THEUNIVERSITY OF THE WEST INDIES, MONA
FACULTY OF MEDICAL SCIENCES
DEPARTMENT OF BASIC MEDICAL SCIENCES

THE MASTER IN FORENSIC SCIENCE
&
POSTGRADUATE DIPLOMA IN FORENSIC SCIENCE

COURSES & SYLLABUS

Academic Year 2021 - 2022

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BACKGROUND AND AIMS

The University of the West Indies (UWI) in 2007 embarked upon a strategic transformation process in order to address some of the most challenging problems in the region. One of the greatest challenges facing the region is that of the increase in crime and violence which has impacted negatively on all aspects of the society. Initiatives of the University to help to address these challenges include the creation of a Centre for Public Safety and Justice to provide strategic advice to governments, regional organizations and the private sector in the region and the establishment of Caribbean Genetics (CARIGEN) and Caribbean Toxicology (CARITOX) to provide independent forensic DNA and toxicology services to citizens and the judicial system. In the academic year 2008/2009 the University approved a new Masters programme in Forensic Science to provide a new cadre of expertise in the area of forensic science for the region.

It was recognized that many professionals or graduates entering Forensic Science have had little or no formal training in the area. Traditionally, persons entering the field undergo an internship period on the job or pursue a graduate programme in a forensic science discipline. The UWI Forensic Science programme was therefore designed to offer a broad-based learning experience to produce individuals with the necessary theoretical and laboratory problem-solving skills necessary for success in a modern forensic laboratory. Such individuals conduct and or direct the analysis of forensic samples, interprets data and reaches conclusions. In this regard, the programme combines rigorous scientific and laboratory training with exposure to the breadth of forensic science disciplines and further specialization in one of the following four areas: forensic chemistry, forensic biology, forensic pathology and forensic toxicology. Students also receive training in statistical evaluation of forensic evidence, legal testimony related to chain of custody, good laboratory practices, testing procedures, results and interpretations, report writing, research, and the value of professional ethics.

Upon completion of the programme graduates can have careers in forensic science, basic research, industry, and allied health or in the criminal justice system. Additionally, students can elect to pursue degrees in medicine, law, and MPhil/PhD programmes. The potential employers of graduates from the MSc Forensic Science programme will include forensic science laboratories, public or private laboratories involved in health and environmental control, food analyses, clinical analyses, pharmaceutical industry, industrial laboratories, regulatory agencies, quality control and police crime scene investigation teams.

Programme Objectives

On completion of this programme students are expected to:

1. Demonstrate an understanding of the areas that are essential to forensic science
2. Apply basic forensic science concepts to problem solving necessary for success in a modern forensic science laboratory
3. Discuss the social aspects of crime

4. Demonstrate professional values, concepts and ethics
5. Provide expert testimony in the court
6. Demonstrate integration of knowledge and skills through a variety of experiences and tools such as comprehensive examinations, thesis, and research project.

Target Groups

University graduates of science, medical sciences or medical programmes, nurses, teachers, persons employed in the criminal justice sector such as police officers and forensic services.

TEACHING STAFF

The teaching staff for the Forensic Science programme is drawn from various campuses and faculties of The University of the West Indies, from other universities and research institutions, from government, non-government organizations, and the legal fraternity and from foreign institutions. The international background, variety of academic disciplines and professional expertise represented by the staff expose students to a diversity of perspectives on the approaches to the field of forensic science.

Teaching staff

Daniel Attinger, PhD	Associate Professor, Department of Mechanical Engineering Iowa State University, USA
David Batts, LLB	The Honourable Mr Justice – Puisne Judge, Jamaica
Compton Beecher, MPhil	Chief Forensic DNA Analyst Caribbean Genetics Department of Basic Medical Sciences University of the West Indies, Mona Campus
Paul Brown, PhD	Professor – Molecular Biology Department of Basic Medical Sciences University of the West Indies, Mona Campus
Sherline Brown, PhD	Lecturer – Molecular Biology Department of Basic Medical Sciences University of the West Indies, Mona Campus
Tamara Comrie, MSc	Forensic DNA Analyst Forensic Science Laboratory & Legal Medicine Institute Hope Boulevard, Kingston, Jamaica
Wayne Cranston, MSc	Forensic Anthropologist Louisiana State University USA
Dionne Cruickshank	Attorney at Law 7 Duke Street Kingston
Garth Dawkins, MPhil	Laboratory Quality Assurance School of Natural & Applied Science University of Technology
Stephen DeRoux, MD	Deputy Chief Medical Examiner Office of the Chief Medical Examiner New York City, NY, USA
D'Michelle DuPre, BA, MD	Forensic Pathologist ITT Technical Institute Columbia, SC
Jean Williams-Johnson, DM (Em Med)	Department of Surgery, Radiology & Intensive Care University of the West Indies, Mona Campus

Albert Leung, MA	Medical-legal/Forensic Investigator Office of the Chief Medical Examiner New York City, NY, USA
Carole Lindsay, MPhil	Assistant lecturer – Biochemistry Department of Basic Medical Sciences University of the West Indies, Mona Campus
Paul Maragh, PhD	Snr. Lecturer - Chemistry Chemistry Department University of the West Indies, Mona Campus
Dr. Stephen Morley MRCP FRCPath DM LLM	Clinical Lead for clinical chemistry and toxicology Sheffield Teaching Hospitals Toxicology Unit, Northern General Hospital Sheffield UK
Marissa Moses, PhD	Cocoa Research Unit University of the West Indies, St Augustine Campus Trinidad & Tobago
Wayne McLaughlin, PhD	Professor & Programme Coordinator Department of Basic Medical Sciences University of the West Indies, Mona Campus
Judith Mowatt-Henry	Director (Toxicologist) Institute of Forensic Science & Legal Medicine Institute Hope Boulevard, Kingston, Jamaica
Hillary Mullings-Williams, MSc	Forensic Officer Institute of Forensic Science & Legal Medicine Institute Hope Boulevard, Kingston, Jamaica
Vaughn Rattray, PhD	Lecturer - Chemistry Chemistry Department University of the West Indies, Mona Campus
Raymond Reid, PhD	Lecturer - Chemistry Chemistry Department (Pesticide Research Unit) University of the West Indies, Mona Campus
Paul Singh, PhD	Lecturer - Toxicology Department of Basic Medical Sciences University of the West Indies, Mona Campus
Jacqueline Campbell, MBBS	Lecturer - Pharmacology Department of Basic Medical Sciences University of the West Indies, Mona Campus
Christine Walters, PhD	Office of the Dean Faculty of Medical Sciences University of the West Indies, Mona Campus
Alfredo Walker, MB.BS, FRCPath, DMJ (Path)	Forensic Pathologist and Assistant Professor University of Ottawa Department of Pathology and Laboratory Medicine The Ottawa Hospital, Canada.
Insp. Gregory Williams, BSc (Hon), MSc	Royal Police Force Antigua & Barbuda American Road St Johns, Antigua
Dr. Natasha Richards, MBBS, DM, RCPSC	Forensic Pathologist Forensic Science Laboratory & Legal Medicine Institute Ministry of National Security, Jamaica
Dr. Trudy-Ann Brown, MBBS, DM	Forensic Pathologist Forensic Science Laboratory & Legal Medicine Institute Ministry of National Security, Jamaica
Michael Gardner, CD	Lecturer, Anatomy Department of Basic Medical Sciences University of the West Indies, Mona Campus

Shelly McFarlane, PhD	Research Fellow Epidemiology Research Unit Tropical Medicine Research Institute
Andriene Grant, PhD	Director, Epidemiological Research and Data Analysis Unit (ERDAU), Health Promotion and Protection Branch (HPPB), Ministry of Health
Latoya Foote, MPhil	Entomologist Department of Life Sciences University of the West Indies, Mona Campus
Anika Lowe, MSc	Forensic Biologist Forensic Science Laboratory & Legal Medicine Institute Ministry of National Security, Jamaica
Omroy Shaw, MSc	Forensic Chemist Forensic Science Laboratory & Legal Medicine Institute Ministry of National Security, Jamaica
Sgt Sean Henry	Forensic Firearm Investigator Forensic Science Laboratory & Legal Medicine Institute Ministry of National Security, Jamaica
Parris Lyew-Ayee, PhD	Director, Mona Geo Informatics University of the West Indies, Mona Campus
Pete Gagliardi	ATF Agent (Retired)t Ultra Electronics Forensic Technology Inc. Côte St-Luc , QC Canada
Christopher Ogunsalu, MBBS, DDS, PhD	Snr. Lecturer, Anatomy Department of Basic Medical Sciences University of the West Indies, Mona Campus
Insp. Gary Husbands	Firearms Examiner Royal Barbados Police Force Barbados

EXTERNAL EXAMINERS

Dr Christopher Johnson (Pathology)	Forensic Pathology Unit Department of Pathology Royal Liverpool University Hospital Liverpool UK
Professor Paul Evison (Anthropology)	Centre for Forensic Science Northumbria University Newcastle Upon Tyne\ UK
Dr. Susan Pope (Biology)	Director, Principal Forensic Services Ltd Melbury House Bromley, Kent UK
Dr. Marilyn Huestis (Toxicology) Retired	Chief, Chemistry and Drug Metabolism Section The National Institute on Drug Abuse (NIDA) Biomedical Research Center 251 Bayview Blvd. Suite 200 Room 05A-721 Baltimore, MD 21224 USA
Dr. Suzanne Bell (Chemistry)	West Virginia University

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POSTGRADUATE PROGRAMME IN FORENSIC SCIENCE

Organisation of the Programme

The MSc programme is **18-months (4 semesters) full-time or 24 months (6 semesters) part-time** and the postgraduate diploma (PGDip) prorgamme is **12-months full-time (3 semesters) and 24 months (6 semesters) part-time**. Lectures for the first semester are scheduled from the first week of September and end in December. The second semester begins in January and ends in April. The summer semester begins in May and ends the last week of October. The lecture schedule may however change to accommodate visiting lecturers.

