



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

**Department : Forensic Science**

**Programme Name : Ph.D.**

**Academic Year : 2022-23**

**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
04.	DFSC-PP-04	Seminar

विभागाध्यक्ष  
HEAD  
फॉरेंसिक साइंस विभाग  
Department of Forensic Science  
गुरु घासीदास विश्वविद्यालय,  
Guru Ghasidas Vishwavidyalaya,  
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. III<sup>rd</sup> Semester (Course Code: LS/FSC/SEC/301-L) and B.Sc. IV<sup>th</sup> 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 VRET Entrance Examination was discussed and approved.

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08/02/21

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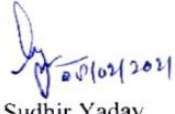
**Item No.4:** To Approve the Proposal of Pre-Ph.D. Course work Syllabus and Scheme of examination of the Department of Forensic Science.

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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**SYLLABUS**

(Pre-Ph.D. Coursework)

**DEPARTMENT OF FORENSIC SCIENCE**

**Paper-1 (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, AMOVA, 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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*Signature*  
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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. Danniel 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, Physio-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, Physiochemical 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.
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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 : 2022-23**

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

Sr. No.	Course Code	Name of the Course
01.	FSUATG1	Elementary Forensic Science
02.	FSUALG1	Practical's Based on Crime Scene Investigation
04.	FSUBTG1	Applied Forensic Science
05.	FSUBLG1	Practical's Based on Applied Forensic Science
07.	FSUCTG1	Crime Scene Management
08.	FSUCLG1	Practical's Based on Crime Scene Management
09.	FSUDTG1	Advanced Forensic Science
10.	FSUDLG1	Practical's Based on Advanced Forensic Science
11.	FSUATL1	Handwriting Identification And Recognition
12.	FSUBTL1	Introduction to Biometry

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**गुरु घासीदास विश्वविद्यालय**  
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)  
**कोनी, बिलासपुर - 495009 (छ.ग.)**



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## **Scheme and Syllabus**

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**UG COURSE IN FORENSIC SCIENCE**  
**(THREE YEARS / SIX SEMESTERS)**

Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
B.Sc I <sup>st</sup> Semester	Core-1	FSUATT1	Introduction to Forensic Science	3	3
	Core -1 Practical	FSUALT1	Practical's based on Crime Scene	2	4
	Core -2	FSUATT2	Crime and Society	3	3
	Core -2 Practical	FSUALT2	Practical's based on Crime and Society	2	4
	Generic Elective - 1 (GE-1)	FSUATG1	Elementary Forensic Science	3	3
	Generic Elective - Practical	FSUALG1	Practical's based on Crime Scene Investigation	2	4
	AEC(Ability Enhancement Course) 01	FSUATA1	Introduction to criminalistics	2	2
	SEC(Skill Enhancement Course) 01	FSUATL1	Handwriting Identification and Recognition	2	2
			<b>Total Credits</b>	<b>19</b>	
B.Sc II <sup>nd</sup> Semester	Core-3	FSUBTT1	Criminal Law	3	3
	Core -3 Practical	FSUBLT1	Practical's based on preparing schedules	2	4
	Core -4	FSUBTT2	Forensic Psychology	3	3
	Core -4 Practical	FSUBLT2	Practical's based on Forensic Psychology	2	4
	Generic Elective - 2 (GE-2)	FSUBTG1	Applied Forensic Science	3	3
	Generic Elective - Practical	FSUBLG1	Practical's based on Applied Forensic Science	2	4
	AEC(Ability Enhancement Course) 02	FSUBTA2	English/Hindi	2	2
	SEC(Skill Enhancement Course) 02	FSUBTL1	Introduction to Biometry	2	2



