

**SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR**



**M.Sc. Forensic Science
Under Credit Based Course System
SEMESTER – II**

PSO2CFSC21

Fingerprints & Law (Criminal Justice System)

FINGERPRINT

UNIT-I

History and development of fingerprints, formation of ridges, composition of sweat, poroscopy, edgeoscopy, pattern area, ridge tracing, ridge counting, taking of fingerprints and palm prints from living and dead person, post mortem fingerprinting, forgery of fingerprints.

UNIT-II

Search of fingerprint, Chance fingerprint, latent and visible fingerprint, plastic fingerprints, development of latent fingerprint, conventional methods of development of fingerprints- fluorescent methods, magnetic powder method, fuming method, chemical method, etc., digital imaging and enhancement, photography of fingerprints, digital transmission and comparison of fingerprints, application of laser and other radiations to develop latent fingerprints, metal deposition method and development of latent prints of skin.

Preserving and lifting of fingerprints, basis of comparison, individual characteristics, various types of ridge characteristics.

UNIT - III

Classification of fingerprints for the comparison purpose, classification of fingerprints for recording purpose- symbols, numerical values, primary classification, secondary classification, subdivision and classification by ridge tracing and counting, sub classification of mixed type pattern, Henry system of classification, single digit classification, extension of Henry system, fingerprint bureau, AFIS

UNIT-IV

Criminal Justice System:

Section of Evidence act: 32,45,46,47,57,58,60,73,135,136,137,159

Section of Criminal Procedure code: 291,292,293

Section of Indian Penal Code:

Offence against Person: 299,300,302,304B,306,319,320,326,339,340,351,359,362,375,377

Offence against property: section 378,383,390,405,415,441,463,471,499,503,511.

Explosives Act, Wildlife/ environment protection act, law relating to poisons

Prison system in Criminal Justice.

Basic Texts & Reference Books:-

- 1) Personal Investigation through Fingerprints – Surinder Nath.
- 2) Fingerprints: Sir E.R.Henry.
- 3) Criminal Investigation: Practical Fingerprints, Thumb Impression, Handwriting Expert Testimony, Opinion Evidence – B.C.Bridge, M.Moner.
- 4) The Indian Penal Code – Y.V.Chandrachud.
- 5) Code of Criminal Procedure – Ratanlal Ranchodas.

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Forensic Chemistry

UNIT I

FORENSIC CHEMISTRY: Introduction, types of Cases/ Exhibits, preliminary screening, presumptive test (color & spot test), inorganic analysis, micro-chemical methods for analysis

Examination procedure involving standard method & instrumental techniques, analysis of beverages: alcoholic & non- alcoholic, country made liquor, illicit liquor & medicinal preparations containing alcohol & drugs as constituents.

Drugs of abuse: Introduction, Classification, drugs of abuse in sports, Narcotic drugs & Psychotropic Substances, Designer drugs & their Forensic Examination. NDPS Act 1985.

UNIT II

Arson: Chemistry of Fire, investigation and evaluation of clue material, analysis of arson exhibits by instrumental methods. Management of arson cases.

Analysis of trace evidence, cosmetics, dyes trap related evidence material, paints, pigments, fibers etc.

Examination of Petroleum Products: Various fractions & their commercial uses, standard methods of analysis of petroleum products for adulterations.

UNIT III

Quantitative & qualitative Forensic Analysis of Organic & Inorganic Industrial Products, Chemical Fertilizers, Insecticides, Pesticides, Metallic & Non-metallic products, consumer items such as gold, silver, tobacco, salts, acids, alkalis.

UNIT-IV

Explosives: classification, composition and characteristics of explosives, pyrotechniques, IEDs, explosion process and affects, types of hazards, effect of blast wave on structures, human etc., specific approach to scene of explosion, post-blast residue collection, reconstruction of sequence of events, evaluation and assessment of scene of explosion, systematic examination of explosives and explosion residue in the laboratory using chemical and instrumental techniques in the laboratory and interpretation of results.

