sources, neutron activation analysis (NAA) ,Thermal analysis methods: Basic principles and theory, differential scanning colorimetry and differential analysis, thermogravimetry. Nuclear Magnetic Resonance spectroscopy: Basic principles, theory and instrum, Mass Spectrometry, GCMS, LCMS, Secondary Mass Spectrometry, Laser Mass spectrometry, Fast Atom bombardment and liquid secondary Ion Mass spectrometry, High performance liquid chromatrography, Electrospray Ionization mass spectrometry

Unit 4

Biochemical techniques

Biological and biochemical techniques: General principles of Biological/ Bio-chemical Analysis, pH and buffers, Physiological solution, cell and tissue culture, Cell fractionation, Biological variations etc. Centrifugation Techniques, Immuno-chemical Technique, General principles, Production of antibodies, Precipitin reaction, Gel immune-diffusion, Immuno-electrophoresis, complement fixation, Radio Immuno Assay (RIA), Enzyme-linked Immuno Sorbent Assay (ELISA), Fluorescence immune assay. Chromatographic Techniques, Electrophoretic Technique: General principles, Factors affecting electrophoresis, Low voltage thin sheet electrophoresis, High voltage electrophoresis, Sodium dodecylsulphate (SDS) polyacrylamide gel electrophoresis, Isoelectric focusing (IEF), Isoelectrophoresis, Preparative electrophoresis, Horizontal and Vertical Electrophoresis.

Suggested Readings

1. Robinson, J.W; Atomic Spectroscopy, 2nd Ed. Revised & Expanded, Marcel Dekkar, Inc, New York, 1996.

2. Workman, J; Art Springsteen; Applied Spectroscopy- A compact reference for Practitioners, Academic Press, London, 1997.

3. Subrahmanyam, N. & Lal B; A text Book of Optics, S. Chand & Company, New Delhi, 2004.

4. Willard, H.H. Lynne L. Merrett, J. Dean, A. Frank, A. Settle. J; Instrumental Methods of Analysis, 7th Edn. CBS pub. & Distributors, New Delhi, 1986.

5. Khandpur, R.S; Handbook of Analytical Instruments, Tata McGraw Hill Pub. Co. New Delhi, 2004.

6. Thomson, K.C. & Renolds, R.J; Atomic Absorption Fluorescence & Flame Emission Spectroscopy, A Practical Approach, 2nd Edn. Charles Griffith & Company, New South Wales, 1978.

7. Dudley, H. Williams & Fleming, I; Spectroscopic Methods in Organic Chemistry, 4th Edn, Tata McGraw- Hill Publishing Company, New Delhi, 1994.

Paper 8: Questioned Documents

Unit 1

Introduction to Document Examination

Nature and problems of document examination, classification of forensic documents, Specimen/Admitted writings/type writings etc: handling, preservation and marking of documents, importance of natural variations and disguise in writing, various types of forensic documents- genuine and forged documents, holographic documents, principles of handwriting identification, basic tools needed for Forensic Document Examination & their use, analysis of paper and inks.

Unit 2

Handwriting and Signature examination

Various writing features and their estimation, general characteristics of handwriting, individual characteristics of handwriting, ethnic and gender variability of handwriting, various types of forgeries and their detection, examination of signatures – characteristics of genuine and forged signatures, identification of forger, identification of writer of anonymous letters and application of Forensic Stylistics/Linguistics in the identification of writer, examination of built-up documents and determination of sequence of strokes.

Unit 3

Typewritten and Printed Documents

Identification of typescripts-identification of typist, various types of printing processes, identification of printed matter including printing of security documents and currency notes, identification of electronic typewriters, dot matrix, inkjet and laser jet printers, examination of black and white and color photocopies, fax messages and carbon copies.

Unit 4

Forgery Detection

Determination of age of documents by examination of signatures, paper, ink etc., Examination of alterations, erasures, over writings, additions and obliterations, decipherment of secret writings, indentations & charred documents, physical matching of documents, examination of seal, rubber and other mechanical impressions, examination of counterfeit currency notes, Indian passport/visas, stamp papers, postal stamps etc., examination of fake credit cards, e-documents, digital signatures, an introduction of computer forensics, preliminary examination of documents, opinion writings and reasons for opinion.

