

**SARDAR PATEL UNIVERSITY**  
**Programme: MSC (Forensic Science)**  
**Semester: III**  
**Syllabus with effect from: June 2011**

<b>Paper Code:</b> PS03CFSC01	<b>Total Credits: 4</b>
<b>Title Of Paper:</b> Forensic Physics	

Unit	Description in detail	Weightage (%)
1	<p><b>Glass:</b> types of glass and their composition, Forensic examination of glass fractures under different conditions, determination of direction of impact: cone-fracture, rib marks, hackle marks, backward fragmentation, color and fluorescence, physical matching, density comparison, physical measurements, refractive index by refractometer, elemental analysis, interpretation of glass evidence.</p> <p><b>Soil:</b> formation and types of soil, composition and color of soil, particle size distribution, turbidity test, microscopic examination, density gradient analysis, ignition loss, differential thermal analysis, elemental analysis, interpretation of soil evidence, discussion on important case studies of glass and soil.</p>	25 %
2	<p><b>Paint:</b> types of paint and their composition, macroscopic and microscopic studies, pigment distribution, micro-chemical analysis- solubility test, pyrolysis chromatographic techniques, TLC, colorimetry, IR spectroscopy &amp; X-Ray diffraction, elemental analysis, interpretation of paint evidence.</p> <p><b>Tool marks examination:</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 and cut marks on clothes and walls etc.</p> <p><b>Miscellaneous clue material:</b> physical, chemical and instrumental methods of examination of strings/ropes, fibers, threads &amp; fabrics, Wires/cables, seals, counterfeit coins, physical match of broken objects forensic examination of electrical appliances/installation.</p>	25 %
3	<p><b>Building materials:</b> Types of cement and their composition, determination of adulterants by physical, chemical and instrumental methods, examination of brick, and analysis of bitumen &amp; road materials, analysis of cement mortar and cement concrete &amp; stones.</p> <p><b>Restoration of erased/obliterated marks:</b> method of making- cast, punch, engrave; methods of obliteration, methods of restoration- etching (etching for different metals), magnetic, electrolytic etc., recording of restored marks- restoration of marks on cast iron, aluminum, wood, leather, polymer etc.</p>	25 %
4	<p><b>Speaker identification and tape authentication:</b> Voice production theory- vocal anatomy, speech signal processing and pattern recognition- basic factors of sound in speech, acoustic characteristics of speech signal, Fourier analysis, frequency &amp; time domain representation of speech signal, analogue to digital signal and conversion, fast Fourier transform, quantization, digitization and speech enhancement, analysis of audio video signal for authenticity, introduction to the technique of pattern recognition and comparison.</p>	25 %



### **Basic Text & Reference Books:**

- Criminalistics: An Introduction to Forensic Science – Richard Saferstein.
- Crime Scene Management – M.S.Dahiya.
- Crime Scene Management- M.S.Rao.
- Forensic Science in Criminal investigation – B.R.Sharma.
- Forensic Physics Manual (Directorate of Forensic Science).
- Footwear Impression Evidence – Bodziak William.