			<b>Total Credits</b>	<b>19</b>	
<b>B.Sc IIIrd Semester</b>	Core -5	FSUCTT1	Forensic Dermatoglyphics	3	3
	Core -5 Practical	FSUCLT1	Practical's based on Finger Prints	2	4
	Core -6	FSUCTT2	Technological Methods in Forensic Science	3	3
	Core -6 Practical	FSUCLT2	Practical's based on Technological Methods	2	4
	Core - 7	FSUCTT3	Criminalistics	3	3
	Core -7 Practical	FSUCLT3	Practical's based on Crime scene samples	2	4
	Generic Elective -3 (GE-3)	FSUCTG1	Crime Scene Management	3	3
	Generic Elective - Practical	FSUCLG1	Practical's based on Crime Scene Management	2	4
	AEC(Ability Enhancement Course) 03	FSUCTA3	Environmental Science	2	2
		<b>Total Credits</b>		<b>22</b>	
<b>B.Sc IV<sup>th</sup> Semester</b>	Core-8	FSUDTT1	Forensic Chemistry	3	3
	Core -8 Practical	FSUDLT1	Practical's based on Forensic Chemistry	2	4
	Core -9	FSUDTT2	Questioned Documents	3	3
	Core -9 Practical	FSUDLT2	Practical's based on Questioned Documents	2	4
	Core - 10	FSUDTT3	Forensic Biology	3	3
	Core -10 Practical	FSUDLT3	Practical's based on Forensic Biology	2	4
	Generic Elective -4 (GE-4)	FSUDTG1	Advanced Forensic Science	3	3
	Generic Elective - Practical	FSUDLG1	Practical's based on Advanced Forensic Science	2	4
	AEC(Ability Enhancement Course) 04	FSUDTA4	Wildlife Forensics	2	2
		FSUDECI	Summer Internship	6	



			<b>Total Credits</b>	<b>22+6</b>	
<b>B.Sc. V<sup>th</sup> Semester</b>	Core-11	FSUETT1	Forensic Ballistics	3	3
	Core -11 Practical	FSUEL1	Practical's based on Forensic Ballistics	2	4
	Core -12	FSUETT2	Forensic Toxicology	3	3
	Core -12 Practical	FSUEL2	Practical's based on Forensic Toxicological analysis	2	4
	Discipline Specific Elective-1	FSUETD1	Digital Forensics/	3	3
	Discipline Specific Elective-2	FSUETD2	Economic Offences	3	3
	Discipline Specific Elective Practical's-1	FSUEL1	Practical's based on Digital Forensics/ Practical's based on Economic offences	2	4
	Discipline Specific Elective Practical's-2	FSUEL2	Practical's based on Economic offences	2	4
	Discipline Specific Elective -3	FSUETD3	Forensic Serology	3	3
	Discipline Specific Elective -4	FSUETD4	Accident Investigations	3	3
	Discipline Specific Elective Practical's-3	FSUEL3	Practical's based on Forensic Serology /	2	4
	Discipline Specific Elective Practical's-4	FSUEL4	Practical's based on Accident Investigations	2	4
	AEC(Ability Enhancement Course) 05	FSUETA5	Introduction to Firearms and Explosives	2	2
			<b>Total Credits</b>	<b>22</b>	
<b>B.Sc. VI<sup>th</sup> Semester</b>	Core-13	FSUFTT1	Forensic Anthropology	3	3
	Core -13 Practical	FSUFLT1	Practical's based on Forensic Anthropology	2	4
	Core-14	FSUFTT2	Forensic Medicine	3	3





	Core -14 Practical	FSUFLT2	Practical's based on Forensic Medicine	2	4
	Discipline Specific Elective -5	FSUFTD5	DNA Typing	3	3
	Discipline Specific Elective -6	FSUFTD6	Modern Forensic Toxicology		
	Discipline Specific Elective Practical's-5	FSUFLD5	Practical's based on DNA Typing	2	4
	Discipline Specific Elective -6	FSUFLD6	Practical's based on Modern Forensic Toxicology		
			Seminar	2	
		FSUFDT1	Mini Project work	7	
			<b>Total Credits</b>	<b>17+7</b>	
			<b>Overall Total Credits</b>		

As per UGC CBCS guidelines, University / Departments have liberty to offer GE and SEC courses offered by any department to students of other departments. The No. of GE course is four. One GE course is compulsory in first 4 semesters each. In present scheme it is proposed to have minimum two GE courses (from one subject) in first two semester after which student can change two GE for another subject in III<sup>rd</sup> and IV<sup>th</sup> semester, so that all the student can have exposure of one additional subject. Compulsory Skill Enhancement Course proposed in semester III and IV which can be opted either in department or other department offering this course. There are Total Five Ability Enhancement Course (AEC) offered by Department.