Suggested reading:

1. Hilton, O; Scientific Examination of Questioned Documents. Revised Edition, Elsevier, New York, 1982.

2. Osborn, A.S; Questioned Documents, 2nd Ed., universal Law Publications, Delhi, 1998.

3. Osborn, A.S; The Problem of Proof, 2nd Ed., Universal Law Pub. Delhi, 1998.

4. Thomas, C.C; Identification System for Questioned Documents, Billy Prior Bates Springfield, Illinois, USA, 1971.

5. Harrison, W.R; Suspect Documents Their Scientific Examination, Universal Law Publication, Delhi, 2001.

6. Morris, R.N; Forensic Handwriting Identification, Academy Press, London, 2001.

7. Sheila, K; Graphotypes a new Plant on Handwriting Analysis, Crown Pub. Inc., USA, 1983.

8. Lerinson, J; Questioned Documents, Academy Press, London, 2001.

9. Katherine, M. K; CDE-Forensic Document Examination-Humana Press, New Jersey, 2007.

Practical

Paper III: Forensic Chemistry and Instrumentation

1. TLC and spot test of alkaloids of drugs of abuse and toxic substances.
2. Isolation and instrumental analysis of different toxic substances and drugs.
3. Thin layer chromatography of explosive substances
4. Examination of petroleum products as per BIS standards.
5. Detection and identification of doping drugs from- hair, blood, saliva, urine and other body fluid and estimation of alcohol from breath, urine and blood.
6. UV-Visible Spectroscopic analysis of Drugs
7. Fourier transform infrared spectroscopic (FTIR) analysis of physical evidences
8. Gas chromatography (GC) and High performance liquid chromatography (HPLC) analysis of poisons, explosives, amino acids and proteins

Paper IV: Ballistics and Questioned Documents

1. Forensic identification of class and individual characteristics of handwriting
2. Analysis of signature forgery
3. Examination of anonymous letters and disguised writing
4. To detect and decipher alterations in a document
5. To decipher secret writings, indentations and charred documents
6. To study the handwriting of ethnic and population groups
7. To examine forgery in currency notes, passports and credit cards under Visual Spectral Comparator
8. Linkage of suspected bullet and cartridge case with the firearm on the basis of class and individual characteristics.
9. Classification and designation of ammunition using physical measurements
10. GSR collection and analysis of various components of GSR.
11. Estimation of Range.
12. Determination of velocity and energy of projectiles.

Semester - III

Paper 9: Forensic Anthropology

Unit 1

Personal Identification

Genesis and development of forensic anthropology. Personal identification of living persons- Identification through somatometric and somatoscopic observation, nails, occupation marks, scars, tattoo marks and deformities; handwriting and mannerisms. Genetic traits of forensic significance: Colour blindness, ear lobe, brachydactyly, polydachtyly,widow's peak, eye colour, hair colour, face form, frontal eminences, nasalprofile, nasal tip,lips,chin form. Identification of the recently dead and decomposed bodies.

Unit 2

Human Growth and Development

Major stages of human growth and development- Prenatal growth, Postnatal growth and their characteristics, Factor affecting growth- Genetic and Environmental. Methods of studying Human Growth, Significance of age in growth studies Methods of assessing age-chronological age, dental age, skeletal age, secondary sex character age and morphological age .

Unit 3

Forensic Morphometry of Skeletal Remains

Techniques for recovering skeletonised human remains. Laboratory analysis of skeletal and decomposing remains; maceration, skeletal analysis. Human and Animal remains. Bone fragments, Attribution of sex, estimation of age and reconstruction of stature from skeletal remains. Trauma analysis and identifying skeletal pathology. Antimortem, perimortem, post-mortem and pseudo mortem trauma. Pathological changes in bone. Establishment of partial and complete identity of skeletal material and dead bodies-morphometric techniques.

Unit 4

Forensic Odontology

Tooth structure and growth. Estimation of age from odontological evidences. Population differencesin size and morphology. Individualisation of tooth pulp. Bite marks and its forensic significance. Photography, lifting and preservation of bite marks. Comparison and evaluation of bite mark evidences.

Suggested Readings

1. Reddy,V.R; Dental Anthropology, Inter-India Publication, New Delhi, 1985.
2. Singh, I.P. & Bhasin M.K; A manual of biological Anthropology, Kamla Raj Enterprises, New Delhi, 2004.
3. Kroeber; Anthropology, Oxford & IBH Publishing Company, New Delhi, 1972.
4. Pickering, R. & Bachman D; The use of Forensic Anthropology, CRC Press, Costa Rica, 2009.
5. Bose, N K; Anthropology, Narayana Press, Denmark, 1972.
6. James, R; Forensic examination of hair, Taylor & Francis, 2ND Ed. London, 1999.
7. Shubhra, G; Introduction to forensic examination, Selective Scientific Books, New Delhi, 2008
8. Michael, W. Haney, H.A. & Freas, L.E; The Forensic Anthropology Laboratory, CRC Press, 2008.
9. Eveleth, P.B. & Tanner, J.M; Worldwide Variation in Human Growth, Cambridge University Press, London, 1976.

