

TA 1 - Module 1

Disha S.

NOTES

→ Definitions & Concepts.

Def<sup>n</sup>: Forensics - Forensics is a Latin term derived from the word 'forum'. In its simplest sense, it means court of law. Legal proceedings used in the court of law for the purpose of resolving the crime with evidence perfectly correlated among the crime scene, victim & criminal.

Def<sup>n</sup>: Science - A systematic study of and knowledge about the physical & natural world.

Def<sup>n</sup>: Forensic Science - A scientific discipline which is direct to the recognition, identification; individualization & evaluation of physical evidences related to crimes & other complex issues and are resolved by the application of principles of natural science for the administration of justice.

Alternate: The application of the methods, principles & techniques of the natural & physical sciences to matter of criminal & civil law (purpose of justice).

Concept: Based on Locard's Principle of Exchange :

"Whenever two objects - animate or inanimate; microscopic or macroscopic, in whichever physical state - comes in contact with each other, there would be an exchange of materials and/or matters."

(These materials & matters are known as evidence).

Def<sup>n</sup>: Corpus Delicti - "body of the crime". It is a legal principle that requires the state to prove that a crime has been committed before a defendant can be convicted.

\*\* Kautilya's Arthashastra (2000 yrs ago)  
↳ fingerprints, palm prints (Tajika).

Defn: Modus Operandi - (MO). A criminal's distinct way of operating, including their choices & behaviour while committing a crime.

\*\* → History & Development of Forensic Science in India.

1<sup>st</sup> century: Archimedes & the Golden Crown - The 'Eureka' legend told of Archimedes (287-212 BC) where the philosopher proved that a crown was not solid gold by comparing measurements of its displacement of water & its weight, is a direct forerunner of modern forensic Eng. Tech.

1892: Sir Arthur Conan Doyle - Sherlock Holmes was first published, thus popularizing the scientific method of investigation.

(1757-1853): ~~Matthew~~ <sup>John</sup> Orfila - Father of Forensic Toxicology. He did the study on the effects of poisons on animals & also the detection of them. Tests &

(1813-1914): Alphonse Bertillon - Devised the scientific system of personal identification. Father of criminal investigation through criminal identification. Knowledge of anthropology & body measurements

(1822-1911): Francis Galton - Developed the method of classification of fingerprint

(1847-1915): Hans Gross - Utilize various techniques in the field of scientific criminal investigation.

(1847-1915): Edmond Locard - Concept of exchange of particles in a crime scene.

(1858-1915): Albert Osborn - Principle of document examination as a scientific evidence.

(1887-1954): Leone Lattes - Devised a relatively simple procedure for determining blood group from a drop or blood stain.

(1868-1943): Karl Landsteiner - Father of blood grouping & Immunohematology. Derived the blood groups.

(1891-1954): Cavin Goddar - Technique of comparison of a fire bullet with that of a test one.

\* Chemical Examiner's Laboratories :

Toxicological analysis of viscera, biological analysis of stains of blood, semen etc, chemical analysis of food drugs & various excisable materials.

Labs created: Madras Presidency (1849) → Calcutta (1853) → Agra (1864) → Bombay (1870)

\* Anthropometric Bureau :

Identification of criminals using physical characteristics (anthropology) and Bertillon's anthropometric system (1878)

First Bureau: Calcutta (1892)

\* Finger print Bureau :

William Herschel - fingerprint identification (1877)

Edward Richard Henry - thumb impressions in record slips.

Khan Bahadur Azizul Huq - mathematical formula ↑

Hem chandra Bose - telegraphic code for finger impression.

First Bureau: Calcutta (July 1897).

\* Department of Explosives :

Detect the causes of explosions, evolve provisions under the Explosives & Petroleum Act.

HQ: Nagpur (1898)

\* Govt. Examiner of Questioned Documents :

Handwriting experts, secret censorship, military training.

HQ: Shimla (1906)

\* Serologist to the Govt. of India :

Examine human blood & seminal stains.

HQ: Calcutta (1910).

\* Footprint Section of CID :

Identify criminals through their footprints.

