



1.1.2

List of Employability/ Entrepreneurship/ Skill Development Courses with Course Contents

Colour Codes		
Employability Contents	Green	
Entrepreneurship Contents	Light Blue	
Skill Development Contents	Pink	
Name of the Subjects/Related to all three Components (Employability/ Entrepreneurship/ Skill Development)	Yellow	



**List of Courses Focus on Employability/ Entrepreneurship/
Skill Development**

Department : Forensic Science

Programme Name : Ph.D.

Academic Year : 2020-21

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	DFSC-PP-01	Research Methodology And Scientific Communication
02.	DFSC-PP-02	Analytical Approaches In Forensic Techniques (Physical, Chemical & Biological)
03.	DFSC-PP-03	Advance And Applied Forensic Science

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बिलासपुर (छ.ग.)
BILASPUR (C.G.)



Department of Forensic Science
GURU GHASIDAS VISHWAVIDYALAYA
(A Central University Established Under the Central Universities Act, 25 of 2009)
BILASPUR, CHHATTISGARH, INDIA

Bilaspur Date: 08/02/2021

Minutes of meeting of the Board of Studies
Held on 08-02-2021

A meeting of Board of Studies (BOS) of the department of Forensic Science was held on 08-02-2021 at 2.00 PM in the Department.

The following members were present in the meeting.

- | | | |
|--------------------------|---|-------------------------|
| 1. Prof. Mitashree Mitra | - | External Subject Expert |
| 2. Dr. Bharti AHIRWAR | - | Chairman, BOS |
| 3. Dr. Sudhir Yadav | - | Member, BOS |
| 4. Ms. Blessi Uaikei | - | Invited Member |
| 5. Dr. Ajay Amit | - | Invited Member |
| 6. Dr. Chanchal Kumar | - | Invited Member |

The Head of the Department welcomed the Members. Thereafter the agenda items were taken up:

Item No.1: The credits of Undergraduate Course of Forensic Science, Paper- Skill Enhancement Course (SEC) of the B.Sc. IIIrd Semester (Course Code: LS/FSC/SEC/301-L) and B.Sc. IVth Semester (Course Code: LS/FSC/SEC/402-L)

As per OM No. 106/Academic/20, dated 23/07/2020 the committee resolve and approved the course of B.Sc.(Hon's) Forensic Science, SEC as per notification for Academic Session 2019-2020

Item No.2: To Approve the Proposal of Vishwavidyalaya Entrance Test (VET) course Syllabus for the Post Graduate Admission in the Department of Forensic Science.

The committee approved the draft syllabus for VET course for the Post Graduate Admission in the Department of Forensic Science for academic session 2019-2020.

Item No.3: To Approve the Syllabus of the Entrance Examination of Vishwavidyalaya Research Entrance Test (VRET) for the Ph.D. Admission in the Department of Forensic Science for academic session 2020-2021

The syllabus of VERT Entrance Examination was discussed and approved.

Dr. Chanchal Kumar
08/02/21

Dr. Bharti AHIRWAR
08/02/21

Dr. Chanchal Kumar

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Item No.4: To Approve the Proposal of Pre-Ph.D. Course work Syllabus and Scheme of examination of the Department of Forensic Science.

The syllabus of Pre-Ph.D course work was discussed and approved for the academic session 2020-2021

The meeting ended with a vote of thanks

Prof. Mitashree Mitra
(External Subject Expert)

Dr. Bharti Ahirwar
(Chairman, BOS)

Dr. Sudhir Yadav
(Member, BOS)

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Scheme and Syllabus

Pre-Ph.D. Course Work Forensic Science

(Scheme of Examination)

Course	Course Code	Name of the course	Credit	Hours / week
Paper-1	DFSC-PP-01	Research Methodology and Scientific Communication	03	03
Paper-2	DFSC-PP-02	Analytical Approaches in Forensic Techniques (Physical, Chemical & Biological)	03	03
Paper-3	DFSC-PP-03	Advance & Applied Forensic Science	03	03
Seminar				
		Total Credits	09	09

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08/02/2021

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SYLLABUS

(Pre-Ph.D. Coursework)

DEPARTMENT OF FORENSIC SCIENCE

Paper-I (DFSC-PP-01)

Research Methodology and Scientific Communication

UNIT-I

Elements of a Quality Management System: Quality, Total Quality, Quality assurance, Quality control Quality system. Quality Planning, Quality Audit: Internal and External Audit & MRM, History and development of ISO, Terminology of NABL. Benefits of ISO standards and Requirements, IEC-17025.

UNIT -II

IPR Issues, Ethical Issues, Essential requirements for the competence of testing and calibration laboratories, LIMS, Introduction, scope, management Requirements: Organizational, Documents control, Review of requests and Calibrations, Laboratory Hazards, Good Laboratory Practices, Purchasing service and supplies, service to the clients, complaints, corrective and preventive action, control of records

UNIT -III

Meaning of research Problem: Research, definition, Objectives of research. Types of research-From the viewpoint of application, Hypothesis and its Testing, Objectives, Inquiry mode. Search for existing literature, Interpretation and Report Writing, Research Communication, Plagiarism.

UNIT-IV

Sampling: sampling procedures (random and non random), sampling statistics, Physical state, homogenization, size and hazards in sampling, Sampling Error, Significance of statistics in forensic science. Descriptive Statistics- Basic concepts of frequency distribution, Measure of Central Values - Mean, median and mode, Measures of Dispersion- Range, Mean deviation and Standard deviation, Standard Error.

UNIT-V

Inferential Statistics-Correlation and Regression analysis. Probability- Definition, Theory, Classical and types, Chi Square Test of Association and Independence, t-test, z-test, One-way and Two-way ANOVA, ANOVA, Relative Risk and Path Analysis. Understanding Statistical Software packages- SPSS Software, XL Stat, MS Excel, R-Package Software's, Genetic Software's

Recommended Books:

1. ISO/IEC/17025:2005, NABL -113, NABL -113A, 131, guidelines of NABL.

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18/02/21

18/02/21


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2. International Standard on General requirements for the competence of testing and calibration laboratories, 1st Ed., 1999-12-15, ISO/IEC 17025:1999(E). C.G.G.
3. Kothari, C.R. Research Methodology Methods and Techniques. Wiley Eastern Limited, New Delhi.
4. Saferstein R. Forensic Science Handbook I, II, III.
5. William L. Duncan: Total Quality, Key Terms and Concepts.
6. Murray S. Cooper: Quality control in the Pharmaceutical Industry.
7. John T. Rabbitt, Peter A Bergh: The ISO 9000Book.
8. Willard Merritt, Dean & Settle: Instrumental Methods of Analysis.
9. Jami St. Clair Crime Laboratory Management: Academic Press.
10. Thomas A The laboratory Quality Assurance system: A manual of Quality Procedures and forms.
11. Ratliff. 2003 3rd ed. John Wiley & Sons.
12. Gary B Clark Systematic Quality Management. Practical Laboratory Management Series.

