



**THE UNIVERSITY OF THE WEST INDIES, MONA**

**FACULTY OF MEDICAL SCIENCES  
DEPARTMENT OF BASIC MEDICAL SCIENCES**

**UWI MONA**



**MASTER OF SCIENCE  
IN FORENSIC SCIENCE  
REGULATIONS AND PROGRAMME**



**THE UNIVERSITY OF THE WEST INDIES, MONA  
FACULTY OF MEDICAL SCIENCES  
DEPARTMENT OF BASIC MEDICAL SCIENCES**

**THE MASTER IN FORENSIC SCIENCE PROGRAMME**

**Academic Year 2011 - 2012**

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**BACKGROUND AND AIMS**

The University of the West Indies (UWI) has 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. Recent 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), the first independent forensic DNA laboratory to provide forensic DNA services to citizens and the judicial system. In the academic year 2008/2009 the University approved a new Masters programme in Forensic Science. This programme will provide a new cadre of expertise in the area of forensic science for the region.

Many professionals or graduates entering the field or graduate programmes in 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 is 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. 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 molecular biology, forensic pathology and forensic toxicology. Students will 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, and allied health or in the criminal justice system. Additionally, students can elect to pursue careers in medicine, allied health, law, and MPhil/PhD programmes. The potential employers of graduates from the MSc Forensic Science programme will include the police forensic laboratories 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. Demonstrate professional values, concepts and ethics
4. Provide expert testimony in the court

5. 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, 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, the legal fraternity and from foreign institutions. The international background, variety of academic disciplines and professional expertise represented by the staff will expose students to a diversity of perspectives on the approaches to the field of forensic science.

### *Current members of teaching staff*

Bradley Adams, PhD, DAFFA	Director of Forensic Anthropology Office of the Chief Medical Examiner New York City, NY, USA
David Batts, LLB	Senior Partner Livingston, Alexander & Levy 72 Harbour Street Kingston
Compton Beecher, MPhil	Chief Forensic DNA Analyst Caribbean Genetics Department of Basic Medical Sciences University of the West Indies, Mona Campus
Paul Brown, PhD	Senior Lecturer – Molecular Biology Department of Basic Medical Sciences University of the West Indies, Mona Campus
Sherron Brydson, MSc	Chief Forensic DNA Analyst Government Forensic laboratory Hope Boulevard, Kingston, Jamaica
George Carmody, PhD	Adjunct Professor - Statistics Department of Biology Carleton University, Ottawa, Canada
Rosalee Chingara, MSc	Lecturer - Toxicology Department of Basic Medical Sciences University of the West Indies, Mona Campus
D/Sgt. Christopher Anderson	Forensic Crime Scene Investigator Jamaica Constabulary Force Technical Services Division 34 Duke Street, Kingston
Fitzmore Coates, BSc	Forensic Chemist (Consultant) Government Forensic laboratory Hope Boulevard, Kingston, Jamaica
Tara Dasgupta, PhD	Professor - Chemistry Chemistry Department

Garth Dawkins, MPhil	University of the West Indies, Mona Campus Manager, Laboratory Quality Assurance Department of Basic Medical Sciences
Stephen DeRoux, MD	University of the West Indies, Mona Campus Deputy Chief Medical Examiner Office of the Chief Medical Examiner New York City, NY, USA
Carlos Escoffery, DM	Professor - Pathology Department of Pathology University of the West Indies, Mona Campus
Michelle Hamilton, MB BS, PhD	Lecturer - Biochemistry Department of Basic Medical Sciences University of the West Indies, Mona Campus
Carole Lindsay, MPhil	Assistant lecturer – Biochemistry Department of Basic Medical Sciences University of the West Indies, Mona Campus
Parris Lyew-Ayee Jr., PhD	Director Mona Geo-Informatics Institute University of the West Indies, Mona Campus
Paul Maragh, PhD	Lecturer - Chemistry Chemistry Department University of the West Indies, Mona Campus
Norma McFarlane-Anderson, PhD	Professor - Bioethics Department of Basic Medical Sciences University of the West Indies, Mona Campus
Colin McKenzie, PhD	Senior Lecturer - Tropical Medicine Research Institute University of the West Indies, Mona Campus
Wayne McLaughlin, PhD	Professor & Programme Coordinator Department of Basic Medical Sciences University of the West Indies, Mona Campus
Judith Mowatt, PhD	Director Government Forensic laboratory Hope Boulevard, Kingston, Jamaica
Christopher Ogunsalu, PhD	Lecturer - Anatomy Department of Basic Medical Sciences University of the West Indies, Mona Campus
Melissa Pasquale-Styles, MD	City Medical Examiner Office of the Chief Medical Examiner New York City, NY, USA
Robin Rattary, PhD	Lecturer - Chemistry Chemistry Department University of the West Indies, Mona Campus
Kedambady Shetty, MB BS	Lecturer - Anatomy Department of Basic Medical Sciences University of the West Indies, Mona Campus
Paul Singh, PhD	Lecturer - Toxicology Department of Basic Medical Sciences University of the West Indies, Mona Campus
Marina Stajic, PhD, D-ABFT	Director, Forensic Toxicology Office of the Chief Medical Examiner