HQ: Bengal (1915)

\* Note Forgery Section in CID :

examination of forged currency notes

HQ: Bengal (1917)

\* Ballistics Laboratory :

examination of firearms

HQ: Calcutta (1930)

\* Scientific Sections in CID :

examination of bullets, cartridge cases, firearms etc.

HQ: Bengal (1936)

\* State Forensic Science Lab :

Medico-legal, Physics etc. Multidisciplinary FS Laboratory

HQ: Calcutta (1952), Bombay (1958)

\* Central Fingerprint Bureau :

State FPB in tracing/locating interstate criminals.

HQ: Shimla (1905)

\* Central Detective Training School :

Impart training in scientific investigation of crimes

HQ: Calcutta (1956)

\* Central Forensic Science Laboratories :

Physics, Chemistry, Biology, Ballistics

HQ: Calcutta (1957), Hyderabad (1965)

\* Indian Academy of Forensic Science :

Biennial scientific journal  
(1960)

- Interview (structured question)
- Interrogation (fast-paced, try to get whatever info he/she gives).

### → Need for Forensic Science

### Technological Advances of Human Justice

Justice Delivery

Identification

Protection

Investigation

Social changes & the evolution of crime Inc. complexity of crime

### → Scope of Forensic Science.

Crime Scene

Forensic

Entomology

DNA

Toxicology

Digital

Investigation

Pathology

Anthropology

Analysis

Odontology

Forensics

(Criminalistic)

Biology/DNA

Justice is abstract, law is concrete

### → Basic Principles Involved in Forensic Science

(1) Principle of Individuality - Every object either natural or manmade has an individuality which is not duplicated in any other object. That means every object is unique & individualistic.

(2) Principle of Exchange - Whenever any two objects come into contact with each other, there is always an exchange of minute particles or trace evidences in between them.

(3) Principle of Progressive Change - Everything changes with the passage of time. There is nothing permanent & invincible.

(4) Principle of Comparison - There is a possibility of comparison only when there are things that are similar.

(5) Principle of Analysis - Proper sampling is necessary for right analysis by experts.

(6) Principle of Probability - All identification, whether definite may be done on the basis of probability.

(7) Facts do not lie, - Law of circumstantial Factor but men can & do.

## → Functions of Forensic Science Laboratories.

|                      |                    |                 |                 |
|----------------------|--------------------|-----------------|-----------------|
| <u>Investigation</u> | <u>Crime Scene</u> | <u>Training</u> | <u>Research</u> |
|                      | <u>Management</u>  |                 |                 |

## \* \* Functions & Duties of a forensic scientist.

### → Divisions of Forensic Science

- 1) Questioned Documents → Biological Divisions.
- 2) Fingerprint Science
- 3) Forensic Psychology
- 4) Forensic Accounting
- 1) DNA
- 2) Serological
- 3) Thanatological - time & cause of death
- 4) Anthropological

### → Role of forensic scientist

- 1) Analysis of physical evidence.
- 2) Providing expert testimony.

[ 3) Teaching, Training & Creating Protocols.  
→ Research .

- 4) Admissibility of evidence.
- 5) Report writing
- 6) Presentation -

### Burden of Proof

lies with defendant

Examination in  
chief

(184)  
(185)  
(186)  
(187)  
(188)  
(189)  
(190)  
(191)  
(192)  
(193)  
(194)  
(195)  
(196)  
(197)  
(198)  
(199)  
(200)

### Unit 1: Introduction to Forensic Science & law

- Science - systematized body of knowledge that deals with general truths.
  - Forensic science - applying scientific principles in the court of law to administer justice (Forensics).
- multi-dimensional (disciplinary)  
multi-professional