The Master of Science degree requirements are met upon satisfactory completion of minimum of 45 credits of which 24 credits make up the core courses for all disciplines. Twenty-one (21) credits are specific to the disciplines of forensic chemistry, forensic biology, forensic pathology and anthropology, or forensic toxicology and 8 elective credits. The Diploma programme is designed to meet the needs of today's working professionals. The Diploma programme also offers several areas of concentration. These include Forensic Biology, Forensic Toxicology and Crime Scene Investigation. The Diploma requirements are met upon satisfactory completion of a minimum of 24 credits.

The Forensic Science curriculum is designed according to a modular structure consisting of core and elective courses. The curriculum of the first semester of the programme is to: (1) provide the student with a broad introduction to forensic science, the history and overview of the disciplines; (2) familiarize students with the legal and ethical underpinnings for their work; (3) expose students to research methodologies; (4) crime scene investigation procedures and (5) quality control in the forensic laboratory.

Teaching Methods

Teaching is designed to encourage active student participation and to foster dynamic exchange of ideas among staff and students. Teaching methods are chosen to best reflect the contents of each course and include: group discussions, projects, seminars, field visits, didactic lectures, laboratory practicals, video demonstrations and visits to the criminal courts.

FACILITIES

Teaching Facilities

The Department relocated to the new Faculty of Medical Sciences Teaching and Research Complex in January 2013. The complex is a 28,000 m^2 state-of-the-art facility with research and teaching laboratories, lecture theatres, seminar rooms, tutorial rooms and meeting rooms. Lectures are generally held in seminar rooms and seminars in lecture theatres.

Library Facilities

The University has three libraries, the Main, Science or Medical libraries (Mona catalogue). In addition, there are a number of specialised collections in the various departments. On-line access will be available for some of the relevant journals.

Laboratory Facilities

The programme has available a variety of state-of-the-art equipment such as GC-MS, LC-MS/MS, HPLC, FTIR, Genetic Analysers, thermal cyclers both for real time and end-point PCR, and TRUEPOINT 300® Laser Scanner, comparison microscope, digital microscope. Laboratories and research facilities are available for forensic anthropology, molecular biology, serology and toxicology in the Faculty of Medical Sciences Teaching and Research Complex. Students will also have to opportunity to conduct laboratory and research in CARIGEN, CARITOX and ICENS. Forensic chemistry takes place in the Drug Testing Laboratory in the Chemistry Department and Forensic Pathology takes place at the Pathology Department at the Institute Forensic Science Legal Medicine Unit.

Housing Facilities

Information on Housing can be found at http://www.mona.uwi.edu/admissions/pdf/Student-Housing-Application-Form2.pdf

COURSE OF STUDY IN FORENSIC SCIENCE

MSc Degree Core Curriculum

Each student is required to successfully complete the Core Curriculum which provides the student with a broad-based educational experience in Forensic Science. Courses included in the Core Curriculum are as follows:

Course Code	Course	Credit	Semester
FSCI6101	Fundamentals of Forensic Science	3	1
FSCI6102	Crime Scene Management	3	1
FSCI6103	Forensic Laboratory Quality Assurance	2	1
FSCI6201	Legal and Ethical Issues in Forensic Science	3	1
FSCI6202	Moot Court	2	Summer
FSCI6301	Statistical Analysis of Forensic Evidence	3	1
FSCI6401	*Research methods & Project	6	2 & Summer
FSCI6402	Graduate Seminar	2	2 & Summer
Total		**24**	

** Research Method topics will be done in Semester 2 and the Research Project starts in the summer.*

Electives

Course Code	Course	Credit	Semester
FSCI6302	Population Genetics	3	Summer
FSCI6204	Crime Scene Reconstruction	3	2
FSCI6205	Crime Scene Reconstruction Laboratory	2	2
FSCI6501	Forensic Chemistry I	3	2
FSCI6502	Forensic Chemistry II	3	Summer
FSCI6503	Forensic Chemistry Analysis Laboratory	2	Summer
FSCI6504	Forensic Firearm Investigation	3	Summer
FSCI6505	Forensic Firearm and Tool Mark Analysis Lab	2	Summer
FSCI6601	Forensic Serology	3	2
FSCI6602	Forensic Serology Laboratory	2	2
FSCI6603	Forensic Molecular Biology	3	Summer
FSCI6604	Forensic Molecular Biology Laboratory	2	Summer
FSCI6605	Forensic Entomology	3	2
FSCI6606	Forensic Entomology Laboratory	2	2
FSCI6701	Forensic Anthropology	3	Summer
FSCI6702	Forensic Anthropology Laboratory	2	Summer
FSCI6703	Forensic Pathology I	3	2
FSCI6704	Forensic Pathology II	3	Summer
FSCI6705	Forensic Pathology Laboratory	2	Summer
FSCI6801	Forensic Toxicology I	3	2
FSCI6802	Forensic Toxicology II	3	Summer
FSCI6803	Forensic Toxicology Laboratory	2	Summer
PHAL6010	Drugs of Abuse: Psychopharmacology	3	Summer
SALI6106	Deviance, Crime and Social Management	3	Summer

MSc FORENSIC SCIENCE AREAS OF SPECIALIZATION

Students are required to complete at least one (1) area of emphasis.

MSc Forensic Chemistry

Prerequisite: A BSc degree, for example in Chemistry, Biochemistry, Pharmacology

Course Code	Course	Credit	Semester
FSCI6501	Forensic Chemistry I	3	2
FSCI6502	Forensic Chemistry II	3	Summer
FSCI6503	Forensic Chemistry Analysis Laboratory	2	Summer
FSCI6801	Forensic Toxicology I	3	2
FSCI6803	Forensic Toxicology Laboratory	2	Summer
Electives		8	
Total		**21**	

MSc Forensic Biology

Prerequisite: A BSc degree, for example in the biological, biochemical or life sciences.

Course Code	Course	Credit	Semester
FSCI6302	Population Genetics	3	Summer
FSCI6601	Forensic Serology	3	2
FSCI6602	Forensic Serology Laboratory	2	2
FSCI6603	Forensic Molecular Biology	3	Summer
FSCI6604	Forensic Molecular Biology Laboratory	2	Summer
Electives		8	
Total		**21**	

MSc Forensic Pathology and Anthropology

Prerequisite: A medical degree, for example MBBS degree or BBMedSci Anatomy or B.Sc. RN.

Course Code	Course	Credit	Semester
FSCI6701	Forensic Anthropology	3	Summer
FSCI6702	Forensic Anthropology Laboratory	2	Summer
FSCI6703	Forensic Pathology I	3	2
FSCI6704	Forensic Pathology II	3	Summer
FSCI6705	Forensic Pathology Laboratory	2	Summer
Electives		8	
Total		**21**	

MSc Forensic Toxicology

Prerequisite: MBBS or BSc degree for example in the biological, biochemical, chemical, pharmacology or life sciences.

Course Code	Course	Credit	Semester
FSCI6501	Forensic Chemistry I	3	2
FSCI6503	Forensic Chemistry Laboratory	2	Summer
FSCI6801	Forensic Toxicology I	3	2
FSCI6802	Forensic Toxicology II	3	Summer
FSCI6803	Forensic Toxicology Laboratory	2	Summer
Elective		8	
Total		**21**	

POSTGRADUATE DIPLOMA PROGRAMME

Postgraduate Diploma in Forensic Biology

Prerequisite: A BSc degree, for example in the biological, biochemical or life sciences.

Course Code	Course	Credit	Semester
FSCI6101	Fundamentals of Forensic Science	3	1
FSCI6102	Forensic Laboratory Quality Assurance	3	1
FSCI6201	Legal and Ethical Issues in Forensic Science	3	1
FSCI6302	Population Genetics	3	Summer
FSCI6601	Forensic Serology	3	2
FSCI6603	Forensic Molecular Biology	3	Summer
FSCI6605	Forensic Entomology	3	2
Elective		3	
Total		**24**	

Postgraduate Diploma in Forensic Toxicology

Prerequisite: MBBS or BSc degree for example in the biological, biochemical, chemical, pharmacology or life sciences.

Course Code	Course	Credit	Semester
FSCI6101	Fundamentals of Forensic Science	3	1
FSCI6102	Forensic Laboratory Quality Assurance	3	1
FSCI6201	Legal and Ethical Issues in Forensic Science	3	1
FSCI6501	Forensic Chemistry I	3	2
FSCI6801	Forensic Toxicology I	3	2
FSCI6802	Forensic Toxicology II	3	Summer
PHAL6010	Drugs of Abuse: Psychopharmacology	3	Summer
Elective		3	
Total		**24**	

Postgraduate Diploma in Crime Scene Investigation

Prerequisite: BSc degree for example in the biological, biochemical, chemical, pharmacology or life sciences.