  
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Semester – IFSUATG1

Generic Elective-1

Elementary Forensic Science

Credits: 3

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, Cr.PC.

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.

  
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**Suggested Readings:**

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.
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



**Semester – IFSUALG1**  
**Generic Elective -1 Practical**  
**Practical based on Crime Scene Investigation**

**Credits: 2**

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.





**Semester – II** **FSUBTG1**  
**Generic Elective-2**  
**Applied Forensic Science**

**Credits: 3**

**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.



**Suggested Readings:**

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. 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.



**Semester – II FSUBLG1**

**Generic Elective -2 Practical**

**Practical based on Applied Forensic Science**

**Credits: 2**

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.



**Semester – III** **FSUCTGI**  
**Generic Elective-3**  
**Crime Scene Management**

**Credits: 3**

**Unit I: Crime Scene Management**

Introduction to Crime scene investigation, Types of Crime scene, Lockard'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, Cybercrimes, 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.





**Suggested Readings:**

1. Shama, 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 Knupfer, G.C., Encyclopedia of Forensic Sciences, Academic Publishers, London
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 FSUCLG1**  
**Generic Elective -3 Practical**  
**Practical based on Crime Scene Management**

**Credits: 2**

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 – IV FSUDTG1**  
**Generic Elective-4**  
**Advanced Forensic Science**

**Credits: 3**

**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.



**Suggested Readings:**

1. Encyclopedia of criminal and deviant behavior (2001) Clifton D. Pryart, Editor in chief rout ledge, 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.
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 FSUDLG1  
Generic Elective -4 Practical  
Practical based on Advanced Forensic Science

Credits: 2

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.

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**Three-year UG Course in Forensic Science**  
**Semester –IFSUATL1**  
**Skill Enhancement Course (SEC)**  
**Handwriting Identification and Recognition**

**Credits: 2**

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

- a. The importance of examining questioned documents in criminal cases.*
- b. The tools required for examination of questioned documents.*
- c. The significance of comparing handwriting 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. Application 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, 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, 4<sup>th</sup> Edition, Foundation Press, New York (1995)
3. Albert S. Osborn; Questioned Documents, 2<sup>nd</sup> Edition, Universal Law Pub., Delhi.
4. Wilson R. Harrison; Suspected Documents and their Scientific Examination.
5. Saferestein, Criminalistics: An Introduction to Forensic Science. Prentice, Hall.
6. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.



**Three-year UG Course in Forensic Science**

**Semester – II FSUBTL1**

**Skill Enhancement Course (SEC)**

**Introduction to Biometry**

**Credit: 2**

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

- The importance of biometrics systems in criminal cases.*
- Knowledge and awareness regarding current and advanced biometric identification systems.*
- Use of biometrics in personal identification.*
- To provide information regarding the applications of biometric parameters and technologies.*

**Unit 1: Introduction to Biometrics**

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**

Physical biometrics: Fingerprints, Iris, Retina, Facial recognition, Hand geometry, DNA.

