



**COURSE CURRICULUM**

**Course Title: FORENSIC PHYSICS**

**Course Code: FSIC 603**

**Credit Units: 3**

**Course Level: PG**

**Course Objectives:** This course will cover:

- Important physical evidences found at crime scene.
- Understanding of general characteristics and identification of physical evidences.
- Examination and evidential value of important physical evidences.

**Pre-requisites:** Basic Knowledge of Physics.

L	T	P/S	SW/F W	TOTAL CREDIT UNITS
3	0	0	0	3

**Course Contents/Syllabus:**

	Weightage (%)
<b>Module I : SOIL</b>	
<b>Descriptors/Topics</b> Formation and types of soil, composition of soil, particle size distribution, microscopic examination, density gradient analysis, interpretation of soil evidence, Discussion on important case studies related to soil evidence.	20
<b>Module II : GLASS</b>	
<b>Descriptors/Topics</b> Types of glass and their composition, Forensic examination of glass fractures, determination of direction of impact: cone fracture, rib marks, hackle marks, colour and fluorescence, physical matching, refractive index, and interpretation of glass evidence.	20
<b>Module III : PAINT</b>	
<b>Descriptors/Topics</b> Types of paint and their composition, macroscopic and microscopic studies, pigment distribution, micro-chemical analysis, solubility test, pyrolysis chromatographic techniques, IR spectroscopy and X-ray diffraction, interpretation of paint evidence.	20
<b>Module IV : TOOL MARKS &amp; RESTORATION OF ERASED / OBLITERATED MARKS</b>	
<b>Descriptors/Topics</b> Types of tool marks: compression marks, striated marks, combination of compression and striated marks, repeated marks, class characteristics and individual characteristics, tracing and lifting of marks, Photographic examination of tool marks . Method of making-cast, punch, engrave; methods of obliteration, method of restoration.	20

<b>Module V : SPEAKER IDENTIFICATION AND TAPE AUTHENTICATION</b>	<b>20</b>
<b>Descriptors/Topics</b> Vocal anatomy, Speech signal processing and pattern recognition – basic factors of sound in speech, acoustic characteristics of speech signal, Fourier analysis, analysis of audio-video signal for authenticity, Introduction to the techniques of pattern recognition and comparison.	

**Student Learning Outcomes:** After this course the student will be able to:

- The students will be able to **analyze** the characteristics and properties of different evidences like glass, soil, paint, tool marks, hair and fiber which are normally encountered at the scene of crime.
- They would also be able to **identify** and **examine** these evidences in the laboratory.

**Pedagogy for Course Delivery:**

The course will be taught in active-learning mode, incorporating both lectures along with class presentations, general discussions, and interactions.

**Lab/ Practicals details, if applicable: NA**

**Assessment/ Examination Scheme:**

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

**Theory Assessment (L&T):**

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

**Text Reading & References:**

- B. Caddy, Forensic Examination of glass and paints analysis and interpretation, ISBN 078405749 2001.
- Bengold and Nelson Morgan, Speech and Audio Signal Processing, John Wiley and Sons, USA, 1999.
- Bengold and Nelson Morgan,, Speech and Audio signal processing, John Wiley and sons, USA, 1999.
- C.E. O 'Hara and J.W. Osterburg, An Introduction to Criminalistic, Indiana University Press, Blomington, 1972.
- Denis Shaw, Physics in the Prevention and Detection of Crime, Contem Phys. Vol.17, 1976.
- F.W. Sears, M.W Zemansky, and H.D. Young, University Physics, Sixth Ed., Narosa, 1995.
- Jenkins and White, Fundamentals of Optics, Mc Graw Hill, Fourth Ed, 1976.
- Nickolls, L.C., Scientific Investigation of Crime, Bulterwest, London, 1956.
- R. Saferstein, Forensic Science Handbook, Vols. I, II, (Ed), Prentice Hall, Eaglewood Cliffs, NJ; 1988.