Course Code	Course	Credit	Semester
FSCI6101	Fundamentals of Forensic Science	3	1
FSCI6102	Crime Scene Management	3	1
FSCI6201	Legal and Ethical Issues in Forensic Science	3	1
FSCI6204	Crime Scene Reconstruction	3	2
FSCI6504	Forensic Firearm Investigation	3	Summer
FSCI6701	Forensic Anthropology	3	Summer
FSCI6703	Forensic Pathology I	3	2
Elective		3	
Total		**24**	

DESCRIPTION OF COURSES

FSCI6101 **Fundamentals of Forensic Science**
3 Credits Semester 1
Pre-requisite: None

Course Description:

This course will provide a broad introduction to forensic science, the history and overview of the disciplines. Students will be introduced to the theory, concepts and practices used in the analysis of biological and physical evidence, analysis of drugs, forms of trace evidence, document examination, identification of biological fluids, personal identification. The importance of application of forensic science to the criminal justice system also its role in international human rights issues, identification the victims of genocide and mass disasters will also be discussed. Guest lecturers will be invited to cover selected topics. Throughout the semester students will be provided with case studies and journal articles and be expected to read and prepare for discussions.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Explain the principles that are central to forensic science in the investigation of crime
2. Describe the role of forensic science in the criminal justice system
3. Describe the forensic techniques used to analyze evidence
4. Describe the organization and issues that are central to a well-run laboratory
5. Describe the emergence of nontraditional forms of evidence collection at crime scenes
6. Discuss current human rights issues pertaining to the use of DNA samples and databases, genocide and mass disasters

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignment	10%

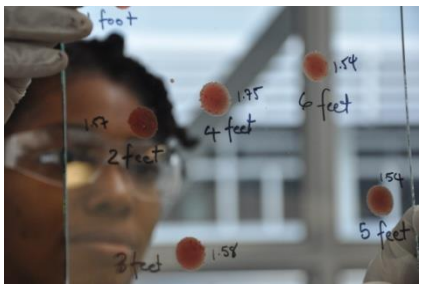
Prescribed text(s):
Houck Max M. and Jay A. Siegel (Eds). *Fundamentals of Forensic Science*. 2nd Ed. 2006. Elsevier Science.
James Stuart H. and Jon J. Nordby *Forensic Science: An Introduction to Scientific and Investigative Techniques* 3rd Edition 2009.

Recommended readings:
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2nd Ed. 2007. Pearson
Saferstein, Richard *Criminalistics: An Introduction to Forensic Science* 9th Ed. 2007. Pearson
Forensic Science International Journal of Forensic and Legal Medicine
Journal of Forensic Sciences

Course Coordinator: Professor Wayne McLaughlin

FSCI6102 **Crime Scene Management**
3 Credits Semester 1
Pre-requisite None

Course Description:



This course will introduce students to procedures for the investigation of a crime scene. The course will describe the role of the First Officer on the scene, scene search procedures, procedures including recognition, protection, documentation techniques, and collection of biological and physical evidence; crime scene documentation (photography, crime scene sketching), information gathering, measurements and report writing and the importance of chain of custody. The management of scene investigations will include burglary, homicide, arson, motor vehicle, and sudden and unexplained death. Students will be introduced to fingerprint processing and blood pattern analysis. Throughout the semester students will be provided with journal articles and be expected to read and prepare for discussions.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Describe the principal roles of the key personnel involved in crime scene processing.
2. Undertake scientific evaluation of forensic evidence gathered during a criminal investigation
3. Describe the general principles and processes involved in the search for items of physical evidence and their marking, collection, packaging, labelling and storage.
4. Document the crime scene using basic technologies (sketching, photography, etc).
5. Prepare documentation related to chain of custody of forensic evidence
6. Explain the importance of crime scene processing in the successful application of methods of forensic science to the solution of crime.
7. Conform to safety issues at the crime scene
8. Describe the recommended practices for the investigation of death scenes.
9. Describe the recommended practices for the investigation of arson scenes.

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
Sutton, Raul and Keith Trueman (Eds.) *Crime Scene Management: Specific Methods*. 2009. John Wiley and Sons, Ltd.
Fisher, B. J. and D. Fisher. *Techniques of crime scene investigation* 7th Ed. 2003 CRC Press
Stuart, James H. and Jon J. Nordby Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd Ed. 2009.

Recommended reading(s):
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2nd Ed. 2007, Pearson.
Swanson C., N. Chamelin, L. Territo and R. Taylor. *Criminal Investigation*. 10th Ed. 2009. McGraw Hill.
Forensic Science International
Journal of Forensic Sciences.

Course Coordinator: Insp Gregory Williams

FSCI6103	**Forensic Laboratory Quality Assurance**		
	2 Credits	Semester:	1
Pre-requisite	None		

Course Description:
To introduce the principles of quality assurance and current industry standards for quality management systems (QMS) in forensic science disciplines. Aspects of the laboratory operation, including the organizational structure, processes, procedures, and analysis that affects the quality of analytical data will be addressed. Implementation steps, use and maintenance of the QMS will also be discussed.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Outline the history, philosophy, concepts and benefits of a laboratory QMS.
2. Describe the essential components of forensic laboratory quality management systems and explain their significance in terms of the reliability of analytical results.
3. Implement a laboratory QA and quality control (QC) program.
4. Describe applicability and how to implement a laboratory QMS.
5. Apply the ISO/IEC 17025 standard to improve laboratory performance.
6. Apply standard practices for methods validation in forensic laboratories.
7. Use statistical methods to ensure the quality of the results.

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

1. A lecture course of 24 hours

Course Assessment Methods:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Teaching/Learning Resources:
Course text; Periodicals; On-line journals.

Prescribed text(s):
Ratcliff, Thomas A. Laboratory Quality Assurance System: *A manual of procedures and forms*. 3rd Ed. 2003. John Wiley & Sons Ltd.

Teaching/Learning Resources:
Course text; Periodicals; On-line journals, laboratory manual

Recommended reading(s):

John Kenkel A Primer on Quality in the Analytical Laboratory. Lewis Publishers/CRC Press 2000. Available free on line @ http://www.forensicnetbase.com/ejournals/books/book_summary/summary.asp?id=22
White, Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry.
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2nd Ed. 2007. Pearson
Scientific Working Group for Forensic Toxicology (SWGTOX) http://www.swgtox.org/

Course Coordinator: Mr Garth Dawkins

FSCI6201	**Legal and Ethical Issues in Forensic Science**		
	3 Credits	Semester	1
Pre-requisite	None		

Course Description:
It is important for forensic scientists to have a thorough understanding of the legal and ethical underpinnings for their work. These are important in establishing and maintaining a responsible and reputable forensic science service. The role that a forensic scientist plays in the litigation process will be discussed. Students will learn the appropriate guidelines for professionalism and conduct in expert witnessing. Students will also be exposed to both the general principles that underlie the criminal and constitutional law as well as to some specific crimes recognised by the criminal law. Legal rules regarding the search and seizure of physical evidence, standards of reliability and relevance of scientific evidence in court, the scientific interpretations and analysis of physical evidence and the development and application of professional codes of ethics will also be discussed. Several case studies will be used.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Describe the hierarchical arrangement of the courts within the criminal justice system and the relationship between them.
2. Explain what constitutes a crime and evidence
3. List the general categories of criminal offence and understand how these relate to the trial destination of each category.
4. Distinguish between the role of the jury and that of the judge in Supreme Court trials or Circuit Court trials.
5. Discuss the two major ethical theories and explain why the Forensic Scientist should study ethics
6. Describe the interaction of ethics and the criminal justice system and explain the importance of the expert witness
7. Explain the role of ethics in scientific research
8. Describe ethical practices that are specific to Forensic Science and give examples of situations where misconduct has occurred
9. Describe and discuss ethical issues associated with the forensic use of bioinformation
10. Write a code of ethics for an organisation

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
Antoine R. *Commonwealth Caribbean law and legal systems*. 2nd Ed. 2008. Routledge-Cavendish Publishing Ltd.
Bowen Robin T. Ethics and the Practice of Forensic Science 2009. CRC Press

Recommended reading(s):
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2nd Ed. 2007. Pearson
Hodgkinson T *Expert evidence law and practice*. 3rd Ed. 2009. Sweet and Maxwell Publishers.
Ellner, P. *The biomedical scientist as expert witness*. 2006 ASM Press
Journal of Forensic and Legal Medicine

Course Coordinator: Ms. Dionne Cruickshank

FSCI6202	**Moot Court**		
	2 Credits	Semester	3
Pre-requisite	None		

Course Description:
This course builds upon the material discussed in Legal and Ethical Issues in Forensic Science regarding the criminal trial process, the role of the forensic witness and the presentation of scientific testimony and physical evidence in court. Students will participate in presenting testimony as well as critiquing the performance of others in a mock court setting. Instructors will utilize reports and projects prepared in other courses to provide the subject matter for the students' testimony.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Appreciate the importance of the forensic science report prepared for use in court.
2. Outline the role of the forensic scientist instructed to appear in court as an expert witness.
3. Discuss the legal issues regarding the 'scientific' interpretations and analyses of physical evidence
4. Recognise that the interpretation of evidence by the expert witness is likely to be the most significant area of challenge during cross-examination by the opposing side.