### History of Forensic Science

| Mauryan Empire                                   | Chinese Kingdom                | Contributors   |
|--|--------------------------------|--|
| Kauhiya, palm prints<br>321 BCE - 185 BCE        | Fingerprint<br>Analysis        | 1) Sir Arthur Conan Doyle<br>2) Mathieu Orfila<br>3) Alphonse Bertillon. |
| (1849) - First Chemical lab @ Madras             |                                | * 4) Francis Galton  |
| (1892) - Anthropometric Bureau @ Calcutta.       |                                | 5) Leone Latessa   |
| (1897) - Fingerprint Bureau @ Calcutta.          |                                | 6) Calvin Goddard  |
| (1898) - Chief Inspector of Explosives @ Nagpur. | (1910)*                        | 7) Albert S Osborn   |
| (1906) - GIEQD @ Shimla                          | (1893)                         | 8) Hans Gross  |
| (1915) - Footprint Section @ CID Bengal          | (1901)                         | 9) Karl Landsteiner  |
| (1917) - Note Forgery Section @ CID Bengal       |                                | * 10) Edmond Locard.   |
| (1930) - Arms Expert @ Calcutta.                 |                                |  |
| (1952) - First SFSL @ Calcutta                   | (1957) - First CFSL @ Calcutta |  |
| (1958) - Second SFSL @ Bombay.                   | (1972) - INJNN I @ Delhi       |  |
| (1960) - IAFS                                    | (1961) - CFSL @ Chandigarh     | (1967) - Sagar University  |
| (Sept 30 2008) - QFSU                            | (2020) - NFSU                  |  |

→ Laws of Forensic Science.

Law of Individuality, Principle of Exchange, Law of Comparison, Law of Analysis, Law of Progressive Change, Law of Probability, Law of Environmental Factor.

→ Scope of Forensic Science.

Criminalistics, Forensic Anthropology, Forensic Biology / DNA, Forensic Odontology, Forensic Toxicology, Forensic Ballistics, Cyber Forensics, Questioned Document Examination, Forensic Pathology & Medico-legal death Investigation.

→ Role of a Forensic Scientist

Analysis of physical evidence, Providing Expert Testimony, Furnishing Training in analysis of physical evidence.

→ Need of Forensic Science.

Social change & evolution of crime, Increasing complexity of crime, Technological advancements & their misuse.

#### Divisions of Forensic Science

| Biology         | Chemistry  | Physics    | Cyber | Q.D | Fingerprint | Psych | Accounting |
|-----------------|------------|------------|-------|-----|-------------|-------|------------|
| DNA             | Narcotics  | Physical   | C.S   |     |             |       |            |
| Serological     | Toxicology | Ballistics | C.F   |     |             |       |            |
| Thaumotological | Explosives | Multimedia | D.F   |     |             |       |            |
| Anthropology    | Chemical   | Tongg.     |       |     |             |       |            |

## Unit 2 : Contemporary Development - Academic & Practices

(1897) - Central Fingerprint Bureau @ Kolkata.

- 29 FB, 37 SFSL, 7 CFSL
- 80 unis, 54 private & 22 govt.

[NCRB, CCRB]

- Indian Academy of Forensic Science - 1960, biennial scientific journal
- Teaching FS - 1967, UGC president Dr. D.S. Kothari
- LNJP NICFS Delhi - 1971.

- 1) Centre for Cellular & Molecular Biology (CCMB) - DNA profiling after 1985 by Prof. Alec Jeffreys ; Hyderabad ; centre of excellence by UNESCO ; 1st April 1977 ; Dr. P.M. Bhargava ; CSIR CSIR Delhi
  - 2) Crime Detective Training Institutions (CDTI) - 5 ; Hyd, ~~Bombay~~. Chandigarh, Kolkata, Jaipur, Ghaziabad ; Dy. SSP ; 10 week course ; BPR&D (Bureau of Police R&D) ; training & syllabus
  - 3) Centre for DNA Fingerprinting & Diagnostic (CDFD) - Dept of Biotech ; Manipal Academy of Higher ed ; PhD life sciences ; Hyderabad
  - 4) Bureau of Police Research & Development (BPR&D) - 28/08/1970 ; MoHA ; Research, Development, Gore- Committee (1971) ; Training (1973) ; active interest, study, apply
- Types of Tools - Accurate & Valid.