Basic Texts & Reference Books:-

- 1) Criminalistics: An Introduction to Forensic Science – Richard Safferstein.
- 2) Crime Scene Management – M.S.Dahiya.
- 3) Forensic Science in Criminal investigation – B.R.Sharma.
- 4) Working procedure manual on chemistry (Directorate of Forensic Science).
- 5) Forensic Toxicology manual (Directorate of Forensic Science).
- 6) Narcotic drugs & Substance abuse – Debasis Baghchi.

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Forensic Ballistics

UNIT-I

Introduction to fire-arms: History and back ground of firearms, their classification and characteristics, identification of various parts of firearms. various component of small arms, smooth bore and rifled arms, different system and their functions, Rifling-various class characteristics, purpose of rifling, types of rifling and methods to produce rifling, trigger and firing mechanism, cartridge- firing mechanism, techniques and dismantling/assembling firearms, identification of origin, improvised/ country made firearms and constructional features.

Introduction to ammunition: Types of ammunition, classification and constructional features of different types of cartridge, types of primers and priming composition, propellants and their composition, velocity and pressure characteristics under different condition, various types of bullets and compositional aspects, latest trend in their manufacturing and design, smooth bore firearms projectile, identification of origin, improvised ammunition and safety for handling firearms and ammunition.

UNIT-II

Internal ballistics: Definition, ignition of propellants, shape and size of propellants, manner of burning, various factors affecting the internal ballistics lock time, ignition time, barrel time erosion, corrosion and gas cutting, equation of motion of projectile, projectile velocity determination, theory of recoil.

External ballistics: Principle problems of exterior ballistics, details on vacuum trajectory, base drag, yaw, shape of projectile and stability, ballistic co-efficient and limiting velocity.

UNIT-III

Terminal ballistics: Effect of projectile on hitting the target, function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullet, effect of instability of bullet, effect of intermediate targets, influence on range, cavitations- temporary and permanent cavities, ricochet and its effect, stopping power, wound ballistics, threshold velocity for penetration of skin/flash/bones, preparation of gel block, penetration of projectile in gel block and other targets, nature of wound of entry and exit, initial track with various ranges and velocities with various types of projectiles, explosive wounds, evaluation on injuries coursed due to shot gun, rifle, hand guns and country made firearms, methods of measurements of wound ballistics parameters, postmortem fire injuries.

UNIT-IV

Introduction to automated system of trajectory computation and automated management of ballistic data.(BDAS). Principles of practice of identification of firearms, ammunition and their components, different types of marks produced during firing process on cartridge and on bullet, techniques of obtaining test dies.

Time of firing- different methods employed & their Limitations, Stereo & Comparison Microscopy, Automated Bullet & Cartridge Comparison System.

Analysis of GSR – mechanism of formation of GSR sources & collection, spot test, Chemical test, Identification of Shooter & Instrumental methods of GSR analysis.

Basic Texts & Reference Books:-

- 1) Firearms in Criminal Investigations & Trials – B.R.Sharma.
- 2) Principles of Forensic Medicine including Toxicology – Nandi Apurba.
- 3) Parikh's Textbook of Medical Jurisprudence Forensic Medicine – C.K.Parikh.

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Preventive Forensics

UNIT I

Introduction: what is crime? relationship with crime, crime & media

Principle Facts, assertions & opinions, Criminal Psychology

Understanding Modus Operandi

Causes of crime: poverty, drug abuse, media, firearm ownership.

Rational choice theory, behaviorism, psycho-analytic theory, Social control theory, conflict theory, feminist criminology.

Recidivism, Facts about crime, offenders & Victimization

Why do Crime Occur? Need/ Insanity/ Greediness/Unawareness/Fame

UNIT II

Crime & Environment: location, crime & urbanization, crime in rural areas, re-creating rural qualities in urban environments, crime & urban regeneration, key principles for sustainably safe places, boundaries & edges. CCTV & street lighting effects on crime.

Targeting certain types of crime. Fear of crime- a problem in its own right.