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, evidence presentations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 18 hours
2. Moot Court Sessions of 6 hours

Evaluation:

One 2 hour written paper	60%
One In-course Test	10%
Case Report	10%
Moot Court	20%

Prescribed text(s):
Wall, W Forensic Science in Court: The Role of the Expert Witness. 1st Ed 2009 Wiley-Blackwell.

Recommended reading(s):
Antoine R. *Commonwealth Caribbean law and legal systems*. 2nd Ed. 2008. Routledge-Cavendish Publishing Ltd.
Bowen Robin T. Ethics and the Practice of Forensic Science 2009. CRC Press
Ellner, P. *The biomedical scientist as expert witness*. 2006 ASM Press
White Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry.
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2nd Ed. 2007. Pearson

Course Coordinator: Ms. Dionne Cruickshank

FSCI6204 **Crime Scene Reconstruction**
3 Credits Semester 2
Pre-requisites: FSCI6102

Course Description:
This course will provide students with the theory and scientific methods used in the reconstruction analysis of a crime scene. This course build on aspects taught in the Crime Scene Management course [FSCI6201]. Reconstruction is based on the ability to make observations at the scene, the scientific ability to examine physical evidence, and the use of logical approaches to theory formulations. The students will develop a basic understanding of the discipline of bloodstain pattern analysis, trajectory dynamics, fire investigation and recording of the crime scene.

Learning Outcomes:
At the end of this course the student should be able to:

1. Demonstrate the basic principles for the forensic examination of physical evidence and reconstruction.
2. Describe the stages in the reconstruction process
3. Classify the types of reconstruction depending on the nature of the crime
4. Gather, evaluate and analyse evidence to reconstruct a crime scene.
5. Describe pattern evidence commonly found at different crime scenes
6. Develop chain of custody procedures for managing evidence samples.
7. Explain the relationships between the disciplines of bloodstain pattern analysis in forensics and that of fluid dynamics
8. Describe common patterns found at fire scenes and how they are used in reconstructing fire scenes
9. Use both a mathematical and a physical approaches to determine bullet trajectory
10. Describe the techniques used in recording the crime scene

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Course Assessment Methods:

One 2 hour written paper	70%
Two In-course Test	20%
Assignment	10%

Teaching/Learning Resources:
Course text; Periodicals; On-line journals

Prescribed Texts:
Gardner R. M. and T. Bevel (2009) Practical Crime Scene Analysis and Reconstruction: Practical Aspects of Criminal & Forensic Investigations. CRC Press
Kubic T and Petraco N (2005) Forensic Science laboratory Manual and Workbook. CRC Press

Recommended Text:
Fisher B.A. Techniques of Crime Scene Investigation (7th Ed) CRC Press
James S. H., P. E. Kish, T. P. Sutton (2005) Principles of Bloodstain Pattern Analysis: Theory and practice. CRC Press
Haag M. and L. Haag. 2011. Shooting Incident Reconstruction 2nd Edition Academic Press

Forensic Science International	Journal of Forensic Identification
Journal of Forensic and Legal Medicine	Journal of Forensic Sciences

Course Coordinator: Insp Gregory Williams

FSCI6205 **Crime Scene Reconstruction Laboratory**
2 Credits Semester 2
Co-requisites: FSCI6204

Course Description:
This course will provide students with hands on experience in identifying finger prints, documenting and establishing parameters in bullet trajectory, bloodstain and pattern evidence, pattern identification and crime scene reconstruction. The course will enhance basic skills and develop the student to a basic competency level as a crime scene reconstruction analyst. The methodology and techniques needed to properly analyse and reconstruct the scene are emphasized.

Learning Outcomes:
At the end of this course the student should be able to:

1. Demonstrate the basic principles for the forensic examination of physical evidence and reconstruction.
2. Recognize pattern evidence commonly found at different crime scenes
3. Develop chain of custody for managing evidence samples.
4. Analyse bloodstain evidence and use the information to reconstruct a crime scene
5. Determine the origin and common patterns of fires and how they are used in reconstructing fire scenes
6. Use both mathematical and a physical approaches to determine bullet trajectory
7. Use a camera, 3-D laser scanner in mapping a crime scene and developing 3-D images

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, field work

Course Assessment Methods:

Laboratory reports	60%
Case Report	20%
Two In-course tests	20%

Teaching/Learning Resources:
Course text; Periodicals; On-line journals, laboratory manual

Prescribed Texts:
Gardner R. M. and T. Bevel (2009) Practical Crime Scene Analysis and Reconstruction: Practical Aspects of Criminal & Forensic Investigations. CRC Press
Kubic T and Petraco N (2005) Forensic Science laboratory Manual and Workbook. CRC Press

Recommended Texts:
Fisher B.A. Techniques of Crime Scene Investigation (7th Ed) CRC Press

James S. H., P. E. Kish, T. P. Sutton (2005) Principles of Bloodstain Pattern Analysis: Theory and practice. CRC Press
Haag M. G. and L. C. Haag. 2011. Shooting Incident Reconstruction 2nd Edition Academic Press

Forensic Science International Journal of Forensic and Legal Medicine
Journal of Forensic IdentificationJournal of Forensic Sciences

Course Coordinator: Insp Gregory Williams

FSCI6301 **Statistical Analysis of Forensic Evidence**
3 Credits Semester 1
Pre-requisite None

Course Description:

The element of uncertainty pervades forensic investigations. Statistical and probabilistic tools, once appropriately applied, can aid in providing answers to problems often encountered in the field. Hence, the course is designed to introduce graduate level forensic science students to the fundamental principles and applications of statistics and probability. Specific topics to be covered include descriptive data measures, laws of probability, conditional probability, theoretical probability distributions, statistical inference and evaluation of evidence using likelihood ratios and Bayes' theorem. A blended format of didactic presentations, exercises involving use of statistical software and discussions surrounding relevant published literature and legal debates is geared towards building a deeper understanding of the subject in both professional and research contexts. Assessment will be through in-course assignments and tests as well as a final examination.

Learning outcomes
Upon completion of this course, students should be able to:

1. Describe the basic concepts of statistical methodologies
2. Present summaries of forensic data collected
3. Apply laws of probability to the analysis of forensic evidence
4. Evaluate hypotheses and interpret results
5. Generate regression models for forensic data
6. Apply likelihood ratio and Bayesian inference to the analysis of forensic evidence
7. Critique the application of statistical and probabilistic principles in the literature
8. Engage the use of statistical software in aiding calculations and presenting results

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:
One 2 hour written paper 70%
Two In-course tests 20%
Two take-home assignments 10%
Prescribed text(s):
Lucy, David. *Introduction to Statistics for Forensic Scientists*. 2005. John Wiley & Sons, Ltd.
Adams, Craig. Essential Mathematics and Statistics for Forensic Science. 2010. Wiley-Blackwell, Ltd.

Recommended reading(s):
Aitken, Colin and Franco Taroni. *Statistics and the evaluation of evidence for forensic scientists.* 2nd Ed. 2004. John Wiley & Sons, Ltd
Forensic Science International
Forensic Science International: Genetics

Course Coordinator: Dr. Christine Walters

FSCI6302	**Population Genetics**	
	3 Credits	Summer
Pre-requisite	None	

Course Description:
Population genetics provides the background for the forensic scientist to understand the importance of population size, migration, mating, alleles and genotypes in DNA profiling and using DNA databases. This course will examine the principles of population genetics and the practical application of these principles to understanding genetic variation within and between populations, the significance of Hardy-Weinberg equilibrium, race and ethnicity. Throughout the semester students will be provided with journal articles and be expected to read and prepare for class discussions.

Learning Objectives:
Upon completion of this course, students should be able to:

1. Calculate the frequency of both genotypes and alleles in a population.
2. Calculate the expected genotype frequencies after a generation of random mating.
3. Test for deviations from Hardy-Weinberg expectations.
4. Apply the Hardy-Weinberg equation to calculate frequency of a gene in a population.
5. Apply Wright's F statistics to estimate genetic differences among sub-populations.
6. Describe how evolutionary forces (mutations, selection, drift, migration) and patterns of mating are expected to affect the allele and genotype frequencies in population.

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
Daniel Hartl. *A Primer of Population Genetics*. 3rd Ed. 2000. Sinauer Associates Inc.

Recommended reading(s):
Lucy, David. *Introduction to Statistics for Forensic Scientists*. 2005. John Wiley & Sons, Ltd.
Forensic Science International: Genetics

Course Coordinator: Dr. Marissa Moses

FSCI6401 **Research Methods and Project**

6 Credits Semester 2 and Summer

Pre-requisite None

Course Description:
Laboratory research in forensic science subject areas. The original research problem will be written up as a formal document and submitted as part of the requirements to fulfill a Master of Science degree. Data generated from research will form the basis for the Graduate Seminars (FSCI 6402). Students will be exposed to research methodologies prior to starting their project. Students will be required to perform their research in semester 2 and during the summer. Research can be performed on campus or at an external laboratory/ agency.