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Paper-2 (DFSC-PP-02)

Analytical Approaches in Forensic Techniques (Physical, Chemical & Biological)

UNIT-I

Nature, Scope, Basic principles & Forensic Applications of Microscopy, Comparison microscope, Stereoscopic microscope, Fluorescent Microscopy, Infra Red Microscopy, Scanning Electron Microscope (SEM) & Transmission Electron Microscope (TEM). General principles of Immuno chemical technique, Antigen-Antibody binding, Precipitation, Agglutination, Complement fixation, Gel immuno diffusion, Immuno electrophoresis, Radio Immuno assay, ELISA, Fluorescent immuno assay, Fluorescent Activated Cell Sorting (FACS).

UNIT-II

Nature, Scope, Concepts, Basic Principles & Forensic Science Applications of UV-Visible spectroscopy, Infra Red (IR) Spectroscopy, Fourier transform Infra Red (FTIR) Spectrophotometer Atomic Absorption Spectrophotometry (AAS), Atomic emission Spectrometry (AES), Inductive coupled plasma (ICP), X-ray spectroscopy, Auger emission spectroscopy, Mass spectrometry.

UNIT-III

Nature, Scope, Concepts, Basic Principles & Forensic Science Applications of Chromatography, Thin Layer chromatography (TLC), High Performance Liquid Chromatography (HPLC), Gas Chromatography (GC) and High performance Thin layer Chromatography (HPTLC).

UNIT-IV

Nature, Scope, Basic principles & Forensic Applications Electrophoretic Technique, General principles, Factors affecting electrophoresis, High voltage electrophoresis, polyacrylamide gel electrophoresis, Isoelectric focusing (IEF), Isoelectrophoresis, Preparative, Horizontal and Vertical Electrophoresis.

UNIT-V

Molecular Biology Techniques: Genetic Manipulations, Restriction enzymes, Gene cloning, Cloning strategies, cloning vectors- Plasmids, Cosmids, phagemids, BAC, YAC, DNA extraction, Polymerase chain reaction, DNA sequencing methods and its advances, Mutagenesis, Gene Libraries, Colony Hybridization, Nick translation, Expression of Genes etc.

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Tissue culture techniques, Cell lines maintenance, Cryopreservation etc.

Recommended Books

1. Working Procedure Manual Serology, DFS, New Delhi.
2. Danniell P. Stites, Abba I. Jerr, Tristram G. Parstow Medical immunology, Ninth edition; Prentice Hall International Inc. 1997.
3. Saferstein, R. (1982): Science Handbook, Vol. I, II, & III, Prentice Hall New Jersey.
4. Stern, C. (1964): Principles of Human Genetics, Freeman, California.
5. Beerman, K.E.: Blood Group Serology, Churchill, and Lincoln, P.J. (1988)
6. Race, R.R, and Sanger, R. (1975) : Blood Groups in Man. Blackwell Scientific, Oxford.
7. Gilblet, E. (1969) : Markers in Human Blood, Davis, Pennsylvania
8. Culliford, B.E. (1971) The Examination and Typing of Blood Stains, US Deptt. of Justice, Washington
9. Chowdhari, S. (1971) : Forensic Biology, B P R & D, Govt, of India.
10. Dunsford, I and Bowley, C. (1967) : Blood Grouping Techniques, Oliver & Boyd, London

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Paper-3: (DFSC-PP-03)

Advance and Applied Forensic Science

UNIT-I

Nature, Scope & Definition of Forensic chemistry, Introduction to Narcotic drugs, Depressants, stimulants, and Hallucinogens their Active components and legal issues and method of analysis of Designer Drugs & Anabolic steroids, Forensic Medicine- Definition, Scope and Importance, Postmortem examination, Death: Definition, types, and nature, time since death, Injuries-Definition and Nature, Estimation of Age of injuries from Ante-mortem and Post mortem injuries, Burns-Classification, Ante-mortem and Post mortem Burns.

UNIT-II

Toxicology, Poisons-Definition & Classification, Collection and Preservation of Viscera and other relevant materials, Isolation and identification of Plant Poisons, opium and its derivatives, Benzodiazepine tranquilizers, Metallic Poison, Insecticides and Pesticides. Basic concepts of Poisonous Mushrooms, Poisonous fungi, Food Poisoning, Common vegetable abortifacients, Animal poison, Snake venom.

UNIT-III

Serology & Immunology, Blood: Composition and Histology, Examination & Identification of blood, blood stains & Analysis of Blood Pattern, and other body fluids/stains viz. menstrual blood, semen, saliva, sweat, tear, pus, vomit, hair, bone, nail, Secretors and Non-secretors. Immunology: Cell & Organ of Immune system, Haematopoiesis, immune response, innate and acquired immunity, Antigens, Immunoglobulin: Types, Physico-chemical properties and function. Antigen-Antibody Reactions: Precipitation, agglutination, complement fixation, Compliment system, Major Histo-compatibility Complexes (MHC) and antigen presentation, Autoimmunity, Apoptosis.

UNIT IV

An Introduction to Genetic Material, Structure of DNA, Chemical nature of DNA, Physicochemical properties of DNA, Denaturation and Renaturation kinetics of DNA, Central Dogma. DNA extraction and Quantification; Basic concept of sequence variation - VNTRs, STRs, Mini STRs, SNPs. Mitochondrial DNA Evaluation of results, frequency estimate calculations and interpretation, Allele frequency determination, STR Profiling: Structure of STR loci; The development of STR multiplexes; Detection of STR

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polymorphisms; Interpretation of result; Assessment of STR profiles: Stutter peaks. Sp. Pull-up; Degraded DNA; Statistical Assessment of STR profiles; estimating the frequencies of STR profiles. History of DNA profiling applications in disputed paternity cases, child swapping, missing person's identity, civil immigration, limitations of DNA profiling.