**Unit 3: Behavioral Biometrics**

Behavioral Biometrics: Speaker recognition, Signature, Gait biometrics

**Unit 4: Biometric Parameters**

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





**Suggested readings:**

1. Ross, Jain, Nandakumar, Introduction to Biometrics, Springer (2011)
2. Jucheng Yang, Biometrics, InTech, (2014)
3. Midori Albert, Biometrics - Unique and Diverse Applications in Nature, Science, and Technology, InTech (2014)

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

**Department : Forensic Science**

**Programme Name : M.Sc.**

**Academic Year : 2022-23**

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

Sr. No.	Course Code	Name of the Course
01.	FSPBTT1	Question Document
02.	FSPBTT6	Question Document
03.	FSPBTT7	Forensic Photography

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**गुरु घासीदास विश्वविद्यालय**  
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)  
**कोनी, बिलासपुर - 495009 (छ.ग.)**



**Guru Ghasidas Vishwavidyalaya**  
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)  
**Koni, Bilaspur - 495009 (C.G.)**

## **Scheme and Syllabus**



**M. SC. IN FORENSIC SCIENCE**  
**(TWO YEARS / FOUR SEMESTERS)**

		M.Sc.1 <sup>st</sup> semester		Hours/ week	Credit
M.Sc.1 <sup>st</sup> semester	Core -1	FSPATT1	Forensic Science & Criminology	3	3
	Core -2	FSPATT2	Crime Scene management	3	3
	Core -3	FSPATT3	Instrumental analysis in Forensic sciences	3	3
	Core -4	FSPATT4	Forensic Biology and Serology	3	3
	Lab -1	FSPALT1	Practical's Based on Crime Scene management	6	3
	Lab -2	FSPALT2	Practical's Based on Forensic Biology and Serology	6	3
		FSPAST1	Seminar	2	2
			<b>Total credits</b>		<b>20</b>
M.Sc.2 <sup>nd</sup> semester	Core -5	FSPBTT1	Questioned Documents	3	3
	Core -6	FSPBTT2	Forensic Genetics and DNA Profiling	3	3
	Core -7	FSPBTT3	Forensic Chemistry and Toxicology	3	3
	Core -8	FSPBTT4	Research Methodology and Ethics	3	3
	Elective- 1*	FSPBTD1	Forensic Psychiatry	3	3
	Elective- 2*	FSPBTD2	Wildlife Forensics AND Forensic Entomology		
	Lab -3	FSPBLT1	Practical's Based on Forensic Genetics and DNA Profiling	6	3
	Lab -4	FSPBLT2	Practical's Based on Forensic Chemistry and Toxicology	6	3
	Lab -5	FSPBLD1	Practical's Based on Forensic Psychiatry	6	3
	Lab -6	FSPBLD2	Practical's Based on Wildlife Forensics and Forensic Entomology		
		FSPBST1	Seminar	2	2
			Summer / Field/Industrial Training	--	2
			<b>Total Credits</b>		<b>26+2</b>
M.Sc.3 <sup>rd</sup> semester	Core -9	FSPCTT1	Computer Forensics and Digital investigations	3	3
	Core -10	FSPCTT2	Forensic Ballistics and Physics	3	3
	Core -11	FSPCTT3	Forensic Medicine	3	3
	Core -12	FSPCTT4	Forensic Anthropology	3	3
	Elective – 3**	FSPCTD1	Forensic Genomics, Proteomics and Bioinformatics	2	2
	Elective – 4**	FSPCTD2	Forensic Microbiology and Immunology	2	2





