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UGC NET Paper 2

Forensic Science (082)
Complete revision notes — all 10 units

10 units | Tables & formulas | Key revision points

01 Introduction to Forensic Science
02 Crime Scene Management
03 Fingerprints
04 DNA Profiling and Serology
05 Forensic Chemistry and Toxicology
06 Forensic Ballistics
07 Questioned Documents
08 Forensic Medicine
09 Digital Forensics
10 Forensic Science and Law

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How to use these notes

- Read one unit at a time, then test yourself with its key revision points.
- Make your own short notes on topics you find difficult.
- Units follow the main areas of the official syllabus — the exact unit list can change between sessions.
- Always check the latest syllabus and notices on the official UGC NET portal: **ugcnet.nta.ac.in**.

UNIT 01

Introduction to Forensic Science

Principles, history and organisation of forensic science.

- **Locard's exchange principle**: every contact leaves a trace.
- Principles: individuality, comparison, progressive change, probability.
- India: CFSLs (central), state FSLs; National Forensic Sciences University (Gandhinagar, 2020).

★ Key revision points

- Every contact leaves a trace = Locard.
- NFSU: 2020, Gandhinagar.
- CFSL = central labs.
- Individuality principle: no two objects identical.

UNIT 02

Crime Scene Management

Securing, documenting and collecting evidence.

- Steps: secure the scene → document (notes, photos, sketches) → search (spiral, grid, strip, zone) → collect and package → chain of custody.
- Physical evidence: trace, biological, impression, digital.

★ Key revision points

- Chain of custody keeps evidence admissible.
- Search patterns: spiral, grid, strip, zone.
- Document before collecting.
- Package evidence separately.

UNIT 03

Fingerprints

Fingerprint patterns, classification and development.

- Patterns: loops (most common), whorls, arches.
- Henry classification system; Francis Galton's work on fingerprint individuality.
- World's first fingerprint bureau: Calcutta (1897).
- Development: powders, ninhydrin (porous surfaces), cyanoacrylate fuming.

★ Key revision points

- Loops are most common.
- First fingerprint bureau: Calcutta, 1897.
- Ninhydrin for paper.
- Henry classification system.

UNIT 04

DNA Profiling and Serology

Biological evidence analysis.

- DNA fingerprinting — Alec Jeffreys (1984).
- STR (short tandem repeat) analysis; PCR amplification; mitochondrial DNA (maternal lineage); Y-STR (paternal).
- Serology: blood groups; presumptive and confirmatory tests for blood and semen.

★ Key revision points

- DNA fingerprinting = Jeffreys (1984).
- mtDNA = maternal lineage.
- STR is the standard profiling method.
- PCR amplifies DNA.

UNIT 05

Forensic Chemistry and Toxicology

Drugs, poisons and chemical analysis.

- Poisons: corrosive, irritant, neurotoxic, cardiac; arsenic (Marsh test).
- Techniques: TLC, GC-MS, HPLC, spectroscopy.
- NDPS Act (1985) — narcotic drugs and psychotropic substances.

★ Key revision points

- Marsh test = arsenic.
- GC-MS identifies drugs.
- NDPS Act: 1985.
- TLC separates compounds.

UNIT 06

Forensic Ballistics

Firearms, ammunition and wound ballistics.

- Rifling: lands and grooves; class vs individual characteristics.
- Comparison microscope for bullets and cartridge cases.
- Gunshot residue (GSR) analysis; range of fire.

★ Key revision points

- Rifling = lands and grooves.
- Comparison microscope matches bullets.
- GSR shows firing.
- Class characteristics are shared; individual are unique.

UNIT 07

Questioned Documents

Handwriting, forgery and document analysis.

- Handwriting comparison; disguised writing; forgery types (simulated, traced).
- Ink and paper analysis; alterations; ESDA for indented writing.
- Albert Osborn — *Questioned Documents*.

★ Key revision points

- ESDA reveals indented writing.
- Osborn = questioned documents pioneer.
- Traced forgery copies an outline.
- Ink analysis dates and compares inks.

UNIT 08

Forensic Medicine

Death, post-mortem changes and injuries.

Change	Meaning
Algor mortis	Cooling of the body
Livor mortis	Pooling of blood (hypostasis)
Rigor mortis	Stiffening of muscles

- Injuries: abrasion, bruise, laceration, incised wound, stab wound.
- Forensic odontology and anthropology aid identification.

★ Key revision points

- Algor = cooling.
- Livor = blood pooling.
- Rigor = stiffening.
- Odontology uses teeth for identification.

UNIT 09

Digital Forensics

Investigating digital evidence.

- Process: identification, preservation (write blockers, hashing), analysis, reporting.
- Hash values (MD5, SHA) prove data integrity.
- IT Act, 2000; electronic evidence certificates.

★ Key revision points

- Write blockers prevent changes.
- Hashing proves integrity.
- IT Act: 2000.
- Preserve before analysing.

UNIT 10

Forensic Science and Law

Expert evidence and legal provisions.

- Expert opinion is admissible — earlier Section 45, Indian Evidence Act; now under the Bharatiya Sakshya Adhiniyam, 2023.
- Daubert standard (USA) for scientific evidence.
- Ethics: impartiality, documentation, quality assurance (NABL accreditation).

★ Key revision points

- Expert opinion admissible in court.
- Daubert = US standard.
- NABL accredits labs.
- BSA 2023 replaced the Evidence Act.

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