Christine Walters, PhD

New York City, NY, USA  
Office of the Dean  
Faculty of Medical Sciences  
University of the West Indies, Mona Campus

# THE CURRICULUM OF THE MASTER'S PROGRAMME IN FORENSIC SCIENCE

## *Organisation of the Programme*

The curriculum is a 12-month programme full-time or 24 months part-time in line with the University's academic year which runs from August 1<sup>st</sup> to July 31<sup>st</sup>. 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 May. The summer semester begins in May and ends the last week of July. The lecture schedule may however change to accommodate visiting lecturers.

The Master of Science degree requirements are met upon satisfactory completion of minimum of 37 credits of which 24 credits make up the core courses for all disciplines. Thirteen (13) credits are specific to the disciplines of forensic chemistry, forensic molecular biology, forensic pathology and anthropology, or forensic toxicology.

The MSc 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.

## **REGULATIONS AND ASSESSMENT PROCEDURES**

Students should refer to the Manual of Procedures for Graduate Diplomas and Degrees, the regulations for Graduate Diplomas and Degrees, the Graduate Studies Guide for Students and Supervisors, and the Thesis Guide. (<http://www.mona.uwi.edu/postgrad/>)

## *Assessment of Students' Performance*

Examinations are held according to the UWI's regulations. Examinations are held in December, May and July.

- i. In order to pass a course, a candidate must have been in satisfactory attendance at the course, and must have satisfied the examiners in the associated examinations and course work. Attendance at, and the submission of the relevant reports pertaining to all laboratory courses is required.
- ii. Examinations associated with each course shall be conducted mainly by means of written and or practical papers, normally taken at the end of the semester in which the candidate has registered for the courses concerned. However, oral examinations as well as performance in course work in the form of essays, in-course tests, projects, or continuous assessments of theoretical and /or practical work may contribute towards the final grade awarded in a course.

- iii. When practical and/or practical coursework contributes towards an examination, candidates must satisfy the examiners in both theoretical and practical aspects of the course.
- iv. Candidates who score 50% (B Grade) and above would be deemed to have successfully completed the course at the appropriate level that is consistent with the grading scheme given below; these candidates would be given the credits that are assigned to the course.
- v. Those candidates who fail the examination (i.e. scores < 50%) associated with the prescribed course(s) will need to register for examinations only and re-sit the examination when it is offered again.
- vi. All failing grades will be calculated in the overall grades.

### *Grading System*

<b>Percentage</b>	<b>Grades</b>
70 - 100	A
60 - 69	B <sup>+</sup>
50 – 59	B
0 – 49	F

### *Progress through the Programme*

- i. Students admitted to the programme are required to register for all the prescribed courses. Students may elect to do additional courses of not more than 6 credits outside of their prescribed option and is subject to the approval of the Programme Coordinator. Additional course(s) must not include laboratory courses.
- ii. Candidates are not permitted to carry failed courses valued more than 8 credits in any one semester (see time limits and conditions for withdrawal).
- iii. By the end of the 12-months (FT) or 24-months (PT), each student is expected to successfully complete a minimum of **thirty seven** (37) credits. Candidates who satisfy these requirements will be eligible for the award of the degree subject to iv above.