Paper 10: Forensic Biology and DNA Profiling

Unit 1

Serology and Immunology

Cell structure and functions. Structure and function of carbohydrates, fats and proteins, serum proteins, haemoglobin and its variants, haptoglobins, HLA, polymorphic enzymes, blood groups-history, biochemistry and genetics of ABO, Rh, Mn and other systems, Methods of ABO blood grouping from fresh blood and biological stains, body fluids, determination of secretor status, polymorphic enzyme typing, serogenetic markers; determination of origin of species, immunology, immune response, antigens, haptens and antibodies, function and rising of antisera, lectins.

Unit 2

Forensic Biology

General plant classification schemes. Sub specialisation of forensic botany- plant morphology, plant anatomy, plant systematic, palynology, plant ecology. Wood and timber analysis. Diatoms and their forensic importance. Study and identification of various diatoms. Paper and pulp identification. Intrbduction and importance of wild life. Protected and endangered species of animals and plants. Sanctuaries and their importance. Relevant provision of wild life and environmental act. Types of wildlife crimes, different methods of killing and poaching of wildlife animals. Collection and preservation of hair samples. Morphological and microscopic examination of human and animal hair. Hair growth and development, determination of origin, race, sex, site from hair. Comparison between human and non-human hair. Macroscopic and microscopic features of hair.

Unit 3

DNA Profiling

Double helical structure of DNA, alternate forms of DNA double helix, denaturation and renaturation of DNA, DNA binding proteins, factors affecting DNA stability, types and structure of RNA. Chemical nature of DNA and RNA. Nature and structure of human genome and its diversity. mt-DNA, Y-Chromosomes and the peopling, migration, of modern humans.

Unit 4

DNA Polymorphism

Concept of gene – Conventional and moderrn views.

Concept of sequence variation - VNTRs, STRs, Mini STRs , SNPs. Detection techniques - RFLP, PCR amplifications, Amp-FLP, sequence polymorphism, Y-STR, Mitochondrial DNA. Disputed paternity cases. Missing person identity, population genetics and legal admissibility of DNA evidence.

Suggested Readings

1. Brown, T; Gene cloning and DNA analysis: An Introduction , 5th ed. Blackwell publishing, London, 2006 .
2. Butler, J; Advanced Topics in Forensic DNA Typing: Methodology, 1st Ed., Academic Press, London, 2009.
3. Easteal, S. McLeod, N. & Reed, K; DNA Profiling: Principles, Pitfalls and Potential, Harwood Academic Publishers, New Jersey, 1991.
4. Primorac, D.& Schanfield, M; Forensic DNA Applications: An Interdisciplinary Perspective, CRC Press, New York, 2014.
5. Rudin, N. & Inman, K; An Introduction to Forensic DNA Analysis, Second Ed.,CRC press, New York, 2001.
6. Spencer, C; Genetic testimony: a guide to forensic DNA profiling, Pearson, New Delhi, 2004.

Paper 11: Forensic Medicine and Psychology

Unit 1

Medico legal aspects of death

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 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 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.

Unit 2

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.

Unit 3

Forensic Entomology

Forensic Entomology- History, significance, determination of time since death- Dipterean larval 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 as an evidentiary tool in child and senior abuse cases and animal abuse cases, collection of entomological evidence.

Unit 4

Forensic Psychology

Lie detection, brain fingerprinting, narco analysis, hypnosis, neuro-anthropological and psychological testing. Ethical issues in forensic psychology, mental disorders, eye witness testimony, memory recovery, psychological assessment, hypnosis, current research in detection of deception/truth finding mechanisms, legal and ethical aspects of human rights of individual.

Suggested Readings

1. Mclay, W.D.S; Clinical forensic medicine, Cambridge University Press, London, 1990.

2. Shepherd, R; Simpson's forensic medicine, Oxford University press, London, 2003.

3. Mant, A.K; Taylor's priniciples & practice of medical jurisprudence, Wingking Tong company ltd., Hong Kong, 2003

4. Maio, D.J. & Maio V.J; Forensic pathology, CRC press, Costa Rica, 1993.

5. Wecht, C.H; Legal medicine annual, Academic Press Publisher, Massachussets, 1970.

6. Polson C.H; Essentials of forensic medicine, Pergamon press, London, 1973.

7. Lahiri, S.K; Elements of medical jurisprudence , Prabasi press, Calcutta, 1973.

8. Flzinga, R.J; Fundamentals of Entomology, Prentice hall of India pvt ltd, New Delhi, 1978.

9. Smith, D.G.V; A manual of Forensic Entomology, Ithaca New York Camstock Univ. Press, New York, 1986.

10. Byrd, J.H. & Castner, J.L; Forensic Entomology, The utility of Anthropods in legal Investigation, CRC Press, New York, 2000.