### Microscope

#### Light Microscope

(photons of light)

- 1) Simple Non opt parts - Base, Pillar,
- 2) compound Arm, Body Tube, Screws.
- 3) Stereo Optical parts - Condenser,
- 4) Fluorescence \* Reflector, Occ. lens, Obj. lens
- 5) Phase Contrast \* fluorescein, rhodamine
- 6) Polarizing

#### Electron Microscope (electrons)

- 1) Scanning
- 2) Transmission

### Chromatography

(mixture  $\rightarrow$  indu, stationary & mobile phases)

#### Paper

- 1) Thin layer
- 2) Paper - MP: solvent  
SP: cellulose paper

#### Gas

MP: liquid solvent

SP: solid (silica, al)

#### Liquid

MP: Gas (He, N)

SP: liquid, polymer

### Spectroscopy

(matter  $\rightarrow$  elec radiation)

### Molecular

Molecules  $\rightarrow$  ER

IR, UV, Raman

### Atomic

Atoms  $\rightarrow$  light abs

AAS, AES, ICP

- Video Spectral Comparator - comparison of inks using IR & luminescence; document examination; light (IR, UV) &
  - Electrostatic Discharge App (ESDA) - restoring handwritten impressions in paper; indented writing; misplaced, destroyed, unavailable documents.
  - Electrophoresis - Separate DNA, RNA, protein based on charge
  - Alternate Light Sources (ALS)
    - UV (100-400 nm), Blue (400-450 nm), Violet (400-450 nm),
    - Green (500-550 nm), IR (700-1000 nm)
  - European Union & Europe - European Network of Forensic Science Institutions (ENFSI) (39/26/12-15)
  - American Society of Crime Laboratory Directors (ASCLD)
  - Senior Managers Australian & NZ Forensic Laboratories (SMANZFL)
- 1) Federal Bureau of Investigation (FBI) - 1908; Theodore Roosevelt; 34 agents; J Edgar Hoover (1924-1972); Lindbergh kidnapping, John Dillinger, Bonnie & Clyde; Criminal, Counterintelligence, Cyber, Counterterrorism, laboratory. [Combined DNA Index System - CODIS]
- 2) INTERPOL (International Criminal Police Org) - 1914; 20 countries; Johann Schöber; Int. Criminal Police Comm (ICPC); ICPo - 1956; Jürgen Stock (2014); HQ - Lyon, France; 94 countries; IBIN; Operation Hydra.

→ Ethics for Forensic Scientist - Impartiality & Objectivity, Use of scientific method; Professional competence; Ethical reporting; Confidentiality & integrity; Avoiding conflict; Responsibility in Inv; Respect for Human rights; Accountability; Professional conduct.

→ Key standards for Forensic Report Writing - Purpose & scope, objectivity, systematic approach, timeliness, record keeping, relevance of content, readability, understandability, precision, truthfulness, clarity.

→ Format of Forensic Report :

|                |                  |                |
|----------------|------------------|----------------|
| Title          | Name of test     | Cond of Parcel |
| Name & Address | Case ID          | Description    |
| Affiliation    | Mode of rec      | Method         |
| Credentials    | Sampling method  | Result         |
| Unique ID      | Ref. Test Method | E-Sign         |

20 chapters, 358 sections

BNS/IPC

Sections

- 121 - Attempt to Wage a war or Wage a war or Abetment to wage a war against Govt of India.
- 45 - Abetment of a thing \*
- 46 - Abettor \*
- 47 - Abetment in India for offences outside India
- 48 - Abetment outside India for offences in India.
- 49 - Punishment for an abetted act in consequence where no express provision is made for punishment.
- 50 - Punishment of abettor if abettor does act with diff intention from abettor.
- 51 - Liability of person abetted when one act done (diff)
- 52 - Liability for cumulative punishment.
- 53 - Liability of abettor. \*
- 54 - Abettor present when offence is done.
- 55 - Abetment of offence → death + imprisonment life
- 56 - Abetment u a → ~~death~~ imprisonment life
- 57 - Abetting commission of crime & by ≥ 10 persons
- 58 - Concealing design
- 59 - Concealing design by public servant
- 60 - Concealing design → life imprisonment
- 61 - Criminal Conspiracy \*
- 62 - Punishment for committing off → death + LI