### *Time Limits for Completion and Enforced Withdrawals.*

- i. A candidate taking examinations in the programme will normally:
  - a) not be allowed to re-sit any examination more than twice;
  - b) be required to withdraw from the programme, if the candidate is carrying more than eight (8) credits of failed courses in any one semester.
- ii. Candidates who do not complete the programme within the maximum period will be required to withdraw from the programme. However, if the candidate has exhausted the maximum time limit with a deficit of no more than eight (8) credits for completion of the degree requirement, the Dean may recommend to the Campus Committee for Graduate Studies (after consultation with the Programme Coordinator) an extension of the period of study by one or two semesters.

### *Re-admission to the programme after enforced withdrawal*

Candidates, who have had to withdraw from the programme because of poor academic performance, may re-apply for admission after two (2) year of separation.

### *Exemptions and Transfers*

Students entering the program may transfer up to 8 credit hours taken at other institutions. The transferred courses, however, must be equivalent to courses listed in the curriculum and earned with a grade of B (GPA 3.0) or better and the course(s) cannot have been taken longer than seven years from enrolment as an MSc student.

## **QUALITY ASSURANCE**

All Quality Assurance procedures are as described in The University of the West Indies' Regulations for Graduate Degrees and Diplomas.

The proposed programme will be assessed and reviewed through the appointment of examiners (First and Second) a University Examiner and an External Examiner.

## **ADMISSION AND REGISTRATION**

### *The University Graduate Office*

The general administration of graduate affairs is performed by the University's Office of Graduate Studies and Research. The documentation associated with applications, admissions, programme of study, course grades, transcripts and reports is all maintained in this office. In addition it coordinates on behalf of the University activities such as registration and graduation. (<http://www.mona.uwi.edu/postgrad/>)

### *Admission Requirements:*

The minimal admission criteria for the program are outlined below:

- i. B.Sc. degree with a minimal cumulative GPA of 2.0 (Lower Second Class Honours) from a recognized post-secondary institution  
or
- ii. Medical Degree (Candidates for Forensic Pathology and Anthropology)

The following coursework must have been passed at the undergraduate level:

- i. Two semesters of Level-1 Chemistry. Two semesters of Level-2 Chemistry (including Analytical Chemistry) for candidates intending to pursue Forensic Chemistry.
- ii. One semester of Statistics/Biostatistics.
- iii. Two semesters of Level-1 Biology/Genetics

Additional requirements to be met by all applicants:

- i Two letters of recommendations from individuals who can attest to the candidate's character, scientific ability or work experience.

- ii Provision of an acceptable criminal record check, or a certified reference letter of security clearance from a current employer
- iii Have either started or completed a course of Hepatitis B vaccinations

All supporting documents are to be submitted to the Office of Graduate Studies and Research, Mona Campus.

### *Interviews*

As part of the selection process, the department reserves the right to interview applicants for further exploration of their qualifications, experience and interest. Applicants may be called for an interview, possibly at short notice.

### *How to Apply*

All applications must be completed on-line using the website <http://sas.uwimona.edu.jm:9010>. For further information please contact:

Professor Wayne McLaughlin  
Programme Coordinator  
The University of the West Indies  
Department of Basic Medical Sciences  
Mona Campus  
Kingston 7, Jamaica

Telephone: 1-876-977-4342  
Fax: 1-876-977-7852  
Email: [wayne.mclaughlin@uwimona.edu.jm](mailto:wayne.mclaughlin@uwimona.edu.jm)

Ms. Thornia Smith  
Programme Administrator  
The University of the West Indies  
Department of Basic Medical Sciences  
Mona Campus  
Kingston 7, Jamaica

Telephone: 1-876-927-2290  
Telephone: 1-876-977-4342  
Fax: 1-876-977-7852  
Email: [thornia.smith@uwimona.edu.jm](mailto:thornia.smith@uwimona.edu.jm)  
Email: [bms@uwimona.edu.jm](mailto:bms@uwimona.edu.jm)

### *Closing Date for Application*

For admission in September, applicants must complete their applications by January 31<sup>st</sup>. The processing of an application can only begin when all the required documentation is received.