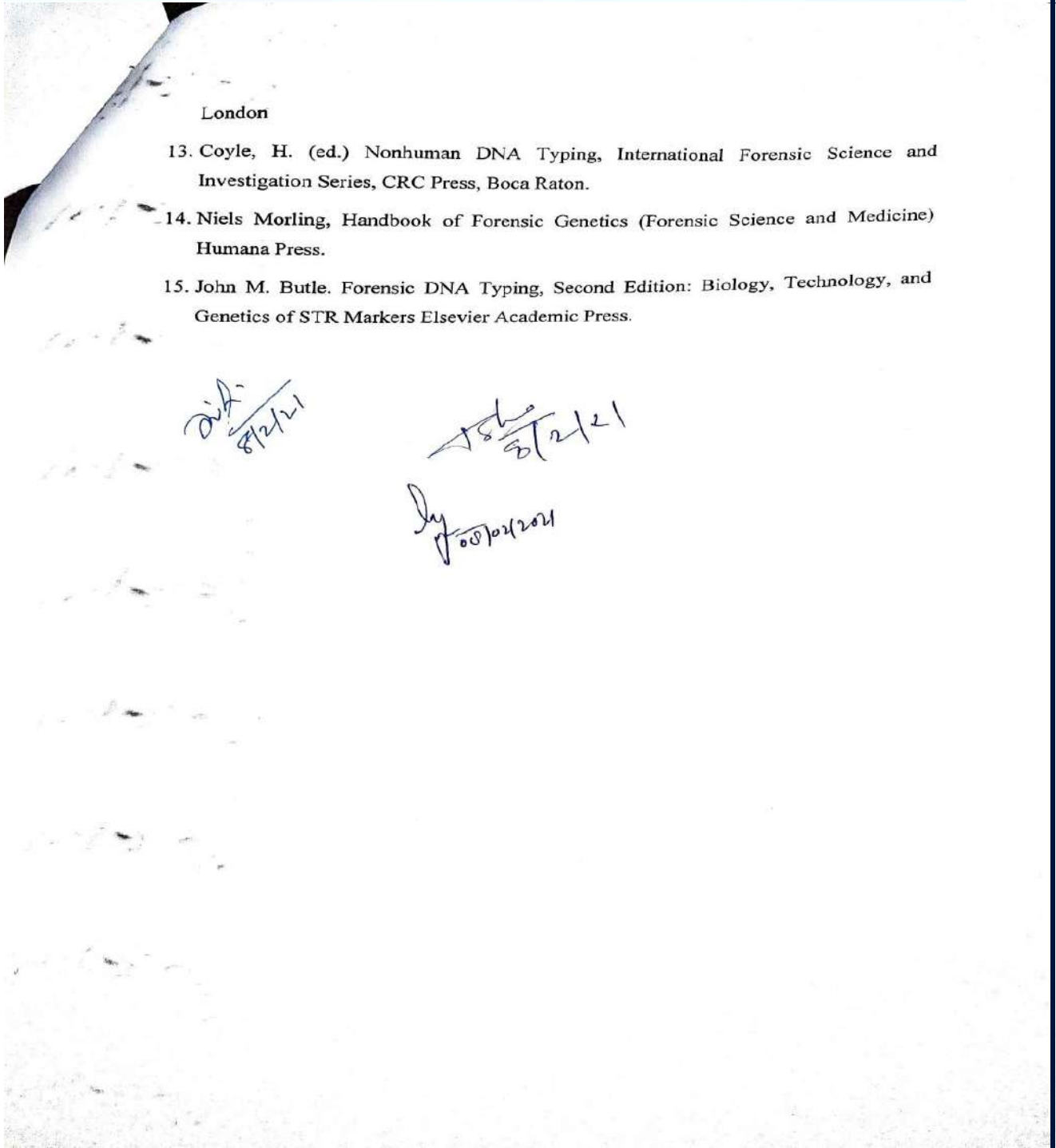
UNIT -V

Detection techniques- RFLP, PCR amplifications, Massive parallel sequencing, Y- STR, Advance Cloning methods, Analysis of SNP, DNA chip technology- Microarrays Cell free DNA, mi-RNA and its role in forensic science, RNAseq, Chip-Seq, Match probability - Database, DNA typing from blood, semen, bone and teeth and the use of DNA typing in wildlife investigations

Recommended Books:

1. Khan, Javed I., Ho, Mat H. Analytical Methods in Forensic Chemistry. New York: Working Procedure Manual Chemistry/Toxicology/Explosives/Narcotics, DFS Pub. New Delhi
2. Kennedy, Thomas J., Christian, Jr., Donnell Basic Principles of Forensic Chemistry, Springer
3. Saferestein, Criminalistics: An Introduction to Forensic Science. Prentice Hall
4. Maudham.B.et.al; Vogel's Textbook of Quantitative Chemical. Analysis, Longman
5. John D. DeHaan ; Kirk's Fire Investigation, Prentice Hall Eaglewood Cliffs, N.J
6. Yinon J; Modern Methods & Application in Analysis of Explosives, John Wiley.
7. C.A. Watson; Official and standardized Methods of Analysis. Royal Society of Chemistry, UK.
8. Goutam, M. P. and Goutam S Analysis of Plant Poison, Selective & Scientific Books, New Delhi.
9. Parikh C.K; Text Book of Medical Jurisprudence Forensic Medicines and Toxicology. CBS Pub. New Delhi.
10. Stern, C. (1964) : Principles of Human Genetics, Freeman, California.
11. Chowdhari, S. (1971) : Forensic Biology, B P R & D, Govt, of India.
12. Dunsford, I and Bowley, C. (1967) : Blood Grouping Techniques, Oliver & Boyd,

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London

13. Coyle, H. (ed.) Nonhuman DNA Typing, International Forensic Science and Investigation Series, CRC Press, Boca Raton.
14. Niels Morling, Handbook of Forensic Genetics (Forensic Science and Medicine) Humana Press.
15. John M. Butle. Forensic DNA Typing, Second Edition: Biology, Technology, and Genetics of STR Markers Elsevier Academic Press.

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**List of Courses Focus on Employability/ Entrepreneurship/
Skill Development**

Department : Forensic Science

Programme Name : B.Sc.