Learning Objectives:
Upon completion of this course, students should be able to:

1. State the different study designs and sampling methods
2. Calculate sample size
3. Determine what to measure and how to measure it
4. Select data analysis tools
5. Undertake a literature review
6. Define a research question, hypothesis, statement and choose an appropriate study design
7. Design a research protocol

Mode of Delivery/Teaching Methodologies:

Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Independent Research

Evaluation:

MSc Research paper	80%
One In-course test (Research Methods)	15%
Laboratory Manual	05%

Prescribed text(s):
Christensen L et al *Research methods, design, and analysis* 12th Edition 2013. Pearson

Recommended reading(s):
Journal of Analytical Toxicology
Journal of Forensic and Legal Medicine
Forensic Science International: Genetics
Forensic Science International
Journal of Forensic Sciences
Journal of Forensic Identification

Course Coordinator: Dr. Shelly McFarlane

FSCI6402 **Graduate Seminar**

2 credits Semester 2 and Summer

Pre-requisite None

Course Description:
A seminar series involving presentations from students on their research project, journal articles, case reviews and from invited speakers. Each student will also be required to present a one-hour seminar on the results of their research. Students are expected to constructively join in discussions, with appropriate preparation, and to interact professionally with their classmates Attendance at all seminars is compulsory.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Critically analyse and discuss journal articles in their respective discipline
2. Review and present cases involving the use of forensic evidence
3. Present results from their research project

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. Seminars of 48 hours

Evaluation:

Final Research Project presentation (FSCI6401)	40%
Research Project Proposal presentation (FSCI6401)	30%
Journal article presentation	20%
Attendance and participation	10%

Course Coordinator: Prof. Wayne McLaughlin

FSCI6501 **Forensic Chemistry I**

3 Credits Semester 2

Pre-Requisite None

Course Description:

This course will introduce students to various analytical techniques in forensic analytical chemistry. Students will be introduced to the principles, instrumentation, applications, advantages and limitations of spectroscopic, immunoassay and chromatography techniques. The following spectroscopic techniques will be discussed: flame atomic emission spectroscopy, flame atomic absorption spectroscopy, molecular absorption spectroscopy, analytical fluorescence spectroscopy. The application of immunoassay, thin layer chromatography (TLC), liquid (LC) and gas chromatography (GC) in relation to the analysis of drugs and organic compounds with be discussed.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Discuss the principles of chromatographic separation, factors that influence separation efficiency and the components, layout, functioning and optimization of typical instruments.
2. Describe specialized chromatographic techniques for analysing micro-samples and trace analytes.
3. Discuss the principles of atomic absorption and atomic emission spectroscopy (AAS, GFAAS, AES, ICP-AES), typical instrumentation, components and operating conditions.

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
2. A lecture course of 24 hours
3. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):

Bell, Suzanne. *Forensic Chemistry.* Pearson/ Prentice Hall, Upper Saddle River, NJ, 2006.

Recommended reading(s):

White Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry

James, S. H., Nordby, J. J.; *Forensic Science, An Introduction to Scientific and Investigative Techniques*, 2nd Ed, Taylor and Francis, New York, NY, 2005.

Saferstein, R., *Criminalistics, An Introduction to Forensic Science*, 8th Ed., Pearson/Prentice Hall, Upper Saddle River, NJ, 2004.
Jackson, A.R.W., Jackson, J. M., *Forensic Science*, Pearson/Prentice Hall, Upper Saddle River, NJ, 2004.
Forensic Science International
Journal of Forensic Sciences

Course Coordinator: Dr. Paul Maragh

FSCI6502	**Forensic Chemistry II**		
	3 Credits	Semester	Summer
Pre-Requisites:	FSCI6501		

Course Description:
This course builds on Forensic Chemistry I where the students will cover various advanced analytical techniques used in forensic investigations. The students will be introduced to the theory and applications of electron microscopy, fourier transform infrared (FTIR) spectroscopy and Inductively coupled plasma mass spectrometry (ICPMS). Analytical techniques to determine trace levels of elements in forensic samples by graphite furnace atomic absorption spectrometry (GFAAS) and neutron activation analysis will be discussed. The theory behind high resolution gas and liquid chromatography and their applications for some specific forensic samples will also be discussed The students will be introduced to thermodynamic and kinetic theories behind combustion, fire, explosives and the analytical techniques used to investigate evidence of arson. Students will be familiarised with the chemistry behind colorants, and polymers involved in various fabrics. The forensic implications associated with inks used in writing of letters and documents and fabrics used in apparels will be highlighted. An overview of various alkaloids and non-alkaloid drugs will be presented and some case studies involving the use of these drugs will be discussed.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Explain the principles of electron microscopy and its application to forensic investigation.
2. Explain and apply the principles of spectroscopy techniques to detect and analyse various forensic samples for physical evidence.
3. Explain the principles of graphite furnace atomic absorption spectroscopy; typical instrumentation, components and operating conditions.
4. Explain the principle of neutron activation analysis, and its use in forensic analysis.
5. Interpret high resolution mass spectrometric data generated from the applications of gas and liquid chromatographs.
6. Apply the appropriate chromatographic technique for analysing micro-samples and trace analytes.
7. Distinguish all major alkaloid and non-alkaloid drugs used in crime.
8. Describe the appropriate techniques and tests for analysing fire and explosives.
9. Apply knowledge of chemistry of various fabrics, colorants including dyes and inks colorants, inks and fabrics in analysing forensic samples.

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed texts:
Bell, Suzanne. *Forensic Chemistry,* Pearson/ Prentice Hall, 2006. Upper Saddle River, NJ.
Almirall Jose R. and James D. Winefordner. *Forensic Chemistry*. 2006. John Wiley & Sons, Ltd

Recommended reading(s)::
White Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry.
James, S. H., Nordby, J. J.; *Forensic Science, An Introduction to Scientific and Investigative Techniques*, 2nd Ed, Taylor and Francis, New York, NY, 2005.
Saferstein, R., *Criminalistics, An Introduction to Forensic Science*, 8th Ed., Pearson/Prentice Hall, Upper Saddle River, NJ, 2004.
Jackson, A.R.W., Jackson, J. M., *Forensic Science*, Pearson/Prentic Hall, Upper Saddle River, NJ, 2004.
Forensic Science International Journal of Forensic Sciences

Course Coordinator: Dr. Paul Maragh

FSCI6503 **Forensic Chemistry Laboratory**
2 Credits Semester Summer
Pre-Requisites: FSCI6502

Course Description:
This laboratory-based course will provide hands-on experience with the methods, techniques and instruments used to analyze trace evidence such as glass, paint, hairs and fibers, with the ultimate goal of identifying and comparing known trace evidence materials with questioned samples.

Upon completion of this course, the student should be able to:

1. Discuss and use laboratory instrumentation and basic analytical techniques, such as spot tests, TLC, UV-VIS, HPLC, etc
2. Apply chromatographic techniques to the identification and quantification accelerants from arson debris, components of explosives and also selected toxicants;
3. Apply spectroscopy techniques to analysis of trace evidence associated with gunshot residues, paints, fibres, glass, bone, metal fragments.
4. Students will be required to collect analytical data that is free from systematic errors, representative of the sample analysed and operate within laboratories that observe defined quality assurance and quality control programmes.
5. Select instrumentation appropriate to the measurement need
6. Prepare forensic examination reports that accurately reflect the findings of suitable chemical identification and quantification tests. Forensic chemistry cases will be assigned to each student where they are expected to analyse the case, write a report, and present their findings at seminars.

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, demonstrations, field work

Evaluation:

Laboratory reports	60%
Case Report	20%
Two In-course tests	20%

Prescribed Text(s):
McCord, Bruce R. and Jose R. Almirall. *Forensic Chemistry Laboratory Manual: (Chemical Analysis: A Series of Monographs on Analytical Chemistry and Its Applications)* 1st Ed. 2009. Wiley-Interscience

Course Coordinator: Dr. Raymond Reid

FSCI6504 **Forensic Firearm Investigation**
3 Credits Semester: Summer
Pre-requisites: None

Course description:
This course is an introduction to firearms investigation with emphasis on the history of firearm, internal ballistics, external ballistics, terminal ballistics, gunshot residue (GSR), wound ballistics and microscopy. Students will learn how to differentiate between the different areas in forensic ballistics, develop an appreciation of the comparison microscope as well as interpret ballistics evidence.

Learning outcomes:
At the end of this course the student should be able to:

1. Discuss transnational gun crimes and its implications to society
2. Explain the differences between the different areas of ballistics
3. Explain the terms used in ballistics
4. Describe how firearms investigations are carried out while ensuring all evidence is preserved
5. Explain how small arms work and operate
6. Describe the different types of firearm and ammunition and their components
7. Describe factors that affect the internal ballistic/performance of a gun.
8. Describe the forces that influence a bullet's trajectory
9. Correlate bullet types and wound injuries
10. Interpret and analyse firearms evidence

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. Lectures of 24 hours
2. Tutorials & formal group discussions of 24 hours

Course Assessment Methods:

One 2-hour written paper	60%
Two in-course tests	20%
Assignment	20%

Teaching/Learning Resources:
Course text; Periodicals; On-line journals

Prescribed text:
Hatcher, J. S. F. Jury and J. Weller, (2006). Firearms Investigation Identification and Evidence. (Editor Samworth, Thomas. G.), Ray Riling Arms Book Company, Philadelphia, Pennsylvania, USA

Recommended Texts:
Warlow T. A. 2003. Firearms, the Law and forensic Ballistics. Taylor and Francis Forensic Science Series.
Fisher B.A. Techniques of Crime Scene Investigation (7th Ed) CRC Press
Heard B.J. 2008. Handbook of Firearms and Ballistics: Examining and interpreting forensic evidence 2nd Edition. Wiley-Blackwell
Di Maio V.J. 1999. Gunshot Wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques. CRC Press

Forensic Science International Journal of Forensic and Legal Medicine
Journal of Forensic IdentificationJournal of Forensic Sciences

Course Coordinator: Insp. Gregory Williams

FSCI6505 **Forensic Firearm Investigation Laboratory**
2 Credits Semester: Summer
Co-requisites: FSCI6504

Course Description:
Laboratory sessions will cover firearms analysis, the fundamentals of firearms identification, the technical details of firearms and the documentation of analytical findings. Students will receive training in the basics of forensic ammunition and firearms examination, learning classification and research skills. This course will be offered as an elective.

