

Forensic Ballistics Syllabus

Section- C

Unit-1

History and background of firearms, their classification and characteristics, various components of firearms, different systems and their functions, rifling - purpose of rifling, types of rifling, trigger and firing mechanism, choke: purpose, use and function. Cartridge-firing mechanism, projectile velocity determination identification of origin, improvised/country-made/imitative firearms and their constructional features.

Unit-2

Various types ammunition, classification and constructional features of different types of cartridges, types of primers and priming composition, propellants and their compositions, various types of bullets and compositional aspects, smooth bore firearm projectile, identification of origin, improvised ammunition and safety aspects for handling firearms. Projectiles- shots, bullets, their types and compositions, purpose, use, forensic significance, air gun, muzzle-loaders, improvised gun.

Unit-3

Examination of firearms, fired cartridge cases and bullets in the laboratory. Determination of range of firing, identification of shooter, accidental discharge, restoration of erased stamped serial numbers on firearms, IBIS etc. Forensic statistics: types of data, collection of data measures of central tendency, dispersion of data, correlation, probability and proof, likelihood ratio.

Unit-4

Interior ballistics - theory of burning of propellants, pressure- curve inside barrel, twist, muzzle-velocity, barrel length and velocity. Exterior ballistics- trajectory of projectiles, effect of air resistance, drift, drag, tumbling of bullets, bullet drop, bullet range, dispersion of pellets, ballistic coefficient, ballistic tables, yaw stability of bullet.

Unit-5

Explosives-chemicals used as explosives, classification of explosives, low and high explosives, ied (improvised explosive devlces). Examination of black powder and smokeless powder, examination of explosive debrts, defusion on live bombs. Photography and crime scene inspection in explosion cases.

Unit-6

Restoration of erased numbers, methods of marking-cast, punch and engraved, methods used for removal of serial numbers, theory behind number restoration, restoration of marks on cast iron, aluminium, brass, wood, leather etc., chemical methods of restoration (etching), reagents used for various metals, electrolytic methods of restoration-reagents used, ultrasonic cavitation for restoration, magnetic particle method for restoration, other methods of restoration, laser etched serial numbers and bar codes and their restoration, recording of restored marks.

Unit-7

Introduction to firearm crime scene photography. Camera Its Parts and Functioning, Enlarger and Other Equipment's used in Photography, Developing and Printing Methods. Digital Photography, Specialized Techniques Used For Documents, Fingerprints, Special Photographic Techniques; Use of Instant of Photography, Use of Flash Attachments, Use of Infrared Photography, Use of Ultraviolet Photography & Alternative Light Source. General Photographic Responsibilities and Videography.

Unit-8

Terminal ballistics- Effect of projectile n hitting the rarget. striking velocity, Stopping power. ricochet. Wound Ballistics: Elements of mechanism of wounding, Threshold velocity for penetration in human body, Use of Gel block for study of wound ballistics, casualty criteria, Nature of temporary and permanent cavity formation in wound, entry and exit wounds in firearms injury. Determination of suicidal, homicidal and accidental firings, Post-mortem and Ante-mortem firearm wounds, Photography and Reconstruction of Crime Scene in Firearms cases.

Unit-9

Introduction to forensic photography, role of photography in forensic science, camera its parts and functioning, enlarger and other equipment's used in photography, developing and printing methods. digital photography, specialized techniques used for documents, fingerprints, special photographic techniques; use of instant of photography, use of flash attachments, use of infrared photography, use of ultraviolet photography & alternative light source. General photographic responsibilities and videography.

Unit-10

Forensic statistics: types of data, collection of data measures of central tendency, dispersion of data, correlation, probability and proof, likelihood ratio. coefficient of correlation (karl pearson's 'r'). graphic representation of data. Significance of results: - t test, f- ratio (analysis of variance) and chi square test.

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