



**THE UNIVERSITY 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 2017 - 2018**

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THE MASTER IN FORENSIC SCIENCE  
POSTGRADUATE DIPLOMA IN FORENSIC SCIENCE

## 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

D/Insp. Christopher Anderson	Forensic Crime Scene Investigator Jamaica Constabulary Force Technical Services Division 34 Duke Street, Kingston
David Batts, LLB	The Honourable Mr Justice – Puisne Judge
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
Dr. Stephen Morley MRCP FRCPath DM LLM	Clinical Lead for clinical chemistry and toxicology Sheffield Teaching Hospitals Toxicology Unit, Northern General Hospital Sheffield UK
Fitzmore Coates, MSc	Retired Forensic Chemist (Consultant) Forensic Science Laboratory & Legal Medicine Institute Hope Boulevard, Kingston, Jamaica
Wayne Cranston, MSc	Forensic Anthropologist Louisiana State University USA
Tara Dasgupta, PhD	Professor - Chemistry Chemistry Department University of the West Indies, Mona Campus
Garth Dawkins, MPhil	Laboratory Quality Assurance School of Natural & Applied Science University of Technology
Aldrie Henry-Lee; PhD	Professor - Sociology Faculty of Social Sciences University of the West Indies, Mona Campus
Stephen DeRoux, MD	Deputy Chief Medical Examiner Office of the Chief Medical Examiner New York City, NY, USA
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
Dione Cruickshank	Attorney at Law 7 Duke Street Kingston
Wayne McLaughlin, PhD	Professor & Programme Coordinator Department of Basic Medical Sciences University of the West Indies, Mona Campus
Hillary Mullings, MSc	Forensic Officer Forensic Science Laboratory & Legal Medicine Institute Hope Boulevard, Kingston, Jamaica
Robin 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
Sophie Turfus, PhD	Lecturer – Forensic Toxicology Department of Basic Medical Sciences University of the West Indies, Mona Campus
William A. Dunn, M.S., DABFT	Forensic Toxicology Laboratory Office of the Chief Medical Examiner New York City, NY, USA
Christine Walters, PhD	Office of the Dean Faculty of Medical Sciences University of the West Indies, Mona Campus
Maxine Gossell-Williams, PhD	Senior Lecturer - Pharmacology Department of Basic Medical Sciences University of the West Indies, Mona Campus
D'Michelle DuPre, BA, MD	Forensic Pathologist ITT Technical Institute Columbia, SC
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.
Prasad Kadiyala, MBBS, DFM, MD	Forensic Pathologist Forensic Science Laboratory & Legal Medicine Institute Ministry of National Security, Jamaica
Marissa Moses, PhD	Cocoa Research Unit University of the West Indies, St Augustine Campus Trinidad & Tobago
Insp. Gregory Williams, BSc (Hon), MSc	Royal Police Force Antigua & Barbuda American Road St Johns, Antigua
Althea Neblett, MBBS, DM	Forensic Pathologist and Associate Lecturer Forensic Science Laboratory & Legal Medicine Institute Ministry of National Security, Jamaica
Michael Gardner,	Lecturer, Anatomy Department of Basic Medical Sciences University of the West Indies, Mona Campus
Christopher Ogunsalu, MBBS, DDS, PhD	Snr. Lecturer, Anatomy Department of Basic Medical Sciences University of the West Indies, Mona Campus
Shelly McFarlane, PhD	Research Fellow University of the West Indies, Mona Campus

Andriene Grant, PhD	Epidemiology Research Unit Tropical Medicine Research Institute Director, Epidemiological Research and Data Analysis Unit (ERDAU), Health Promotion and Protection Branch (HPPB), Ministry of Health
Latoya Foote, MPhil	Entomology Department of Life Sciences University of the West Indies, Mona Campus
DSP Dave Brown, MSc	Forensic Firearm Investigator 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
Daniel Attinger, PhD	Associate Professor, Department of Mechanical Engineering Iowa State University, USA
Parris Lyew-Ayee, PhD	Director, Mona Geo Informatics University of the West Indies, Mona Campus
Pete Gagliardi	Retired ATF Agent Ultra Electronics Forensic Technology Inc. Côte St-Luc , QC Canada