Learning outcomes:
At the end of this course the student should be able to:

1. Competently operate a comparison microscope.
2. Interpret and analyse firearms evidence
3. Recognize and identify tool marks and linking it to a firearm
4. Recognize and identify different types of bullets and cartridge case
5. Calculate bullet trajectories.
6. Analyse GSR on various substrates
7. Write forensic expert witness reports

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, demonstrations, field work; visits

Course Assessment Methods:

Laboratory reports	60%
Case Report	20%
Two In-course tests	20%

Teaching/Learning Resources:
Course text; Periodicals; On-line journals, laboratory manual

Prescribed Texts:
Gardner R. M. and T. Bevel (2009) Practical Crime Scene Analysis and Reconstruction (Practical Aspects of Criminal & Forensic Investigations) CRC Press
Kubic T and Petraco N (2005) Forensic Science laboratory Manual and Workbook. CRC Press

Recommended Texts:
Fisher B.A. Techniques of Crime Scene Investigation (7th Ed) CRC Press
Heard B.J. 2008. Handbook of Firearms and Ballistics: Examining and interpreting forensic evidence 2nd Edition. Wiley-Blackwell
Di Maio V.J. 1999. Gunshot Wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques. CRC Press
Wallace J. S. 2008. Chemical Analysis of Firearms, Ammunition, and Gunshot Residue. CRC Press

Forensic Science International Journal of Forensic and Legal Medicine
Journal of Forensic IdentificationJournal of Forensic Sciences

Course Coordinator: Insp. Gregory Williams

FSCI6601 **Forensic Serology**
3 Credits Semester 2
Pre-requisite

Course Description:
A comprehensive study of the theory and practice of isoenzyme, serum protein and immunoglobulin genetic markers in human blood and body fluids. Electrophoretic and isoelectric focusing techniques. Interpretation of genetic marker in blood individualization. Biochemical and immunologic procedures for blood and body fluid identification; typing of Rh, MNSs and other red cell antigens in blood and blood stains; antiserum selection and evaluation; ELISA techniques. Throughout the semester students will be provided with journal articles and be expected to read and prepare for class discussions.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Outline the composition and biological function of each of blood, semen and saliva.
2. Describe techniques used in locating biological evidence and appropriate storage for biological samples
3. Describe the presumptive tests used to determine whether a body fluid found at a crime scene is blood, semen or saliva.
4. Explain the basis on which serological/immunological tests work, including the factors which influence migration and separation.
5. Explain principles behind the techniques of species identification
6. Discuss the relevance and forensic application of species identification

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
White Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry.
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2nd Ed. 2007. Pearson

Recommended reading(s):
Forensic Science International: Genetics
Journal of Forensic Sciences

Course Coordinator: Prof. Paul D. Brown

FSCI6602` **Forensic Serology Laboratory**
2 Credits Semester 2
Co-requisite FSCI6601

Course Description:
Students will be given an opportunity to apply the principles of forensic serology to actual biological samples. Techniques utilized will include screening tests, methods used to confirm the presence of specific biological material(s), microcrystalline tests, catalytic color tests, antigen-antibody interactions, gel diffusion and microscopic identification of cellular material. Serology cases will be assigned to each student where they are expected to analyse the case, write a report, and present their findings at seminars.

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, demonstrations, field work

Evaluation:

Laboratory reports	60%
Case Report	20%
Two In-course tests	20%

Prescribed text(s):
White Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry.

Course Coordinator: Prof. Paul D. Brown

FSCI6603 **Forensic Molecular Biology**
3 Credits Semester Summer
Pre-requisite: None

Course Description:

This course will discuss the techniques for DNA analysis of forensic evidence including DNA isolation, purification and quantification, PCR and based methods for testing of autosomal STR loci, Y chromosome STR loci and mitochondrial. Case examples with commonly encountered forensic issues, such as degradation, mixture analysis, artifacts in PCR testing, DNA profile interpretation, statistical analysis of results and selecting the appropriate DNA test based on the case scenario and serological results will be discussed. Advanced topics including SNPs, next generation sequencing, microbial and animal forensics, and cutting-edge DNA technologies will be covered. Throughout the semester students will be provided with journal articles and be expected to read and prepare for class discussions.

Learning Outcomes:
Upon completion of this course, the student should be able to:

1. Describe the methods routinely used in DNA isolation, preparation and amplification
2. Demonstrate working knowledge of qPCR, real-time PCR, capillary electrophoresis
3. Interpret STRs – stutters, microvariants, mixtures, contamination
4. Conduct a basic analysis and interpretation of a DNA profile
5. Establish and maintain a laboratory validation system
6. Interpretation and undertake statistical evaluation associated with identity and paternity testing
7. Discuss the impact of DNA profiling on forensic investigations
8. Write forensic expert witness reports

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
Butler, J. M. *Forensic DNA typing: Biology & Technology behind STR markers* 2003. Academic Press
Butler, J. M. Advanced Topics in Forensic DNA Typing: Interpretation. 2014 Academic Press

Recommended reading(s):
Rapley Ralph and David Whitehouse (Eds) *Molecular Forensics* 2007. John Wiley & Sons
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2nd Ed. 2007. Pearson
Lucy, David. 2005. *Introduction to Statistics for Forensic Scientists*. John Wiley & Sons, Ltd.

Forensic Science International: Genetics Journal of Forensic Sciences
Other related Journal articles

Course Coordinator: Mr. Compton Beecher

FSCI6604 **Forensic Molecular Biology Laboratory**
2 Credits Semester Summer
Co-requisite FSCI6603

Course Description:
Students will be exposed to state-of–the-art instrumentation such as capillary electrophoresis, PCR and real-time PCR instruments. Laboratory sessions will include several DNA extraction techniques, human DNA quantification, PCR amplification of STR loci, electrophoresis and DNA profile interpretation. DNA cases will be assigned to each student where they are expected to analyse the case, write a report, and present their findings at seminars.

Learning outcomes:
At the end of this course the student should be able to:

1. Extract and quantify DNA from biological evidence
2. Explain the theory and practice of polymerase chain reaction
3. Set up polymerase chain reaction
4. Explain the theory and practice of capillary electrophoresis for genotyping STR markers – ABI3130
5. Set up capillary electrophoreses and fluorescence detection
6. Genotype DNA profiles
7. Interpret DNA profiles
8. Interpret statistical information
9. Prepare a forensic report

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, demonstrations, field work

Evaluation:

Laboratory reports	60%
Case Report	20%
Two In-course tests	20%

Course Coordinator: Mr. Compton Beecher

FSCI6605 **Forensic Entomology**
3 Credits Semester 2
Pre-requisite None

Course Description:
This course is an introduction to forensic entomology and will provide a basic entomology background, with descriptions of practical techniques and the legal aspects of using insects to estimate post-mortem intervals (PMI) and crime solving. Students will also be introduced to best practices in forensic entomology – guidelines, standards relating to the collection, analysis, preservation and chain of custody of evidence; entomotoxicology, which is a relatively new branch of forensic entomology which deals with the use of insects in detecting drugs and other toxins in decomposing tissues; molecular tools for the classification of forensically important insects; the forensic entomologist as expert witness.

Learning Outcomes:
At the end of this course the student should be able to:

1. Describe the life cycle of insects
2. Differentiate forensically important Dipterans and Coleopterans using classical morphological and modern molecular tools

3. Apply knowledge of local insect assemblages, their growth rate as well as population dynamics to forensic cases.
4. Estimate PMI using insect succession information during the decomposition of a body and the stage of development (egg, larva, pupa, or adult) at which the insects were found.
5. Explain how different drugs and toxins can affect the development of insects.
6. Plan a forensic entomological investigation
7. Apply best practice in forensic entomology – guidelines and standards

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Course Assessment Methods:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Teaching/Learning Resources:
Course text; Periodicals; On-line journals.

Required Text:
Dorothy E. Gennard . (2006) Forensic Entomology : An introduction. . Wiley, ISBN: 978-0-470-01478-3

Recommended Text
Current concepts in Forensic Entomology (2010). Eds Amendt, Goff, Campbasso and Grassberger. ISBN 140-209-6836
Forensic Science International Journal of Forensic and Legal Medicine
Journal of Forensic IdentificationJournal of Forensic Sciences

Additional Reading
All students will be encouraged to make full use of the print and electronic resources available to them through membership of the University or members of the academic staff. These include a range of electronic journals and a wide variety of resources available through web sites abs information gateways.

Amendt et al (2007) Best practice in forensic entomology – standards and guidelines Int J Legal Med 121:90-104.
Filipe Pereira et al A Guide for Mitochondrial DNA Analysis in Non-Human Forensic Investigations The Open Forensic Science Journal, 2010, 3, 33-44.