Academic Year : 2020-21

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	LS/FSC/GE-101/L	Elementary Forensic Science
02.	LS/FSC/GE-101/P	Practical's Based on Crime Scene Investigation
03.	ECA	Extra Curricular Activities/ Tour/Field Visit/ Industrial Training/ NSS/Swachchhata/ Vocational Training/ Sports/Others
04.	LS/FSC/GE-102/L	Applied Forensic Science
05.	LS/FSC/GE-102/P	Practical's Based on Applied Forensic Science
06.	ECA	Extra Curricular Activities/ Tour/Field Visit/ Industrial Training/ NSS/Swachchhata/ Vocational Training/ Sports/Others
07.	LS/FSC/GE-303-L	Crime Scene Management
08.	LS/FSC/GE-303-P	Practical's Based on Crime Scene Management
09.	LS/FSC/SEC-301-L	Introduction To Biometry
10.	LS/FSC/GE-404-L	Advanced Forensic Science
11.	LS/FSC/GE-404-P	Practical's Based on Advanced Forensic Science
12.	LS/FSC/SEC-402-L	Handwriting Identification And Recognition


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Scheme and Syllabus

B.Sc. Hon's Forensic Science

Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
I	Core-1	LS/FSC/C-101L	Introduction to Forensic Science	4	4
	Core -1 Practical	LS/ FSC/C-101P	Practicals based on Crime Scene	2	4
	Core -2	LS/ FSC/C-102L	Crime and Society	4	4
	Core -2 Practical	LS/ FSC/C-102P	Practicals based on Crime and Society	2	4
	Generic Elective - 1 (GE- I)	LS/ FSC/GE-101/L	Elementary Forensic Science	4	4
	Generic Elective - Practical	LS/ FSC/GE-101/P	Practicals based on Crime Scene Investigation	2	4
	Ability Enhancement Compulsory Course (AECC)	LS/ FSC/AECC-101/EC	English Communication / MIL (Hindi Communication)	4*	4
	ECA	LS/FSC/ECA/	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
Total				24	28
II	Core-3	LS/FSC/C-203-L	Criminal Law	4	4
	Core -3 Practical	LS/FSC/C-203-P	Practicals based on preparing schedules	2	4
	Core -4	LS/FSC/C-204-L	Forensic Psychology	4	4
	Core -4 Practical	LS/FSC/C-204-P	Practicals based on Forensic Psychology	2	4
	Generic Elective - 2 (GE-2)	LS/FSC/GE-202-L	Applied Forensic Science	4	4
	Generic Elective - Practical	LS/FSC/GE-202-P	Practicals based on Applied Forensic Science	2	4
	Ability Enhancement Compulsory Course (AECC)	LS/FSC/AE-201/ES	Environmental Science	4*	4
	ECA		ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/	2	(2)



			vocational Training/ Sports/ others		
			Total	24	28
	SUMMER Internship: 15 days		Swayam Swachhta / NSS / Industrial Tour/ others	2	100
III	Core-5	LS/FSC/C-305-L	Forensic Dermatoglyphics	4	4
	Core -5 Practical	LS/FSC/C-305-P	Practicals based on Finger Prints	2	4
	Core -6	LS/FSC/C-306-L	Technological Methods in Forensic Science	4	4
	Core -6 Practical	LS/FSC/C-306-P	Practicals based on Technological Methods	2	4
	Core - 7	LS/FSC/C-307-L	Criminalistics	4	4
	Core – 7 Practical	LS/FSC/C-307-P	Practicals based on Crime scene samples	2	4
	Generic Elective - 3 (GE-3)	LS/FSC/GE-303-L	Crime Scene Management	4	4
	Generic Elective - Practical	LS/FSC/GE-303-P	Practicals based on Crime Scene Management	2	4
	Skill Enhancement Course (SEC - 1)	LS/FSC/SEC-301-L	Introduction to Biometry	4*	2 (4)
			Total	28	34
IV	Core-8	LS/FSC/C-408-L	Forensic Chemistry	4	4
	Core -8 Practical	LS/FSC/C-408-P	Practicals based on Forensic Chemistry	2	4
	Core -9	LS/FSC/C-409-L	Questioned Documents	4	4
	Core -9 Practical	LS/FSC/C-409-P	Practicals based on Questioned Documents	2	4
	Core - 10	LS/FSC/C-410-L	Forensic Biology	4	4
	Core -10 Practical	LS/FSC/C-410-P	Practicals based on Forensic Biology	2	4
	Generic Elective - 4 (GE-4)	LS/FSC/GE-404-L	Advanced Forensic Science	4	4
	Generic Elective - Practical	LS/FSC/GE-404-P	Practicals based on Advanced Forensic Science	4	4
	Skill Enhancement Course (SEC -2)	LS/FSC/SEC-402-L	Handwriting Identification and Recognition	4*	2 (4)
			TOTAL	28	34
	SUMMER Internship: 15 days		Swayam Swachhta / NSS / Industrial/ others	2	100
V	Core-11	LS/FSC/C-511-L	Forensic Ballistics	4	4



Three year UG Course in Forensic Science
Semester – IV LS/FSC/GE-404 L
Generic Elective-4
Advanced Forensic Science

Unit I: Forensic psychology

Forensic psychology, Importance of forensic psychology, Role of forensic psychology in Civil and Criminal cases, Modus Operandi and its role in criminal investigations, criminal profiling, methods of investigations, Narco analysis, Hypnosis, Brain Fingerprinting.

Unit II: Wildlife Forensics

Introduction to Wild life Forensics, Protected and endangered species of Animals and Plants, Identification of wild life materials, Identification of Pug marks of various animals, Forensic (medico-legal) necropsy of wildlife, Identification of Pollen grains.

Unit III: Forensic Anthropology

Definition and Scope, Identification of different types of bones, Age and gender determination from skull, Pelvis, and skeletal remains, Significance of Somatoscopy, Somatometry, Osteometry and Craniometry in Personal Identification.

Unit IV: Forensic Genetics

General principles of DNA extraction and PCR, Personal identification techniques - PCR, RFLP, Y-STR, Mitochondrial DNA, DNA profiling applications in disputed paternity cases, child swapping, missing person's identity.

Recommended Books:

1. Encyclopedia of criminal and deviant behavior (2001) Clifton D. Pryart, Editor in chief routeledge, Taylor and Francis group.
2. David Canter, Forensic Psychology, Oxford University Press.
3. Irving B. Weiner, Allen K. Hess. The Handbook of Forensic Psychology. John Wiley & Sons.
4. Denis Howitt. Introduction to forensic and criminal psychology . Pearson Education, Ltd.
5. Jane E. Huffman, John R. Wallace Wildlife Forensics: Methods and Applications, Wiley Blackwell.



5. Barry, A.J. Fisher.; Techniques of Crime Scene Investigation, 6th Edition Ed. C.R.C Press NY(2003)
6. Nordby, J Deed Reckoning ; The Art of Forensic Detection, CRC Pre LLC(2000)
7. Eckett, W.G & James S.H; Interpretation of Bloodstains, Evidence of Crime Scene, Elsevier Pub. NY (1989)

Three year UG Course in Forensic Science
Semester – III LS/ FSC/GE-303 P
Generic Elective -3 Practical
Practicals based on Crime Scene Management

1. Reconstruction of crime scene.
2. Searching of physical evidence at crime scene.
3. Collection, packing and preservation of Physical evidences
4. Lifting of prints and impressions by caste and replicas.
5. Evaluation of Crime scene and photographs.
6. Sole prints comparison and their lifting from the scene of crime.