11. http://www.apa.org/practice/guidelines/forensic-psychology.pdf

12. http://www.uk.sagepub.com/upm-data/39927_1.pdf

13. http://www.blackwellpublishing.com/intropsych/pdf/chapter21.pdf

14. W.O.Donohue & E.Levensky; Handbook of Forensic Psychology, Elseiver Academic Press, 2004.

Paper 12: Digital Forensic and Cyber Crime

Unit 1

E-data analysis

Principles of computer and data storage, Hardware, passwords and encryption techniques, seizure of computers, Preparations to be made before seizure, Actions at the scene, treatment of exhibits, bit stream of original media, Investigation on imaging methods, acquisition, collection and seizure or magnetic media, Legal and privacy issues, Preparing and verifying forensically sterile storage media

Unit 2

Types of cyber crimes

Definition and types of cyber crimes, Digital signal processing overview of several operating systems, html and other internet protocols, internet history, e-mail and header interpretation, virus and Trojan infections, different type of attacks, internet research and investigative tools

Unit 3

Audio-video examination

Forensic audio video analysis, voltage, decibels, audio line levels, frequency measurements, spectrum analysis, noise characteristics; digital filters and audio enhancement, authentication of recorded audio, speech spectrographic analysis, magnetic developing and optical methods Falsification in video recording, video frame sequence, method – waveform – vectroscope, videogrametry and photogrametry techniques, video image analysis, facial image recognition from video frame image

Unit 4

Speaker Identification

Basic factors of sound in speech, components of speech, analogue and digital speech signal, Fourier analysis, Fourier transforms, acoustic speech production, speech anatomy, mechanism of speech production, phonetic aspects of speech, principles of speaker recognition, methods of speaker recognition, various approaches in forensic speaker identification, concept of test and error in speaker identification, application in automatic speaker identification and verification system.

• Suggested Readings

1. Blitzer, H.L. & Jacob J; Forensic Digital Imaging and Photography, Academic Press, London, 2002

2. Henry, H; Color photography – A Working Manual, Little Brown Co. Boston, 1995.

3. Vacca, J. R; Computer Forensic, Firewall Media Pub. New Delhi, 2002

4. Rose, P; Forensic Speaker Identification, Taylor & Francis, Forensic Science Series, London,2002.

5. Sharma, B.R., Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, 2003.

6. James, S.H. & Nordby, J.J; Forensic Science- An Introduction to Scientific and investigative Techniques, CRC Press, New York, 2003.

7. Seigel, J.A, Sukoo, R.J, & Knupfer, G.L; Encyclopaedia of Forensic Science, Academic Press, London, 2000.

8. Swansson, C.R. Chamelin, N.C. & Territ, L; Criminal Investigator, McGrawhill, New York, 2000.

9. Becker, R; Criminal Investigation, ASPEN Publishing, Inc. Maryland, 2000.

Sem III

Practical

Paper V: Anthropology, Biology and DNA

1. Morphological and microscopic examination examination of hair and fibres
2. Examination of blood stains : Physical and Chemical tests; spectroscopic examination
3. Examination of body fluids (Saliva, vomit, urine, semen, sweat)
4. Identification of diatoms and pollen grains
5. Determination of age and sex from skull, teeth, pelvic girdle and long bones.
6. Stature estimation from long bones
7. Determination of species of origin from blood.
8. Blood grouping from fresh and dried blood stains
9. Determination of secretor status
10. Electrophoresis of polymorphic markers
11. DNA isolation from biological samples, quantitation and profiling

Paper VI : Digital Forensics

1. Recovery of data, copying and imaging
2. Tracking of IP address
3. Encrypting and decrypting files
4. Audio, video and image authentification
5. Speaker identification using voice spectrograph.

Semester IV

1. Dissertation based on field work or laboratory work (for 2-3 weeks) in a specialized field chosen by the student. Two hard copies of the dissertation to be submitted by the student for its evaluation by the end of month of April.
2. Project Work.

   A student will submit a project report on the basis of forensic anthropology/ forensic physics/ forensic chemistry/ document examination pertaining to one case starting from police station to court room and final forensic analysis to be done by the student.
3. Field visits to crime scenes, police stations, FSLs, court rooms etc. and submit a specific report on the same for the evaluation.
4. Out house trainings at FSLs/ CFSLs/University and Research laboratories/ GEQD's for 2-3 weeks and submit a brief report on the work done.