Forensic criminalistics

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<th>Basic module information</th>
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<tr>
<td>1. Course Title: Forensic Criminalistics</td>
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<td>2. Course Code: CRIM</td>
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<td>3. Credit Points: 7</td>
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<td>4. Duration: One semester</td>
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<td>5. School: Faculty of Natural Sciences and Mathematics</td>
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<td>6. Date: September 2008</td>
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7 Pre, Post and Co-requisites:
These are modules that you must have studied previously in order to take this module, or modules that you must study simultaneously or in a subsequent academic session

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<tr>
<th>Pre, Co, Post</th>
<th>Module Code</th>
<th>Module Title</th>
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<td>NO</td>
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8 Overview and Aims
To develop an awareness of the application of criminalistics techniques in forensic science; Enabling practical application of relevant techniques to case work problems; Explain the methods and procedures applied by the crime laboratories to identify and characterize the forensic evidentiary samples

10 Course Content

A. Fundamental Principles and Concepts of Criminalistics
- Criminalistics and Special Areas of the Forensic Sciences (*Meaningful areas in forensic investigation of the crime evidence*)
- The Processes of Forensic Criminalistics (*Identification, Classification, Individualisation, Association and Reconstruction*; *The relationship of evidence to source*)
- Physical transfer of trace and macroscopic evidence and factors affecting transfer and detection
- Analysis and Interpretation of physical evidence (*The principle of divisible matter and its corollaries- profound effect on the forensic process of source*)
- A scientific examination of various types of evidence. *Examines the relevance of each type of evidence; Applies the scientific techniques of examination for each type of evidence and their interpretation*

B. Advanced methods to Forensic Criminalistics
- Scientific methods applied to the gathering and preservation of criminal evidence
- Techniques for collecting and identifying of physical evidence
- Appropriate methods of sampling and analysis of case materials
- Analytical techniques enabling forensic identification of evidence

C. Special Fields of application in Forensic Criminalistics
- Forensic macro and micro photography (*I. Importance of Forensic Photography*
from the judicial point of view—visual comparative techniques in Forensic Sciences; 2. Basic principles of forensic photography and legal issues related to forensic photography and courtroom or trial presentation; 3. Introduction to photographic techniques use in the various forensic sciences; 4. Crime scene photography-General scene photos; Fingerprint photography; Fluorescence and luminiscence photography of body fluids and latent fingerprint; Photography of laser beams in bullet trajectory cases; Photomicroscopy)

- Introduction to Forensic Microscopy
- Advance in Fingerprint Technology (Identification of latent print; Composition of latent print residue; Methods of latent fingerprint development—photoluminiscence, physical development, automated fingerprint identification and Imaging Systems)
- Footprint and other impressions (The measurement of the print, reproduction and identification methods)
- Toolmark examination methods
- Forensic Toxicology (Principles and Fundamentals of poisons; Methods of collection, preservation and preparing for analysis)
- Advances in Forensic Application of Mass Spectrometry - GC/MS, LC/MS (Methodology, Instrumentation and Forensic applications; Detection and identification of trace component in complex mixtures; Analysis of nonvolatile and thermally labile compounds; Current methods in Forensic Gunshot Residue Analysis)
- Environmental Forensic—Principles and Applications (Analytical methods and forensic techniques used in environmental litigation; Biodegradation and influence of chlorinated solvents and petroleum hydrocarbons; Nuclear and radioactive materials—detection and investigation of illicit trade)
- Traffic accidents and physical evidences investigation—vehicle identification
- Questioned Document (Paper analysis including banknotes)

D. Forensic Expertises

- Prerequisite for relevance expertise (Translating the legal question into a science question; Formulating Hypotheses; Useful Evidence; Useful Test; Further questions arise as a result of analysis)
- Examination and Analysis (Documentation; Preserving the integrity of the evidence; Results; Verification of results; Interpretation and Conclusions)

E. Legal environment and expert witnessing

- The scientific expert and the investigator (Connection between forensic experts and court practice; Developing the professional relationship)
- Courtroom skills and forensic expert opinions
- Preparation of cases for court—the expert report
- The role of the forensic scientists as expert witnesses
- Standards for Reliability and Relevance

Indicative Reading


### 12 Learning outcomes
Learning outcomes describe what you should know and be able to do by the end of the module.

**Knowledge and understanding.** After studying this module you should be able to:

- Select and explain the methods and procedures applied by the crime laboratories to identify and characterize the forensic evidentiary samples
- Describe and demonstrate the basic principles of forensic photography
- Examine the relevance of each type of evidence and applies the scientific techniques of examination
- Solve criminalistics problems using supplied data
- Describe the principles and fundamentals of poisons and the circumstances of poisoning cases and identify the required toxicological samples
- Describe different methods used in environmental litigation
- Understand the role of the forensic scientists as expert witnesses

**Skills, qualities and attributes.** After studying this module you should be able to:

- Apply scientific principles and methodologies to the solution of problems
- Analyse, evaluate and interpret data
- Competently use appropriate equipment and materials in the laboratory
- Develop subject specific practical/professional skills
- Fully understand the meaning and objective of scientific research, develop research question and apply the appropriate research methodology

### 13 Teaching and Learning

**Range of modes of direct contact**
This indicates the range of direct contact teaching and learning methods used on this module, e.g. lectures, seminars

- Lectures (20 hrs)
- Laboratories (30 hrs)
- Seminar (10 hrs)

Total contact hours: 60

**Range of other learning methods**
This indicates the range of other teaching and learning methods used on this module, e.g. directed reading, research

- Directed reading
- Maintaining laboratory case files
- Independent learning

Total non-contact hours: 80
14 **Assessment methods**  
This indicates the type and weighting of assessment elements in the module

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<thead>
<tr>
<th>Weighting</th>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>100%</td>
<td>Coursework</td>
<td>Laboratory casefiles (... aps)</td>
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<tr>
<td></td>
<td></td>
<td>Problems (... aps)</td>
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**Diagnostic/ formative assessment**  
This indicates if there are any assessments that do not contribute directly to the final module mark

**Further information on assessment**  
This section provides further information on the module's assessment where appropriate