Three year UG Course in Forensic Science
Semester – III LS/FSC/GE-303 L
Generic Elective-3

Crime Scene Management

Unit I: Crime Scene Management

Introduction to Crime scene investigation, Types of Crime scene, Locard's Exchange Principle, Expert's Team composition, Methodological Approach to processing the Crime scene, Sketching and mapping, Role of First responding Officer.

Unit II: Processing a Crime Scene

History and Development of Forensic Science, Basic Principles of Forensic Science, Organizational structure of Forensic Science Laboratories at State and Central level, White Collar crime, Organized Crimes, Economic crimes, Cyber crimes, Crime against children and Women.

Unit III: Searching the Crime Scene

Searching the Crime scene, Types of Searches, Zone Search: Ever Widening, Circle Strip Search, and Grid Search, Indoor searches and outdoor searches, searching of pattern and marks, Collection.

Unit IV: Collection and Packaging of evidence

Physical Evidences: Collection, Packaging and Forwarding of different types of evidences to the laboratories, Techniques for Handling Evidence, Biological evidence, Impression Evidence, Firearms and Ballistic Evidence, Drug Evidence, Toxicological Evidences.

Recommended Books:

1. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.
2. Saferstein: Forensic Science Handbook, Vol I, II & III, Prentice Hall Inc. USA.
3. Saferstein: Criminalistics, 1976, Prentice Hall Inc. USA.
4. Siegel, J. A., Saukko, P. J. And Knapfer, G.C., Encyclopedia of Forensic Sciences, Academic Publishers, London .



7. Michael J. Deverlanko et al: Hand Book of Toxicology CRC Press, USA.
8. Parikh C.K; Text Book of Medical Jurisprudence Forensic Medicines and Toxicology. CBS Pub. New Delhi.
9. Arms Acts, 1959 and Arms Rule, 1962.
10. Working procedure Manual: Ballistics, DFS New Delhi, Publication, 2005.
11. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.

Three year UG Course in Forensic Science
Semester – II LS/ FSC/GE-202 P
Generic Elective -2 Practical
Practicals based on Applied Forensic Science

1. Characterization of blood by Presumptive test and Crystallization assay
2. Identification of Saliva, Semen, Urine by Preliminary tests.
3. Analysis of narcotic drugs.
4. Identification of Dhatura alkaloids by TLC
5. Determination of methanol and ethanol in liquor sample.
6. Detection of adulterant in vegetable oil
7. Identification of firearms, cartridges, bullets, gunpowder, etc.
8. Matching bullets and cartridge cases by comparison microscope.



Three year UG Course in Forensic Science
Semester – II LS/FSC/GE-202 L
Generic Elective-2
Applied Forensic Science

Unit I: Forensic Biology

Preliminary and Confirmatory examination of Blood, Saliva, Semen, Urine and its Forensic Significance. Microscopic examination of Human and Animal Hair, Importance of Wild Life Forensics and Identification of Pug marks of various animals. DNA Fingerprinting in Forensic Science.

Unit II: Forensic Medicine and Toxicology:

Poisons–Definition, Scope, Classification, Legislations concern to poisoning in India, Medico-legal Autopsy, Medico-legal Report, P M Findings in unnatural death, Introduction to methods of isolation of poison from Viscera, Collection and Preservation of viscera in fatal cases.

Unit III: Forensic Chemistry

Definition and Scope, Examination of Fire and Arson, Country made and Illicit liquor, Vitriolage cases, Analysis of Petrol and Diesel, Drugs: Definition, Classification and legislations, Introduction to Narcotic, Depressants, stimulants, and Hallucinogens, Designer Drugs & Nootropics.

Unit IV: Forensic Ballistics

Ballistics: Definition and scope, Firearms: Definition, Classification and Characteristics, Ammunition: Definition as per Indian Arms Act and classification, General Introduction to explosives.

Recommended Books

1. Richard Saferstein; Forensic Science Hand Book, Vol II Prentice Hall, Englewood Cliff, NJ.
2. Goutam Shubhra. ; An Introduction to Forensic Hair Examination; Selective and Scientific Book, New Delhi
3. Saferstein R. – Criminalistics Prentice Hall, Inc, New York.
4. Working procedure manual: Biology/ Serology; DFS, New Delhi
5. Saferstein, Criminalistics: An Introduction to Forensic Science. Prentice Hall
6. Goutam, M. P. and Goutam S Analysis of Plant Poison, Selective & Scientific Books, New Delhi.



7. Esharenana, Adoni, Frame works for ICT Policy Government, Social and Legal Issues. Information Science Reference, Harsey, New YORK.
8. Robert C. Newman ,Computer Forensics: Evidence Collection and Management Auerbach Publications.
9. Eoghan Casey , Handbook of Computer Crime Investigation: Forensic Tools and Technology Academic Press
10. Clark, Franklin, and Diliberto, Ken, (1996). Investigating computer Crime, CRC Press, Boca Raton, Florida, USA

Three year UG Course in Forensic Science
Semester – ILS/ FSC/GE-101P
Generic Elective -1 Practical
Practicals based on Crime Scene Investigation

1. Sketching and Photography of Crime scene.
2. Searching and collection of physical evidence at crime scene.
3. Recording and Identification of Fingerprints.
4. Development of latent finger print on glass, paper, polished surface.
5. Examination of Erasures on Questioned document
6. Comparison of Handwriting and Signatures.
7. Imaging of hard disc, restoration of deleted file.
8. Password cracking and e-mail tracking.



Three year UG Course in Forensic Science
Semester – ILS/FSC/GE-101L
Generic Elective-1
Elementary Forensic Science

Unit I: Elementary Forensic Science

Forensic Science and its branches, Principles of Forensic Science; Scene of Crime – Types, Sketching and Searching methods, Chain of custody; Collection, packing and forwarding of Physical evidences; Forensic Experts; Introduction to IPC, IEA, CrPC.

Unit II: Criminology and Police Science

Crime and Criminal, Criminology and Penology; Classification of Offences under IPC; Police Science and Organizational structure of Police; State Armed Force (SAF), Home Guard, Research and Analysis Wing (RAW), CID, CBI, BPR&D and Interpol.

Unit III: Finger Prints and Questioned Documents

Questioned Documents: Definition, Classification Types, Principles of Hand writing Identification and its Characteristics Fingerprints: History, Classification, Development, Pattern, Types and characteristics for personal identification.

