Module Title:	Laboratory Skills for DNA and Forensics 6
Academic year:	2009 2010
Credit Value:	10.0
Pre- requisites:	Module 5.1. 5.2,5.4
Assessment:	50% for technical competency assessed by practical examination(s) 50% for recording, analysis and discussion of experimental data in laboratory reports and notebooks.
Aims	This module will be based on practical laboratory experience. It is intended that this practical module will cover laboratory based topics from the Pharmacology and Toxicology, Materials analysis and DNA analysis II theoretical modules. In all practicals, students will be encouraged to develop their ability to integrate the use of various laboratory techniques in order to solve a prescribed scientific problem. The concept of team-work, good laboratory practice and the need for both validation and statistical evaluation of results will be emphasized throughout. An underlying theme will also be the development of students' scientific presentation skills.
Module Content	**(a) Pharmacology & Toxicology** • Preparation (solid phase or liquid-liquid extraction) and chromatographic analysis of pharmacologically and toxicologically relevant compounds from biological samples. • Analysis of environmental samples for a selection of potentially toxic heavy metals. • Standard bioassays to establish *in vitro* toxicity of defined compounds. • *In vitro* assays using liver microsomal faction and chromatographic analysis to tract the production of Phase I metabolites. **(b) Materials analysis** • Analysis of automotive paints by FTIR • Measurement of thickness and refractive index of a polymer film by ellipsometry; • Identification of particles and fibres,

	measurement of their dimensions and detailing of their topography using Scanning Electron Microscopy; • Elemental analysis of a sample of glass/ceramic; • Determining the dimensions, morphology and refractive index of nylon fibre using Polarised Light Microscopy **(c) DNA analysis II** • Bacterial genomic DNA isolation and analysis • Bacterial DNA typing to establish clonality • Human DNA fingerprinting using STR profiling • Food identification and authentication methods
Intended Learning Outcomes: (September 2007)	Having completed this practical module the student will be able to: • Prepare a variety of sample types and select the most appropriate analytical technique. • Carry our standard *in vitro* bioassays, along with the necessary statistical analysis. • Obtain images in metallurgical microscope under normal imaging and using polarised light. • Obtain and interpret secondary electron images and back-scattered images in the scanning electron microscope. • Use Energy Dispersive X-rays (EDX) to do an elemental analysis of ceramics, alloys and of additives in polymers. • Use ATR and Specular Reflectance attachments to obtain FTIR spectra of thin films, coatings, paints and oil/fluids; • Use Scanning Spectroscopic Ellipsometry to determine thickness and refractive index of coatings and films. • Isolate, analyze and type bacterial genomic DNA. • Perform human DNA fingerprinting using short tandem repeat (STR) profiling. • Identify and authenticate a food sample using DNA analysis.