M.Sc. 4 <sup>th</sup> Semester	Lab- 7	FSPCLT1	Practical's Based on Computer Forensics and Digital investigations	6	3
	Lab- 8	FSPCLT2	Practical's Based on Forensic Ballistics and Physics	6	3
	Lab- 9	FSPCLD1	Practical's Based on Forensic Genomics, Proteomics and Bioinformatics	6	3
	Lab- 10	FSPCLD2	Practical's Based on Forensic Microbiology and Immunology		
	Open Elective	FSPCTO1	Modern advances in Drugs of abuse	2	2
		FSPCST1	Seminar		2
			<b>Total Credits</b>		<b>27</b>
	Elective- 5***	FSPDIT1	Recent Advancement in Forensic Chemistry	3	3
	Elective- 6***	FSPDIT2	Recent Advancement in Forensic Toxicology and Pharmacology	3	3
	Elective- 7***	FSPDIT3	Nano Forensics	3	3
	Elective- 8***	FSPDIT4	Recent Advancement in Forensic Physics	3	3
	Elective- 9***	FSPDIT5	Recent Advancement in Forensic Ballistics	3	3
	Elective- 10***	FSPDIT6	Recent Advancement in Questioned Documents and Fingerprints	3	3
	Elective- 11***	FSPDIT7	Recent Advancement in Forensic Photography	3	3
	Elective- 12 ***	FSPDIT8	Recent Advancement in Forensic Biology	3	3
	Elective- 13***	FSPDIT9	Recent Advancement in Forensic Serology & Immunology	3	3
		FSPDDT1	Dissertation		12
			<b>Total Credits</b>		<b>15</b>
			<b>Overall Credits</b>		<b>90</b>

\*Students can opt any one Elective paper.

\*\*Students can opt any one Elective paper.

\*\*\*Students can opt any one Elective paper.

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**M.Sc. Forensic Science**  
**Semester II- FSPBT1**  
**Questioned Documents**  
**(Core-5)**

**Maximum Marks: 100**

**Allotted credits: 03**

**UNIT I**

Nature and problems of Document examination, Classification of documents, Types of Forensic Documents; Collection of questioned Documents, Specimen and Requested handwriting, handling, preservation, marking and forwarding of documents to the laboratory; Writing instruments and their characteristics. Characteristic features in Handwriting: Principles of handwriting Identification, Comparison, Class and Individual Characteristic of Handwriting, Factors affecting hand writing.

**UNIT II**

Forgery, Types of Forgery, Examination of Forgery, Examination of Signature characteristics, Age determination of documents, 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. Basic tools needed for Forensic document examination, Photography of documents, Principle and Forensic significance of Video Spectral comparator (VSC), Electrostatic detection apparatus (ESDA). Disguised, Indented and secrete writings, Anonymous letters.

**UNIT III**

History and development of finger prints, Structure of ridged skin, Composition of Sweat Classification of finger Prints, pattern types, classification of Fingerprints (Primary to key classification), Ridge Counting, Ridge Tracing, and Minutiae Examination, Methods of taking fingerprint from living person: Rolled & Plain Searching of finger print evidence on crime scene.

**UNIT IV**

Chance Finger Prints: Conventional methods of development of latent finger prints, Development of Latent fingerprint: Physical, Chemical and Fuming method, Metal Deposition Techniques, Systematic approach to latent print processing, preserving and lifting of finger prints; Photography of Finger Prints, comparison of finger prints. Automatic Finger Print Identification system (AFIS), Expert evidence. Admissibility of Fingerprint, Admissibility of Fingerprint.



**M. Sc. in Forensic Science**

**Semester – IV FSPDTT6**

**Recent Advancement in Questioned Documents and Fingerprints**

**(Elective-10)**

**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, Anonymous 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.



**Course Outcome:** By the end of this course students will know about various questioned document and examination for forensic purposes.

**Learning Outcomes:**

1. Students will learn about various types of questioned document and their examination.
2. They will know about recent advancement in the tools and techniques used for the examination of questioned document.
3. They will also know about analysis and comparison of handwriting and signature samples.
4. They will also learn about basic principles of photography and recent advancement in digital 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)





**M. Sc. in Forensic Science**

**Semester – IV, FSPDTT7**

**Recent Advancement in Forensic Photography**

**(Elective-11)**

**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.

**Course Outcome:** By the end of this course students will have a basic idea about various advancement in tools and techniques used in forensic photography.

**Learning Outcomes:**

1. Students will know about various component of camera and their functions.
2. Students will learn about rules and regulation of photography and videography of various crime scene.
3. They will also know about basics of digital photography and recent advancement in photographic techniques.
4. They will also know about forensic significance of photography in document examination and pattern evidence analysis.



**Recommended Books:**

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 OH WH. Anderson Company. 1971