Unit IV: Cyber Forensics

Cyber Forensic, Cyberspace, Computer crime, LAN, WAN, MAN, IT ACT 2000, OSI Model, Basic principle of security, Active attack, Passive attack, Basic of Forensic Speaker Identification, Hacking and Types of Hackers, Basic of Cryptography and Steganography.

Recommended Books:

1. Hilton; O. Scientific Examination of Questioned Documents, Elsevier, NY.
2. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi.
3. Wilson R. Harrison; Suspect Documents Their Scientific Examination.
4. Saferestein, Criminalistics: An Introduction to Forensic Science. Prentice, Hall.
5. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.
6. Relevant sections of Information technology Act 2000.



6. Vincent J. M. Di Maio, Suzanna E. Dana Handbook of forensic pathology CRC/Taylor & Francis.
7. Krogman, W.M. And Iscan, M. (1987): Human Skeleton in Forensic Medicine Charles & Thomas, U.S.A.
8. Nath, S An Introduction to Forensic Anthropology. Gian Publishing House, New Delhi.
9. A Seigel, P.J Saukoo and G C Knupfer; Encyclopedia of Forensic Sciences Vol. I, II and III, Acad. Press (2000)
10. Beals, R.L. and Hoizer, H. (1985): An introduction to Anthropology, Macmillan, New Delhi.
11. Saferstein, Richard, Handbook of Forensic Science, Vol. I, II, (Ed.) Prentice Hall, Eaglewood Cliffs, NJ.
12. William Goodwin, Adrian Linacre, SibteHadi; An introduction to forensic genetics John Wiley &son's ltd, UK.
13. John M. Butler. Forensic DNA Typing, Second Edition: Biology, Technology, and Genetics of STR Markers Elsevier Academic Press.
14. Siegel, J.A., Saukko, P.J., Knupfer, G. C., Encyclopedia of Forensic Science, Academic Press, London, 2000.
15. Evett, I.W. & Weir, B.S. 1998 Interpreting DNA Evidence: Statistical Genetics for Forensic Scientists. Sunderland Mass: Sinauer.

Three year UG Course in Forensic Science
Semester – IV LS/ FSC/GE-404 P
Generic Elective -4 Practical
Practicals based on Advanced Forensic Science

1. Identification of pollen grains
2. Identification of Pug marks of animals
3. Determination of sex from Skull Sutures & Pelvis
4. Determination of age from teeth & Skull
5. DNA extraction of conventional method
6. DNA typing by PCR



B.Sc IIIrd Semester

LS/FSC/SEC/301-L

Skill Enhancement Course (SEC-1)

Introduction to Biometrics

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

- The fundamental principles on which the science of fingerprinting is based.*
- Fingerprints are the most infallible means of identification.*
- The world's first fingerprint bureau was established in India.*
- Biometrics uses in different aspects.*
- Different types of Biometric parameters*

Unit 1: Definition of Biometrics, Features and function of biometric system, working of biometrics, Classification of biometric systems – physical and behavioral. Strength and weakness of physical and behavioral biometrics.

Unit 2: Physical Biometrics: Fingerprints, Iris, Retina, Facial recognition, Hand geometry, DNA.

Unit 3: Behavioral Biometrics: Speaker recognition, Signature, Gait biometrics.

Unit 4: Biometric parameters: FM, FNM, FTC, FTE, FAR, FRR, EER, ROC, DET; Emerging Biometric Technologies.

Suggested Readings:

1. J.E. Cowger, Friction Ridge Skin, CRC Press, Boca Raton (1983).
2. D.A. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis, CRC Press, Boca Raton (2000).
3. C. Champod, C. Lennard, P. Margot and M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton (2004).
4. Lee and Gaensle's, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).

Handwritten signatures and initials in blue ink.

Handwritten signature in blue ink.

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Bilaspur (C.G.)



B.Sc IVth Semester

LS/FSC/SEC/402-L

Skill Enhancement Course (SEC-2)

Handwriting Identification and Recognition

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

- a. The importance of examining questioned documents in crime cases.*
- b. The tools required for examination of questioned documents.*
- c. The significance of comparing hand writing samples.*
- d. The importance of detecting frauds and forgeries by analyzing questioned documents.*

Unit 1: Handwriting Identification

Basis of handwriting identification. Characteristics of handwriting – scope and application. Class and individual characteristics. Arrangement, alignment, margin, slant, speed, pressure, spacing, line quality, embellishments, movement and pen lifts. Factors influencing handwriting – physical, mechanical, genetic and physiological.

Unit 2: Handwriting Examination

Basis of handwriting comparison. Collection of handwriting samples. Forgery detection. Counterfeiting. Examination of altered and erased documents. Tools used in handwriting examination.

Unit 3: Handwriting Recognition

Basis of handwriting recognition. Off-line and on-line handwriting recognition. Steps involved in handwriting recognition – pre-processing, feature extraction and classification. Applications of handwriting recognition.

Unit 4: Basic tools for examination of Documents

Application of Basic tools for the examination of Questioned document, Ultraviolet, Visible and Fluorescence Spectroscopy. Photomicrography, Microphotography. Video Spectral Comparator, Electrostatic Detection Apparatus.

Suggested Readings:

1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton (1982).
2. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).
3. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi.
4. Wilson R. Harrison; Suspect Documents Their Scientific Examination.
5. Saferstein, Criminalistics: An Introduction to Forensic Science. Prentice, Hall.
6. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.

Sharma *Sharma* *Sharma*



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**List of Courses Focus on Employability/ Entrepreneurship/
Skill Development**

Department : Forensic Science

Programme Name : M.Sc.