UNIT III

Failure in Crime Control & Treatment: political whims, punishment, police, prosperity, relative poverty & social policy, economic methodology & evaluation, overview of effectiveness of Criminal Justice System in India. Sharing crime prevention policy & practice.

Rehabilitation centers' for criminals, Crime control models & frame work

UNIT IV

Future prospects: overview of future, opportunities & their reduction, changing nature of crime & criminal behavior, crime & human nature, organization & management, mainstreaming crime prevention, policy & governance, Private security & Personal profit, drugs & crime, exclusion or inclusion, a broader vision for social policy.

Research policy & practice intersection.

Basic Texts & Reference Books:-

- 1) Pathway & Crime Prevention: Theory policy & practice – France Alan.
- 2) Policy & planning in Criminology – Ram Ahuja.
- 3) Understanding Criminal Behaviour: Psychosocial approaches to criminality – Jones David W.
- 4) Crime Prevention: Facts, Fellacis the future – Shaftoe Henry.

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Criminology

UNIT I

Introduction

Criminology: Definition, Scope & Nature – Sub-areas of Criminology, Historical Development- Criminology as a science- Criminology & other Social Sciences.

Crime, a Fact of Life- Crime in India- Crime: Consensus View, Conflict View & Interactionist view- Legal Definition- Intention & motive – Sin & Crime – Costs of Crime- Case Analysis.

UNIT II

Theoretical approach to Study of Crime

Schools of Criminology- Classical School, Neo- Classical Schools

Cartographic School- The Geography of Crime- Biological Schools: Physiognomy and Phrenology, Biological determinism (Lombroso), Sheldon's Somato types, Sociobiology – Biosocial Theory: Biological Basis for Criminal Behaviour.

UNIT III

Victimology and Human Rights

Victimology: Definition and scope, History, Types: Positivist, Radical and Critical Role and Functions of Victimologists. Demographic characteristics; Victims of violent crimes, typologies of victims.

Human Rights: Definition, Historical Development, U. N. Universal Declaration of Human Rights.

Constitution of India- Fundamental Rights, Salient Features in the Code of Criminal Procedure, The Scheduled Castes and the Scheduled Tribes (Prevention of Atrocities Act, 1), The Rights of Children in India.

UNIT IV

Crime Typology

Conventional Crimes, White Collar Crimes, Cyber Crimes, Organized Crimes, Victimless Crimes, Terrorism.

Definition, Classification: Generic- IPC, Occasional Offenders, Professional Offenders, Chronic Offenders, Violent Offenders, Specific- Types of Robbery, Rapists, Killer, Terrorists.

Female Offenders- Juvenile Offenders.

Basic Texts & Reference Books:-

- 1) White Collar Crimes – Girish Mishra.
- 2) Forensic Criminology – Patherick Wayne H.
- 3) Female Criminality in India – Anju Bajpai.
- 4) Forensic Victimology: Examining violent crimes victims in investigative & legal context – Turvey Brent E.

Practicals-PS02CFSC24

1. Searching of Fingerprints at Crime Scene.
2. Fingerprints development using powder method.
3. Fingerprints development using chemical methods.
4. Fingerprints development using various light sources.
5. Preserving & lifting of Fingerprints.
6. To perform Henry Classification.
7. To take plain & rolled Fingerprints.
8. To identify patterns.
9. To perform ridge tracing & ridge Counting.
10. To identify ridge characteristics.
11. To compare Fingerprints found at crime scene.
12. Qualitative Analysis of Explosive Residues.
13. Detection & Determination of Narcotic & Psychotropic Substances.
14. Extraction & Identification of various drugs.
15. Detection of pesticides from viceras.
16. Analysis of arson exhibits by chemical method.
17. To study construction of IEDs.

Practicals-PS02CFSC25

1. To study various parts of Firearms.
2. To determine Different Characteristics of Ammunition Parts – Caliber, Diameter, Wads, 12 Bore Cartridge Case.
3. Examination & Comparison of Fired Bullet.
4. Examination & Comparison of Fired Cartridge Cases.
5. To Establish Presence of GSR on Different Surfaces.
6. To Determine Shot Number from Size & weight of Shots.

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