Course Coordinator: Dr. Sherline Brown

FSCI6606 **Forensic Entomology Laboratory**
2 Credits Semester 2
Co-requisite FSCI6605

Course Description:
The forensic entomologist's main contribution to death investigation is an estimate of the post-mortem interval (PMI). Estimating the PMI requires that the forensic entomologist be able to identify the insects on and around the body. Students will be exposed both classical and molecular identification of forensically important insects; techniques in collecting, preserving and rearing insects; molecular identification; calculating PMI through detailed and precise data collection. Experimental conditions to calculate PMI will be established from decomposition studies using small pigs (under 23 kg) which have been shown to be

appropriate stand-ins for humans. Cases will be assigned to each student where they are expected to analyse the case, applying best practices, write a report, and present their findings at seminars.

Learning Outcomes:
At the end of this course the student should be able to:

1. Collect, document and preserve entomological evidence
2. Establish chain of custody of evidence
3. Identify forensically important Dipterans and Coleopterans using classical morphological and modern molecular techniques.
4. Rear forensically important insects
5. Analyse the relationship between insect succession during the decomposition of a body and the stages of development (egg, larva, pupa, or adult) and PMI
6. Analyse drugs found in insects and evaluate the effects of different drugs and toxins on insect development and PMI.
7. Profile human DNA from insects found at the crime scene
8. Apply best practice in forensic entomology – guidelines and standards (European Association of Forensic entomologist (EAFA))
9. Apply Guidelines and recommendations for the analysis of mtDNA in forensic casework

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, demonstrations, field work

Course assessment methods:

Laboratory reports	60%
Case Report	20%
Two In-course tests	20%

Teaching/Learning Resources:
Course text; Periodicals; On-line journals, laboratory manual

Prescribed Text:
Forensic Entomology: An introduction.(2006). Dorothy E. Gennard. Wiley, ISBN: 978-0-470-01478-3

Recommended Text:
Current concepts in Forensic Entomology (2010). Eds Amendt, Goff, Campbasso and Grassberger. ISBN 140-209-6836

Forensic Science International Journal of Forensic and Legal Medicine
Journal of Forensic IdentificationJournal of Forensic Sciences

Additional Reading:
All students will be encouraged to make full use of the print and electronic resources available to them through membership of the University or members of the academic staff. These include a range of electronic journals and a wide variety of resources available through web sites abs information gateways.

Amendt et al (2007) Best practice in forensic entomology – standards and guidelines Int J Legal Med 121: 90 – 104
Filipe Pereira et al A Guide for Mitochondrial DNA Analysis in Non-Human Forensic Investigations The Open Forensic Science Journal, 2010, 3, 33-44.

Course Coordinator: Dr. Sherline Brown

FSCI6701 **Forensic Anthropology**
3 Credits Semester: Summer
Pre-requisite:

Course Description:
A comprehensive study of the bones and teeth of the human skeleton emphasizing methods of identification, construction of the biological profile (age, sex, ancestry, stature), and trauma analysis. This course will present the methods and theory behind the analysis of skeletal remains from medico-legal contexts. Topics will include human skeletal anatomy, odontology, establishing the biological profile, trauma analysis, taphonomy, and how anthropological analyses can assist the pathologist with determining cause and manner of death. In addition to the text books, students will be provided with journal articles throughout the semester and will be expected to read and prepare for class discussions.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Differentiate human from non-human remains
2. Determine Sex
3. Determine Ancestry
4. Estimate age at death
5. Estimate stature
6. Evaluate trauma
7. Differentiate pathological conditions from perimortem trauma and postmortem damage.

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
Byers, Steven. *Introduction to Forensic Anthropology: A Text Book* 3nd Ed. 2007. Allyn & Bacon

Recommended reading(s):
Komer D. A. and J. E. Buikstra *Forensic Anthropology: Contemporary theory and practice*. Oxford University Press 2007.

Forensic Science International Journal of Forensic and Legal Medicine
Journal of Forensic Identification Journal of Forensic Sciences

Course Coordinator: Mrs. Kimberly Ramocan

FSCI6702 **Forensic Anthropology Laboratory**
2 Credits Semester: Summer
Co-requisite: FSCI6701

Course Description:
Students will learn how to identify osseous material from non-osseous material, differentiate human from non-human bone, and determine the medico-legal significance of human remains. Students will use gross morphology, odontology and osteometry (measurement of bones) to develop the biological profile (sex, age, ancestry, stature). Students will be provided with the opportunity to observe different types of skeletal trauma and evaluate the effects of taphonomic changes to bone.

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, demonstrations, field work

Evaluation:

Laboratory reports	60%
Case Report	20%
Two In-course tests	20%

Prescribed text(s):
Byers, Steven and Susan Myster. *Introduction to Forensic Anthropology: Laboratory Manual*. 2005. Pearson

Course Coordinator: Mrs Kimberly Ramocan

FSCI6703 **Forensic Pathology I**
3 Credits Semester: Summer
Pre-Requisites: None

Course Description:
This course will focus on the role of the medical practitioner in the investigation of crime and death. Students will be exposed to theoretical knowledge and practical skills relating to the medico-legal investigation of wounds and death and will be taught to observe and analyse evidence at death scenes. Other elements of forensic pathology will include autopsy techniques, interpretation of autopsy findings, taking into account crime scene information and medical history, determining post-mortem interval, death by drowning, asphyxia and by suicide; sudden and unexpected deaths. Throughout the semester students will be provided with journal articles and be expected to read and prepare for class discussions.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Describe the role of the forensic pathologist in the medico-legal community
2. Collect, document and interpret evidence at death scenes
3. Describe the principles involved in the estimation of the time of death
4. Accurately describe and document the findings of medico-legal autopsies, with particular emphasis on lesions caused by violence, drowning or any other unnatural causes of death
5. Identify and discuss the common causes of sudden unexpected death
6. Interpret the results of tests obtained from specimens submitted at autopsy with respect to their elucidation of, or relationship to cause of death

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
Werner U and Daniel Spitz. *Medicolegal Investigations of Death: Guidelines for application of pathology to criminal investigation* 4th Ed. Charles C. Thomas Publishers 2006.
Vincent J.M. DiMaio. *Gunshot Wounds: Practical aspects of firearms, ballistics, and forensic techniques*. 2nd Ed. CRC Press.

Recommended reading(s):
Vincent J.M. DiMaio, Suzanna E. Dana. *Handbook of Forensic Pathology*. 2nd ed, 2006 CRC Press.
Pekka Saukko, Bernard Knight. *Knight's Forensic Pathology*, 3rd ed 2004. Arnold
David Dolinak, Evan Matshes and Emma O. Lew. *Forensic Pathology: Principles and Practice* 2005 Elsevier

Journal of Forensic and Legal Medicine Journal of Forensic Sciences

Course Coordinator: Dr. Tracy-Ann Brown

FSCI6704 **Forensic Pathology II**
3 Credits Semester: Summer
Pre-Requisites: FSCI6703

Course Description:
Instruction will include techniques of forensic odontology and anthropology that are used to support forensic pathology, particularly in identifying unknown remains. Topics related to drugs and drug related deaths, physical abuse of children, child sexual abuse and sexual offenses in adults will also be covered. Throughout the semester students will be provided with journal articles and expected to read and prepare for class discussions.

Learning Objectives:
Upon completion of this course, the student should be able to:

1. Demonstrate proficiency with standard autopsy techniques in the performance and/or assistance in the performance of medico-legal autopsies
2. Demonstrate the use of bones and teeth to describe the basic demographics characteristics of persons
3. Explain the principles of collection of autopsy specimens for submission to the relevant forensic science or other laboratories e.g. toxicology
4. Demonstrate the proper use of a rape kit

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.
Course Structure:

1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
Werner U and Daniel Spitz. *Medicolegal Investigations of Death: Guidelines for application of pathology to crimnal investigation* 4th Ed. Charles C. Thomas Publishers 2006.
Vincent J.M. DiMaio. *Gunshot Wounds: Practical aspects of firearms, ballistics, and forensic techniques*. 2nd Ed. CRC Press.

Recommended reading(s):
Vincent J.M. DiMaio and Suzanna E. Dana. *Handbook of Forensic Pathology* (Paperback) 2nd ed, 2006, CRC Press;
Pekka Saukko and Bernard Knight. *Knight's Forensic Pathology*, 3rd ed 2004. Arnold
David Dolinak, Evan Matshes and Emma O. Lew. *Forensic Pathology: Principles and Practice* 2005 Elsevier

Journal of Forensic and Legal Medicine Journal of Forensic Sciences

Course Coordinator: Dr. Tracy-Ann Brown

FSCI6705 **Forensic Pathology Laboratory**
2 Credits Semester: Summer
Co-Requisites: FSCI6704

Course Description:
Forensic Pathology taught with a strong emphasis on practical learning, with students undertaking a set number of autopsies under supervision. Students will be required to draft a clear and comprehensive autopsy report that will accurately communicate to the relevant authorities, the cause, mechanism and manner of death.

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, demonstrations, field work

Evaluation:

Laboratory reports	60%
Two In-course tests	20%
Case Report	20%

Prescribed text(s):
Vincent J.M. DiMaio and Suzanna E. Dana. *Handbook of Forensic Pathology* (Paperback) 2nd ed, 2006, CRC Press.