- 63/379<sup>5</sup> - Rape
- 64 - Punishment for Rape
- 65 - Punishment for Rape in certain cases.
- 66 - Punishment for causing death or vegetative state
- 100/299 - Culpable Homicide
- 101/300 - Murder
- 102 - C.H causing death of another person not intended
- 102/302 - Punishment for murder
- 104 - Punishment " " by life convict
- 105 - Punishment for C.H not amt to murder
- 106/304a - Death by Negligence .
- 109/307 - Attempt to murder
- 110 - Attempt to C.H
- 178 - Counterfeiting notes , coins , stamps
- 309 - Attempt suicide
- 319 - Hurt
- 320 - Unnecessary Hurt
- 324 - Voluntarily causing hurt
- 326 - Voluntarily causing C.H
- 351 - Assault
- 354 - Assault to woman + modesty
- 359 - Kidnapping
- 362 - Abduction
- 317 - Stolen Property

39 chapters, 581 sections

BNSC/CrPCSections

- 173 - Information for cognizable crimes \*
- 6 - Classes of criminal courts.
- 197 - Ordinary place of enquiry & trial
- 105 - Recording of search & seizure through audio-video means
- 185 - Search by police officer
- 176 - Procedure for investigation \*
- 178 - Power to hold inv or preliminary inquiry
- 180 - Examination of witness by police \*
- 184 - Medical examination of victim of rape \*
- 193 - Report of police off on completion of investigation
- 194 - Police to enquire & report on suicide
- 293/329 - Reports of certain govt. scientific experts \*
- 291 - Deposition of medical witness
- 292 - Evidence of officers of the mint

11 chapters, 167 sections

BSA/IEAsections

- 2 - Definitions
- 3 - Relevancy of facts
- 4 - Facts of same transaction
- 5 - Facts which are occasion
- 6 - Motive, preparation, subsequent conduct
- 7 - Facts necessary to explain relevant fact
- 8 - Things said or done by conspirator in common design
- 9 - Irrelevant → Relevant facts
- 10 - Facts relevant to file suit for damage
- 11 - Facts relevant when right / custom in question
- 12 - Facts showing existence of mind, body, feeling
- 13 - Facts if act was accidental or intentional
- 14 - Existence of course of business when relevant
- 15 - Admissions defined
- 16 - Admissions by party to agent
- 19 - Proof of admissions
- 20 - Oral admissions
- 21 - Admissions in civil cases
- 22 - Confession in court
- 23 - Confession to police officer
- 24 - Proued confession
- 25 - Admissions not conclusive proof
- 26 - Facts of dead 404

- 27 Relevancy of facts to prove truth  
39 Opinions of third persons  
57 Primary evidence  
58 Secondary evidence  
61 Electronic or digital record  
63 Admissibility of ↑  
136 Production of ↑  
140 Examination of witness  
141 Judge to decide AOE  
144 Cross examination  
158 Impeaching credit of witness  
165 Production of documents
- 32 Facts of dead 404 relevant ? same  
45 Opinions of expert  
46 Facts bearing upon  
47 Opinions  
57 Judicial Notice facts  
58 Facts admitted need not be proved  
60 Oral evidence  
73 Comparison of signature  
135 Examination of witness . ? same  
136 Judge to decide AOE  
137 Examination in chief  
138 Order of examinations  
141 Leading questions

## UNIT 5

### \* IT ACT 2000.

- June 2000, Cyber Appellate Tribunal,  
UNCITRAL

- 1) IT Amendment 2008: 66A, cybercrimes
- 2) 66A Repeal 2015: offensive online msgs
- 3) Intermediary guideline & digital media ethics code (2021)

69, 70 Protected systems & intercept'm

79 NSP liability

81 Overriding effect.

66 Hacking

66(C) Identity Theft

66(D) Impersonation

66(F) Cyber Terrorism

69(1) Publishing or transmitting obscene material

(7)(B) u u u for children

72 Breach of confid. & privacy

73 False digital sign. cert

### \* CAs issue DSCs.

CCA - Controller of CA

Ex - eMudhra, Sify, TCS-CA, NIC-CA

\* POCSO Act 2012

Protection of Children against Sexual Offences

14th November 2012

46 sections

IPC - 375, 354, 377

Features - confidentiality, gender-neutral provisions, mandatory reporting, last seen theory, child friendly dignity, right to life.