Academic Year : 2020-21

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	IFSC704	Question Document
02.	IFSC706	Practical Based on Question Document
03.	IFSC 1002 (F)	Question Document
04.	IFSC 1002 (G)	Forensic Photography
05.	IFSC 1002 (H)	Practical Based on Biometrics (Through Portrait Parle Method)
06.	IFSC 1003 (F)	Practical Based on Question Document
07.	IFSC 1003 (G)	Practical Based on Forensic Photography
08.	IFSC 1003 (H)	Practical Based on Biometrics (Through Portrait Parle Method)

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BILASPUR (C.G.)**

Scheme and Syllabus



Department of Forensic Science, GG'V Bilaspur

Semester – VII					
Semester	Paper Code	Paper	Title of the Paper	Hours/Week	Credits
Seventh Semester	IFSC701	I	Forensic science & Criminology	4	3
	IFSC702	II	Forensic techniques & Instrumentation	4	3
	IFSC703	III	Crime Scene Management	4	3
	IFSC704	IV	Questioned Documents	4	3
	IFSL705	V	Practical based on crime scene search study	6	3
	IFSL 706	VI	Practical based on questioned document	6	3
	IFSS 707	VII	Seminar	2	2
Credits					20
Semester – VIII					
Eighth Semester	IFSC801	I	Instrumental analysis-Chemical & Physical	4	3
	IFSC802	II	Instrumental Analysis – Biological Methods	4	3
	IFSC803	III	Forensic Anthropology and Finger prints	4	3
	IFSC804	IV	Forensic Chemistry and Toxicology	4	3
	IFSL 805	V	Practical based on Forensic Anthropology and Finger prints	6	3
	IFSL 806	VI	Practical based on Chemistry and toxicological analysis	6	3
	IFSS 807	VII	Seminar	2	2
Credits					20
Semester IX					
Ninth Semester	IFSC901	I	Computer Forensics and Digital investigations	4	3
	IFSC902	II	Forensic Ballistics and Physics	4	3
	IFSC903	III	Forensic Biology and Serology	4	3
	IFSC904	IV	Forensic Medicine	4	3
	IFSL905	V	Practical Based on Forensic Ballistics and Physics	6	3
	IFSL906	VI	Practical Based on Forensic Biology and Serology	6	3
	IFSC907	VII	Seminar	2	2
Credits					20

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Department of Forensic Science, GG'V Bilaspur

IFSC 1001	I	Quality Management & Research Methodology	4	3	
IFSC 1002		Elective Papers	4	3	
IFSC 1002 (A)	II	Advanced Forensic Chemistry			
IFSC 1002 (B)		Advanced Forensic Toxicology and Pharmacology			
IFSC 1002 (C)		Drugs of Abuse			
IFSC 1002 (D)		Advanced Forensic Physics			
IFSC 1002 (E)		Advanced Forensic Ballistics			
IFSC 1002 (F)		Questioned Documents			
IFSC 1002 (G)		Forensic Photography			
IFSC 1002 (H)		Biometrics (Through portrait Parle Technique)			
IFSC 1002 (I)		Advanced Forensic Biology			
IFSC 1002 (J)		Advanced Forensic Serology & Immunology			
IFSC 1002 (K)		Advanced Forensic Genetics & DNA Profiling			
IFSL 1003			Elective Practical's	6	4
IFSL 1003 (A)		III	Practical based on Advanced Forensic Chemistry		
IFSL 1003 (B)	Practical based on Advanced Forensic Toxicology and Pharmacology				
IFSL 1003 (C)	Practical based on Drugs of Abuse				
IFSL 1003 (D)	Practical based on Advanced Forensic Physics				
IFSL 1003 (E)	Practical based on Advanced Forensic Ballistics				
IFSL 1003 (F)	Practical based on Questioned Documents				
IFSL 1003 (G)	Practical based on Forensic Photography				
IFSL 1003 (H)	Practical based on Biometrics (Through portrait Parle Technique)				
IFSL 1003 (I)	Practical based on Advanced Forensic Biology				
IFSL 1003 (J)	Practical based on Advanced Forensic Serology & Immunology				
IFSL 1003 (K)	Practical based on Advanced Forensic Genetics & DNA Profiling				
IFSD 1004			Dissertation		10
Credits				20	
Total Credits				80	



Five Year Integrated UG/PG Course in Forensic Science
Semester –VII, IFSC- 704

Paper – IV

Questioned Documents

Maximum Marks: 100

Allotted credits: 03

UNIT I

Nature and problems of Document examination, Classification of documents, Types of Forensic Documents; Collection, handling, preservation, marking and forwarding of documents to the laboratory; Writing instruments and their characteristics.

UNIT II

Principle of handwriting identification, Hand writing and its characteristics, Individual characteristics, Factors affecting hand writing, Samples for comparison and comparison of handwriting, Examination of Signature characteristics, Disguised, Indented and secrete writings, Anonymours letters.

UNIT III

Alterations in Documents, Examination of Paper & Ink, Examination of typed documents, Examination of Seal, rubber & other mechanical impressions, Handling and examination of charred documents, Examination of Forged currency notes.

UNIT IV

Forgery, Methods of Forgery, Age determination of documents, Basic tools needed for Forensic document examination, Photography of documents, Principle and Forensic significance of Video Spectral comparator (VSC), Electrostatic detection apparatus (ESDA).

Recommended Books

1. Hilton; O. Scientific Examination of Questioned Documents, Elsevier, NY
2. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi
3. Wilson R. Harrison; Suspect Documents Their Scientific Examination, Universal Law Pub. Delhi Indian
4. Hard less H.R; Disputed Documents, Handwriting and Thumbs – Print identification, profusely illustrated, Law Book, Allahabad
5. Morris Ron N. Forensic Handwriting Identification; AcadPress, London.
6. Roy A Huber, A.M. Headrick; Handwriting Identification- Facts and Fundamental, CRC Press
7. Laboratory working procedure manual, Documents DFS, New Delhi, 2005



Department of Forensic Science, GG'V Bilaspur

**Five Year Integrated UG/PG Course in Forensic Science
Semester –VII, IFSL-706
Paper – VI**

Practical Based on Questioned Documents

Maximum Marks: 100

Allotted credits: 03

1. Examination of Erasures on Questioned document.
2. Examination of Obliteration on Questioned document.
3. Examination of Addition on Questioned document.
4. Decipher unknown Secret Writings.
5. Chromatographic comparison of different ink.
6. Comparison of Handwriting and Signatures.

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Five Year Integrated UG/PG Course in Forensic Science
Semester – X, IFSE- 1002 (f)
Paper –II

Questioned Documents

Maximum Marks: 100

Allotted credits: 03

UNIT – I

Questioned Document—Definition, Nature and History of document examination, Classification of Forensic documents-Admitted, Request and Typescript specimens, Holographic documents, Care and Handling of documents, Basic tools needed for Forensic Document Examination - Hand lens, Stereo microscope, Electrostatic detection device (EDD), Video Spectral Comparator (VSC)

UNIT – II

Handwriting : Principle, General qualities, Writing habits, Individual Characteristics; Factors that causes changes in Handwriting, Systematic Examination of Handwriting; Examination of signatures, Characteristics of genuine and forged signatures; Alteration of Documents, Secret writings, Anonymus writing, Disguised writing, indented writings, Charred documents.

UNIT – III

Forgery : Various types of forgery and their examination, Determination of sequence of strokes; Age of Documents, Examination and Identification of Paper, Ink, Typescripts, seal, rubber, Carbon copies & other mechanical impressions, counterfeiting and examination of forged currency notes, Presentation of evidence in court.