Course Coordinator: Dr. Tracy-Ann Brown

FSCI6801 **Forensic Toxicology I**

3 Credits Semester: Summer

Pre-Requisites: None

Course Description:

Forensic toxicology I will deal with qualitative and quantitative analysis of biological specimens for the presence of alcohol, drugs (marijuana, cocaine, the major opiates, the common hallucinogens and amphetamines), and/or poisons and their corresponding metabolites. The principles of pharmacodynamics and pharmacokinetics as they apply to forensic toxicology, the molecular mechanisms of toxicity, drug toxicity, toxins and poisons, drug classifications will also be discussed. Analytical methods used in the analysis of drugs and toxins e.g. GC, TLC, GC/MS, LC/MS and HPLC will be discussed. Throughout the semester students will be provided with journal articles and expected to read and prepare for class discussions.

Learning Objectives:

Upon completion of this course, the student should be able to:

1. Describe the principles of pharmacodynamics/toxicodynamics and pharmacokinetics/toxicokinetics and their relevance to the impact of substances such as alcohol, drugs, poisons and other agents, e.g. environmental toxins, on the body.
2. Describe the molecular mechanisms of toxicity as it relates to e.g. alcohol, drugs, poisons and environmental toxins.
3. Classify drugs based on their general characteristics and evaluate their potential toxicity utilizing this classification.
4. Give an overview of the methods of analysis such as: GC, TLC, GC/MS, LC/MC and HPLC, used to examine e.g. body fluids for levels of drugs, poisons, environmental toxins and their metabolites.

Mode of Delivery/Teaching Methodologies:

Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:

1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed texts:

Negrusz, Adam and Gail Cooper. Clarke's Analytical Forensic Toxicology 2nd Ed. 2013 Pharmaceutical Press

White Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry.

Recommended reading(s):

Levine, Barry. *Principles of Forensic Toxicology* 3rd Ed. 2010. American Association for Clinical Chemistry.

Olson, Kent R. *Poisoning and Drug Overdose* 5th Ed. 2006. McGraw-Hill Medical.

Klaassen, Curtis. *Casarett and Doull's Toxicology: The Basic Science of Poisons* 7th Ed. 2007. McGraw-Hill

Journal of Analytical Toxicology

Course Coordinator: Mrs Carole Lindsay

FSCI6802 **Forensic Toxicology II**
3 Credits Semester: Summer
Pre-Requisites: FSCI6801

Course Description:
This course will expand on concepts done in Forensic Toxicology I (FSC16801), providing in-depth knowledge of pharmacology and toxicology as it pertains to commonly encountered abused and toxic substances. Analytical methods used in the isolation and identification of substances and drug metabolites in biological samples and other forensic evidence will be discussed. This course also offers modules in doping control, expert testimony and human performance and postmortem toxicology.

Learning Objectives:
Upon completion of this course, the student should be able to:
1. Explain the mode of action of specific chemical toxins including: environmental agents, poisons, illicit drugs, sports enhancing drugs and carcinogens.
2. Describe the signs and symptoms associated with the use of common drugs and poisons
3. Discuss the use of relevant analytical methods to isolate and identify drugs and possible metabolites in biological samples and other forensic evidence.
4. Interpret forensic toxicology findings.
5. Explain the importance of postmortem toxicology in death investigations

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hours
2. Tutorials & formal group discussions of 24 hours

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
Assignments	10%

Prescribed text(s):
Negrusz, Adam and Gail Cooper. Clarke's Analytical Forensic Toxicology 2nd Ed. 2013 Pharmaceutical Press
White Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry.

Recommended reading(s):
Levine, Barry. *Principles of Forensic Toxicology* 2nd Ed. 2006. American Association for Clinical Chemistry.
Olson, Kent R. *Poisoning and Drug Overdose* 7th Ed. 2006. Lange.
Klaassen, Curtis. *Casarett and Doull's Toxicology: The Basic Science of Poisons* 7th Ed. 2007. McGraw-Hill
Hoffman, Robert S et. al. *Goldfrank's Manual of Toxicologic Emergencies* 1st Ed. 2007. McGraw-Hill.
Journal of Analytical Toxicology
Journal of Forensic Sciences

Course Coordinator: Mrs Carole Lindsay

FSCI6803 **Forensic Toxicology Laboratory**
2 Credits Semester: Summer
Co-requisites: FSCI6802

Course Description:
This laboratory-based course will provide students an opportunity to apply the principles of forensic toxicology to actual biological samples. Students will be required to isolate and identify toxins e.g. illicit drugs and their metabolites in biological samples and other forensic evidence using methods of analysis such as: GC, TLC, GC/MS, LC/MS-MS and HPLC. Toxicology cases will be assigned to each student where they are expected to analyse the case, write a report, and present their findings at seminars. Students will also work with cases presented by the Forensic Pathologist.

Mode of Delivery/Teaching Methodologies:
Laboratories, cooperative group work, demonstrations, field work

Evaluation:

Laboratory reports	60%
Case Report	20%
Two In-course tests	20%

Prescribed text(s):
Negrusz, Adam and Gail Cooper. Clarke's Analytical Forensic Toxicology 2nd Ed. 2013 Pharmaceutical Press
White Peter. *Crime scene to court: the essentials of forensic science*. 2nd Ed. 2004. The Royal Society of Chemistry.

Recommended reading(s):
Levine, Barry. *Principles of Forensic Toxicology* 2nd Ed. 2006. American Association for Clinical Chemistry.
Olson, Kent R. *Poisoning and Drug Overdose* 7th Ed. 2006. Lange.
Klaassen, Curtis. *Casarett and Doull's Toxicology: The Basic Science of Poisons* 7th Ed. 2007. McGraw-Hill
Hoffman, Robert S et. al. *Goldfrank's Manual of Toxicologic Emergencies* 1st Ed. 2007. McGraw-Hill.

Journal of Analytical Toxicology Journal of Forensic Sciences

Course Coordinator: Mrs Carole Lindsay

PHAL6010 **Drugs of abuse: Psychopharmacology**
3 credits Summer

Course Description
This course aims to explain specific brain processes involved in rewarding effects of psychoactive substance use, reinforcement and development of dependence. Students will examine current hypotheses and evidence about the biological basis of the behavioural and psychological factors that contribute to substance dependence, The mechanisms of action, behavioural effects, development of tolerance and dependence , long term neuro-psychological consequences and pharmacological treatment of drugs of abuse, as well as the global health burden will be discussed.

Learning Outcomes:
On successful completion of this course students will be able to:

1. Explain brain processes involved in rewarding effects of psychoactive substance use, reinforcement and development of dependence
2. Explain the current hypotheses and evidence about the biological basis of the behavioural and psychological factors that contribute to substance dependence
3. Describe the abuse potential of prescribed and illegal drugs
4. Explain the contribution of licit and illicit drug use to the global health burden

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, demonstrations, webinars (including audio and visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. A lecture course of 24 hrs
2. Tutorials / formal presentations of 24 hrs

Evaluation:

One 2 hour written paper	70%
Two In-course tests	20%
One in-course assignment	10%

Prescribed Text:
Simon Wills (2005). Drugs of Abuse**.** 2nd Ed. Pharmaceutical Press.
ISBN-13: 978-0-85369-582-0

Recommended Reading
Linda F. Quenzer (2004). Psychopharmacology: Drugs, the Brain and Behavior. ISBN-13: 978-0-87893-534-7

Course Coordinator: Dr. Jacqueline Campbell

SALI6106 **Deviance, Conflict and Social Management**
3 credits Summer

Course Description
The course focuses on isolating, understanding and analyzing the various structural contexts that produce conflict, deviance, violence (including criminal and family violence), and ultimately, divide societies. It also gives simultaneous attention to the peculiarities in those contexts that inevitably work to prevent or discourage peace.

Learning Outcomes:
On successful completion of this course students will be able to:

1. Discuss the links between conflict and deviance
2. Analyze various types of conflict and conflict management strategies
3. Outline and critique the main ideas of at least five theories of deviance.
4. Discuss the relevance of theories of deviance to the explanation of deviance in developing countries.
5. Critically analyze current peace – building strategies and approaches.
6. Provide policy directions for the prevention, reduction and abolition of conflicts and deviance.

Mode of Delivery/Teaching Methodologies:
Learning outcomes will be delivered by way of lectures, presentations, webinars (including audio and

visual aids), tutorials as well as a case report. Overhead projections and in some cases multi-media projections will be used in delivering lectures.

Course Structure:
1. Lectures and presentations from lecturer
2. Student presentations organized around central themes of the readings for the course.

Evaluation:

One 3 hour written paper	50%
One In-course tests	20%
Group oral presentation	15%
Group written submission	15%

Prescribed Text:
Akers, Ronald, L. 2000.Criminological Theories: Introduction, Evaluation and Application.3rd Ed. Roxbury Publishing Company. Los Angeles

Recommended Reading
Abbott, Daniel J. and Clinard, Marshall, B. 1973. Crime in Developing Countries: A Comparative Perspective. John Wiley and Sons Inc. New York .1973.

Akers, Ronald, L. 2000.Criminological Theories: Introduction, Evaluation and Application. Third Edition. Roxbury Publishing Company. Los Angeles.

Ellis, Hyacinthe. 1991. Identifying Crime Correlates in a Developing Society: A study of socio-economic and socio-demographic contributions to crime in Jamaica, 1950-1984. Peter Lang Publishing Inc. New York.

Harriot, Anthony. 2003 Understanding Crime in Jamaica: New Challenges for Public Policy. UWI Press

Course Coordinator: Prof. Aldrie Henry-Lee