AMITY UNIVERSITY
UTTAR PRADESH

COURSE CURRICULUM

Course Title: ADVANCED FORENSIC BALLISTICS

Course Code: FSIC 712

Credit Units: 2

Course Level: PG

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
2	0	0	0	2

Course Objectives: The objectives of the course:

- The latest trends in forensic ballistics, safety and operating testing, Identification, evaluation of arms & ammunition.
- They will also learn report writing and presentation of firearm related evidence in court of law.

Pre-requisites: Basic knowledge in Physics.

Course Contents/Syllabus:

	Weightage (%)
Module I : History, Nature and Types of Firearms	**20**
Descriptors/Topics History and Development of Firearms, Nature of firearms, various components of small arms, smooth bore and rifled firearm, firing mechanism, nature and evaluation of injuries caused by Firearms ,post-mortem and anti-mortem firearm injuries.	
Module II : Internal Ballistics	**20**
Descriptors/Topics Definition, energy consideration, initiation, trigger and firing mechanism, ignition of propellants, types of propellant, shape and size of propellants, manner of burning of propellant, Various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting, Heat problems, velocity and pressure characteristics under different conditions, determination of pressure, recoil and theory of recoil, vibration and jump.	
Module III : External Ballistics	**20**
Descriptors/Topics Definition, projectile motion in air and vacuum, Factors affecting external ballistics: range, drop, angle of fall, remaining velocity, limiting velocity. Ballistics coefficient and Ballistic tables, measurements of trajectory parameters, Effect of air resistance on trajectory, sectional density, gravitational pull, wind deflection, base drag, yaw, shape of projectile and stability, shape of trajectory and trajectory computation	
Module IV : Terminal Ballistics	**20**
Descriptors/Topics Definition, 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, Cavitations – temporary and permanent cavities, Ricochet and its effects, stopping power.	
Module V : Ricochet, Accidental Discharge and GSR	**20**
Descriptors/Topics Definition, intermediate target, factors affecting the ricochet phenomena, ricochet from different surfaces, ricochet and critical angle, Accidental discharge, causes of accidental discharge and their evaluation. Mechanism of formation of GSR, source and collection, spot test, chemical test, identification of shooter and instrumental methods of GSR Analysis	

Student Learning Outcomes: At the completion of this course the candidate can:

- **Describe** the basic fundamental approaches to shooting incident analysis using scientific methods to recognize, evaluate and reconstruct a shooting incident.
- **Identify** and **describe** the categories of firearms and ammunition.
- **Identify** and **explain** shooting reconstruction equipment and use.
- **Describe** how shell casings and projectiles are identified to specific weapons of origin.

Pedagogy for Course Delivery:
This course will be taught in the active –learning mode, featuring both lecture and discussions including presentations, different assignments and class tests which provide students abundant opportunity for learning and interaction.

Lab/ Practicals details, if applicable: NA

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total (%)
100	0	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment				End Term Examination
Components (Drop down)	**A**	**H**	**CT**	
Weightage (%)	5	10	15	70

Text Reading & References:

- Brain J. Heard; Hand book of Firearms and Ballistics; John Willey, England, 1997.
- Gary J. Ordog, Management of Gunshot Wounds; Elsevier, New York, 1983.
- Hatcher, Jury and Weller; Firearms Investigation, Identification and Evidence; Stackpole Books, Harrisburg, PA, 1977.
- I.V. Hogg; The Cartridges Guide – A small arms Ammunition Identification Mannual; The Stackpole Co., Harrisburg, PA., 1982.
- J. Howard Mathews; Charles C. Thomas, Firearms Identification, Vols, 1, 2 & 3; Springfield, Illinois, 1973.
- Karl G. Sellier et al; Wound Ballistics and The Scientific Background; Elsevier, London, 1994.
- M. Johari, Identification of Firearm, Ammunition and Firearms Injuries; BPR&D, New Delhi 1980.