UNIT -IV

Photography; Basic principles and techniques of Black & White and colour photography, Cameras and lenses, developments and printing, Different kinds of developers and fixers, Linkage of Cameras and Film negatives, Digital photography, digital water marking & digital imaging, Photogrammetry and videography, crime scene and laboratory photography IR, UV and Portrait photography, Recent developments in photography.

Recommended Books:

1. Ordway Hilton; Scientific Examination of Questioned Documents, Elsevier, NY
2. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi
3. Albert S Osborn; The Problem of Proof, 2nd Ed., Universal Law Pub. Delhi
4. Charles C. Thomas; I.S.Q.D. Identification System for Questioned Documents, Willy Prior Bates Springfield, Illinois, USA
5. Wilson R. Harrison; Suspect Documents Their Scientific Examination, Universal Law Pub. Delhi Indian Reprint
6. Goutam, Shubhra and Goutam M.P. Physical Evidences- Introduction and Bibliography on their forensic analysis, Shiv Shakti Book Traders, New Delhi.
7. Morris Ron N; Forensic Handwriting Identification, Acad. Press, London (2001)
8. Lerinson Jay; Questioned Documents, Acad Press, London
9. Mcmenamin, G. R; Forensic Linguistics- Advances in Forensic Stylistics, CRC
10. Ellen David; Questioned Documents- Scientific Examination, Taylor & Francis, Washington (1997)
11. H.L. Blitzer and J.Jacobia; Forensic Digital Imaging and Photography, Academic Press (2002)



Five Year Integrated UG/PG Course in Forensic Science
Semester – X, IFSEL- 1002 (g)
Paper –II

Forensic Photography

Maximum Marks: 100

Allotted credits: 03

Unit I:

Photography definition and scope, Introduction to Camera, lens, shutter depth of film

Unit II:

Videography, Videography for fire and crime scene, motor vehicle accident scene, surveillance photography and photographic aspects of injuries.

Unit III:

Basics of Digital photography, digital imaging, resolution, digital cameras, Monitors and scanners.

Unit IV:

Crime scene photography, photography of foot and fingerprints, Significance of photography in document examination, Photography in hit and run cases.

References:

1. David R Redsicker: The practical methodology Forensic photography: (second edition) CRC press
2. Duckworth J E: Forensic photography. Springfield I L. Charles C Thomas
3. Samsone SJ: Modern photography for police and fireman, Cincinnati TI OH WH. Anderson Company. 1971.



Five Year Integrated UG/PG Course in Forensic Science
Semester – X, IFSEL- 1002 (h)
Paper –II
Biometrics (Through Portrait parle technique)

Maximum Marks: 100

Allotted credits: 03

Unit I:

History and definition of Biometrics, Types, features and function of Biometrics, Gait scan and principles. Face, voice, signature scan and their principles.

Unit II:

Fundamentals of fingerprints, History, Fingerprint patterns, Definition of patterns: Arch, Loop and Whorl, Ridge counting and Ridge tracing, Henry's system of classification (primary to key classification).

Unit III:

DNA and its principles in personal identification

Unit IV:

Introduction to skin prints, lip prints, ear prints, bare foot prints and their significance in personal identification, conventional method for development of Latent fingerprints.

References:

1. Ellen David; Questioned Documents- Scientific Examination, Taylor& Francis, Washington (1997).
2. H.L. Blitzer and J. Jacobia; Forensic Digital imaging and Photography, Academic Press (2002).
3. R.E. Jaconson, S.F. Ray, G.G. Attridge, N.R. Oxford; The Manual of Photography- Photographic and Digital Imaging, 9th Ed., Focal Press (2000).
4. B.H.E. Jacobson, Ray GG Attridge; The Manual of Photography, Focal Press, London (1998).
5. Upton, Kobre, Brill; Photography, Pearson Education, Inc.
David R. Redsicker; the Practical Methodology of Forensic Photography- 2nd Ed. CRC Press LLC(2001).



Five Year Integrated UG/PG Course in Forensic Science
Semester - X, IFSEL- 1004 (e)
Paper -IV

Practical based on - Advanced Forensic Ballistics

Maximum Marks: 100

Allotted credits: 04

1. Chemical tests for powder residues (Walker's test) and Barrel wash
2. Identification of propellants
3. Examination and Comparison of fired Cartridges/cases (Caliber, firing pin, breech face, Extractor / Ejector marks etc.)
4. Determination of shot number from size and weight of shots.
5. Examination and Comparison of fired bullets - Caliber, rifling, characteristics, probable type of firearms
6. Characteristics of Firearms - Caliber, Choke, Trigger pull, Proof marks etc.
7. Determination of range of firing
8. Examination and Comparison of fired bullets - Caliber, rifling, characteristics, type of firearms
9. Restoration of Erased marking on firearm

Five Year Integrated UG/PG Course in Forensic Science
Semester - X, IFSEL-1004(f)
Paper -IV

Practical Based on Questioned Document

Maximum Marks: 100

Allotted credits: 04

1. Examination of ink by TLC
2. Examination of paper
3. Examination of rubber stamp.
4. Examination of typescripts and printed matters
5. Examination of photocopy documents for machine defect marks.
6. Detection and decipherment of alterations, additions and over writing.
7. Detection of forgeries including traced and simulated forgery and built up documents.
8. Decipherment of indented writings, secret writings and charred documents
9. Examination of security documents Currency notes, Stamp Papers and lottery tickets.
10. Examination of erasures-mechanical and chemical erasures.



Five Year Integrated UG/PG Course in Forensic Science
Semester - X, IFSEL- 1004 (g)
Paper -IV

Practical based on Forensic Photography

Maximum Marks: 100

Allotted credits: 04

1. Photography of crime scene
2. Photography of Tyre print impressions
3. Photography of Hanging
4. Photography of trace evidencde
5. Photography of vehicular accidents

Five Year Integrated UG/PG Course in Forensic Science
Semester- X, IFSEL- 1004 (h)
Paper-IV

Practical based on Biometrics (Through Potrait Parle Technique)

Maximum Marks: 100

Allotted credits: 04

1. Examination of photocopy documents for machine defect marks.
2. Detection and decipherment of alteration, additions and overwriting.
3. Detection of forgeries including traced and simulated forgery and built up documents.
4. Decipherment of indented writings, secret writings and charred documents.
5. Examination of security documents Currency notes, Stamp papers and Lottery tickets.
6. Examination of erasures-mechanical and chemical erasures.
7. Photography of documents/ Crime Scene.