**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)	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 Chemistry/Forensic Chemistry 1600 University Avenue 208 Oglebay Hall Box 6121 Morgantown WV 26505-6121 USA

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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) programme 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<sup>2</sup> 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, FTIR, Genetic Analysers, thermal cyclers both for real time and end-point PCR, and TRUEPOINT 300® Laser Scanner, comparison 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, while forensic chemistry takes place in the Drug Testing Laboratory in the Chemistry Department and at the International Centre for Nuclear Sciences. 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:

<b>Course Code</b>	<b>Course</b>	<b>Credit</b>	<b>Semester</b>
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
<b>Total</b>		<b>24</b>	

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

### *Electives*

<b>Course Code</b>	<b>Course</b>	<b>Credit</b>	<b>Semester</b>
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	
<b>Total</b>		<b>21</b>	

### *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	
<b>Total</b>		<b>21</b>	

### *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	
<b>Total</b>		<b>21</b>	

### *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	
<b>Total</b>		<b>21</b>	

## POSTGRADUATE DIPLOMA PROGRAMME

### *Postgraduate Diploma in Forensic Biology*

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

<b>Course Code</b>	<b>Course</b>	<b>Credit</b>	<b>Semester</b>
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	2
FSCI6605	Forensic Entomology	3	2
SALI6106	Deviance, crime and Social Management	3	Summer
<b>Total</b>		<b>24</b>	

### *Postgraduate Diploma in Forensic Toxicology*

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

<b>Course Code</b>	<b>Course</b>	<b>Credit</b>	<b>Semester</b>
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
SALI6106	Deviance, crime and Social Management	3	Summer
<b>Total</b>		<b>24</b>	

### *Postgraduate Diploma in Crime Scene Investigation*

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

<b>Course Code</b>	<b>Course</b>	<b>Credit</b>	<b>Semester</b>
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
SALI6106	Deviance, Crime and Social Management	3	Summer
<b>Total</b>		<b>24</b>	

## DESCRIPTION OF COURSES

<b>FSCI6101</b>	<b>Fundamentals of Forensic Science</b>
	3 Credits      Semester      1
<b>Pre-requisite:</b>	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.



### Prescribed text(s):

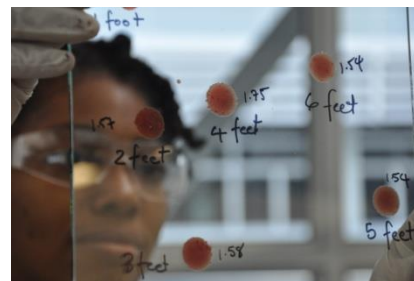
Houck Max M. and Jay A. Siegel (Eds). *Fundamentals of Forensic Science*. 2<sup>nd</sup> Ed. 2006. Elsevier Science.  
James Stuart H. and Jon J. Nordby *Forensic Science: An Introduction to Scientific and Investigative Techniques* 3<sup>rd</sup> Edition 2009.

**Course Coordinator:** Professor Wayne McLaughlin

<b>FSCI6102</b>	<b>Crime Scene Management</b>
	3 Credits      Semester      1
<b>Pre-requisite</b>	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.



### 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* 7<sup>th</sup> Ed. 2003 CRC Press

**Course Coordinator:** Insp Gregory Williams

<b>FSCI6103</b>	<b>Forensic Laboratory Quality Assurance</b>
	2 Credits      Semester:      1
<b>Pre-requisite</b>	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.

**Prescribed text(s):**

Ratcliff, Thomas A. *Laboratory Quality Assurance System: A manual of procedures and forms.* 3<sup>rd</sup> Ed. 2003. John Wiley & Sons Ltd.

