

B.Sc. Forensic Science: Semester-IV

EST401: Forensic Ballistics

Teaching Scheme

Lectures: 1 hr/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12 Marks

Teachers Assessment - 6 Marks

Attendance - 12 Marks

End Semester Exam - 19 marks

Course Objectives: After studying this paper the students will know -

- The classification of firearms and their firing mechanisms.
- The methods of identifying firearms.
- The characteristics of ammunition.
- The importance of firearm evidence.
- The nature of firearm injuries.
- The methods for characterization of gunshot residue.

Unit 1: Introduction to Forensic Ballistics

Definition, Scope, and Significance of Forensic Ballistics.

Gun powder - Definition, History and Development.

Firearms - Definition according to Indian Arms Act. History and Development.

Improvised & country made firearms.

Formation of gunshot residues. Methods of analysis of gunshot residues from shooting hands and targets, with special reference to clothing.

Unit 2: Classification of Small Firearms and Ammunition

Weapon types and their operation. Firing mechanisms of different firearms.

Types of ammunition. Constructional features and characteristics of different types of cartridges and bullets. Primers and priming compounds. Projectiles. Headstamp markings on ammunitions. Different types of marks produced during firing process on cartridge - firing pin marks, breech face marks, chamber marks, extractor and ejector marks.

Unit 3: Internal ballistics

Definition, ignition of propellants, shape and size of propellants, manner of burning, and various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting

Unit 4: External Ballistics

Vacuum trajectory, effect of air resistance on trajectory, base drag, drop, drift, yaw, shape of projectile and stability, trajectory computation, ballistics coefficient and limiting velocity, Measurements of trajectory parameters, introduction to automated system of trajectory computation and automated management of ballistic data.

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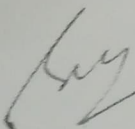
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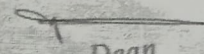
Unit 5: Terminal Ballistics


Effect of projectile on hitting the target: function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullets, effect of instability of bullet, effect of intermediate targets, influence of range. Ricochet and its effects. Stopping power. Identification and nature of firearms injuries.

Suggested Readings

1. B R Sharma, *Firearms in Criminal Investigation and Trials*, Universal Law Publishing - An imprint of LexisNexis
2. K Kumar, *Forensic Ballistics in Criminal Justice*, Eastern Book Company, Lucknow
3. B.J. Heard, *Handbook of Firearms and Ballistics*, Wiley and Sons, Chichester (1997).
4. W.F. Rowe, *Firearms identification*, *Forensic Science Handbook*, Vol. 2, R. Saferstein (Ed.), Prentice Hall, New Jersey (1988).
5. A.J. Schwoeble and D.L. Exline, *Current Methods in Forensic Gunshot Residue Analysis*, CRC Press, Boca Raton (2000).


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