Computer & its components.

CPU, I/O, Memory, Storage, Hardware, Software, UI

Storage Media

Primary, Secondary, Optical, Magnetic, Flash, Cloud, Hybrid, Network, RAID

Categories of cybercrime

IT, tin fraud, Hacking, Terrorism, IPR theft, bullying, ransomware, online trafficking, POCSO, espionage

Case Studies

Wannacry (2017), Stuxnet (2001), Sony Pictures (2014)

Ramseye Analytics (2018)

## UNIT 4

law - rule of conduct + judicial decision

law v/s rule - scale / scope, for documentation, enforcing, made by whom

Types of law - Cultural, Natural, legal, Moral, Societal, Religious, Institutional.

Types of legal laws - Civil, Criminal, Corporate, constitutional, Statutory, family, common, admin.

Criminal laws in India - IPC, IEA, CrPC

1857 1872 1974 (APR)

IPC → BNS

23 chp 511 sec 20 chp 528 sec 358 sec

IEA → ~~BSA~~ BSA

11 chp 167 sec 11 chp 167 sec

CrPC → BNSS

38 chp 484 sec 39 chp 531 sec

Supreme Court - Delhi, CJ, appellate jurisdiction, judicial review

High Court - 24 HC, appellate jurisdiction, Civil and criminal

District Court - District & Sessions judge, nyaya panchayats.

Persons of law - Judge, Jury, Lawyer, Advocate  
 Terms - Cog/Non cog Offense, Bailabai/Non, FIR, Confession  
 Evidence, Hearsay evidence, witness, trial,  
 Examination in chief, cross exam, reexam, expert testimony

Punishment - response to law violations to restore harmony  
 Aim - retributive, deterrence, prevention, rehabilitation,  
 Restitution.

Types - Capital, Imprisonment, Fines, Corporal, comm ser.,  
 Seizure of property

Functions of courts - primary right, sanctioning right, title,  
 Deliberation, appointment, supervisory, advisory

SCM - 10,000 & 7 yrs - 33 PL, duration - 1261

MFC - 5,000 & 3 yrs

MSC - 1,000 & 1 yr

MA - Admin functions

## UNIT 3

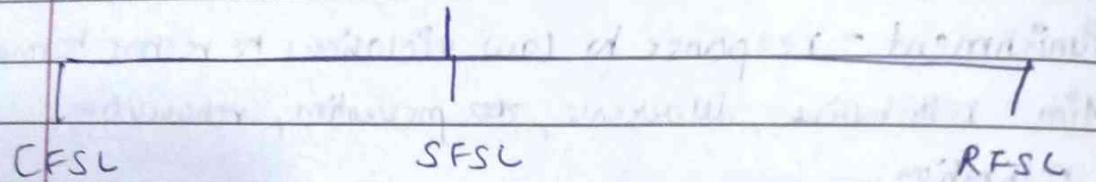
Govt of India



MHA



DFSS



Pune, Delhi, Calcutta,

Hyderabad, Chandigarh

Bhopal, Guwahati

\* ~~GEOR~~ - Albert S. Brown 1910, 1904 - Bengal,  
1906 - Shimla, Mr. CR Hardless, F. Brewster,  
1964 - Kolkata, 1968 - Hyderabad.

\* ~~CEB~~ NIA - 26/11, 31st dec 2008, terrorism,  
Central Counter Terrorism law Enforcement Agency  
govt. conviction rate

\* CCTNS - Common Integrate Police App (CIPA),  
2009, Crime & Criminal Tracking Network &  
systems  
2009, computerization.

DFSS - 2002, separation from BPR&D, under MHA,  
CFSI / STFSL (RFSL), Interoperable Criminal Justice  
System (ICJS), SAARC.

CFB - 1897 Kolkata.