**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.

**Prescribed text(s):**

Antoine R. *Commonwealth Caribbean law and legal systems.* 2<sup>nd</sup> Ed. 2008. Routledge-Cavendish Publishing Ltd.  
Bowen Robin T. *Ethics and the Practice of Forensic Science* 2009. CRC Press

**Course Coordinator:** Prof. Wayne McLaughlin

**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.

**Prescribed text(s):**

White Peter. *Crime scene to court: the essentials of forensic science.* 2<sup>nd</sup> Ed. 2004. The Royal Society of Chemistry.  
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2<sup>nd</sup> Ed. 2007. Pearson

**Course Coordinator:** Prof. Wayne McLaughlin

**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.

**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

**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.

**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

**Course Coordinator:** Insp Gregory Williams

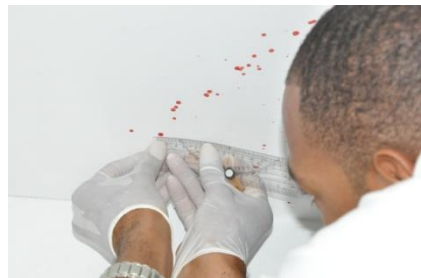
**FSCI6301**                      **Statistical Analysis of Forensic Evidence**

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.



**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.

**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.

**Prescribed text(s):**

Daniel Hartl. *A Primer of Population Genetics*. 3<sup>rd</sup> Ed. 2000. Sinauer Associates Inc.

**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.

**Prescribed text(s):**

Christensen L et al *Research methods, design, and analysis* 12<sup>th</sup> Edition 2103. Pearson

**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.

**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 will be discussed.



**Prescribed text(s):**

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

**Course Coordinator:** Prof. Tara Dasgupta

**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.

**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

**Course Coordinator:** Prof. Tara Dasgupta

**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.

**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)* 1<sup>st</sup> 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.

**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

**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.

**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 Petracco N (2005) *Forensic Science laboratory Manual and Workbook*. CRC Press

**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.



**Prescribed text(s):**

White Peter. *Crime scene to court: the essentials of forensic science*. 2<sup>nd</sup> Ed. 2004. The Royal Society of Chemistry.  
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2<sup>nd</sup> Ed. 2007. Pearson

**Course Coordinator:** Prof. Paul 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.

**Prescribed text(s):**

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

**Course Coordinator:** Prof. Paul Brown

**FSCI6603**                      **Forensic Molecular Biology**  
3 Credits                      Semester                      2

**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.



**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

**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.

**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.

**Required Text:**

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

**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.



**Prescribed Text:**

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

**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.

**Prescribed text(s):**

Byers, Steven. *Introduction to Forensic Anthropology: A Text Book* 3<sup>rd</sup> Ed. 2007. Allyn & Bacon

**Course Coordinator:** Mr Michael Gardner

**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.

**Prescribed text(s):**

Byers, Steven and Susan Myster. *Introduction to Forensic Anthropology: Laboratory Manual*. 2005. Pearson

**Course Coordinator:** Mr Michael Gardner

**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.

**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.

**Course Coordinator:** Dr. Prasad Kadiyala

**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.

**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.

**Course Coordinator:** Dr. Prasad Kadiyala

**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.

**Prescribed text(s):**

Vincent J.M. DiMaio and Suzanna E. Dana. *Handbook of Forensic Pathology* (Paperback) 2<sup>nd</sup> ed, 2006, CRC Press.

**Course Coordinator:** Dr. Prasad Kadiyala

**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.



**Prescribed texts:**

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

**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 (FSCI6801), 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.



**Prescribed text(s):**

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

**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.

**Prescribed text(s):**

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

**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.

**Prescribed Text:**

Simon Wills (2005). *Drugs of Abuse.* 2<sup>nd</sup> Ed. Pharmaceutical Press.  
ISBN-13: 978-0-85369-582-0

**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.

**Prescribed Text:**

Akers, Ronald, L. 2000. *Criminological Theories: Introduction, Evaluation and Application.* 3<sup>rd</sup> Ed. Roxbury Publishing Company. Los Angeles

**Course Coordinator:** Prof. Aldrie Henry-Lee