### *Registration and Payment of Fees*

**All tuition will be due and payable at the start of each academic year.**

US\$ 12,000 for applicants from contributing countries

US\$ 15,000 for applicants from non-contributing countries

**Exchange Rate used will be at the Bursary Rate at the time of payment.**

Students will be required to select courses for both semesters and the summer at the start of the academic year. Students will be charged for the full academic year but **may opt to pay on a Semester basis. Students paying fees by Semester must pay in three equal portions and must pay:**

- (i) Semester I Tuition by August 30
- (ii) Semester II and Summer by January 25
- (iii) Summer Semester by May 02

The fees charged for the programme covers all tuition, handouts, and assessments.

The cost per credit is US\$ 453.00 (for all categories of students)

Examination only (re-sit) is US\$ 250/course

Information on miscellaneous fees can be found at <http://www.mona.uwi.edu/postgrad/>

### *Acknowledgement*

Once your application has been processed and you are successful, you will be advised by the Office for Graduate Studies and Research.

### *Confirmation of Acceptance*

Applicants who have been offered a place in the programme must confirm their acceptance by the date specified in the offer.

## **FACILITIES**

### *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*

Laboratories for forensic molecular biology, serology and toxicology will take place in the Molecular Biology Building, while forensic chemistry will take place in the Drug Testing Laboratory in the Chemistry Department. Forensic Pathology will take place in the Pathology Department.

## COURSE OF STUDY IN FORENSIC SCIENCE

### 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	Credit	Semester
Fundamentals of Forensic Science	3	1
Crime Scene Management	3	1
Forensic Laboratory Quality Assurance	2	1
Legal and Ethical Issues in Forensic Science	3	1
Moot Court	2	2
Statistical Analysis of Forensic Evidence	3	1
*Research methods & Project	6	2 & Summer
Graduate Seminar	2	2 & Summer
	<b>24†</b>	

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

† 24 core credits are covered in Semesters 1, 2 and the summer.

### Electives†

Course Code	Course	Credit	Semester
FSCI6302	Population Genetics	3	Summer
FSCI6501	Forensic Chemistry I	3	2
FSCI6502	Forensic Chemistry II	3	Summer
FSCI6503	Forensic Chemistry Analysis Laboratory	2	Summer
FSCI6601	Forensic Serology	3	Summer
FSCI6602	Forensic Serology laboratory	2	Summer
FSCI6603	Forensic Molecular Biology	3	Summer
FSCI6604	Forensic Molecular Biology laboratory	2	Summer
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

† Elective credits are covered in semester 2 and the summer.

## AREAS OF EMPHASIS

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

### *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
<b>Total</b>		<b>13</b>	

### *Forensic Molecular 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	Summer
FSCI6602	Forensic Serology Laboratory	2	Summer
FSCI6603	Forensic Molecular Biology	3	Summer
FSCI6604	Forensic Molecular Biology laboratory	2	Summer
<b>Total</b>		<b>13</b>	

### *Forensic Pathology and Anthropology*

**Prerequisite:** MBBS degree.

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
<b>Total</b>		<b>13</b>	

### *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
<b>Total</b>		<b>13</b>	

## COURSE DESCRIPTION

**FSCI6101**                      **Fundamentals of Forensic Science**  
3 Credits                      Semester                      1

### Pre-requisite:

### Course Objectives:

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, quality assurance/quality control (QA/QC), chain of custody procedures, the forensic laboratory, expert testimony and the fundamentals of crime scene investigation. 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 will 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 QA/QC issues that are central to a well run laboratory
5. Describe how a crime scene is evaluated and processed
6. Describe the emergence of nontraditional forms of evidence collection at crime scenes
7. Discuss current human rights issues pertaining to the use of DNA samples and databases, genocide and mass disasters

### Course Structure:

1. A lecture course of 24 hours
2. Tutorials of 12 hours

### Evaluation:

One 2 hour written paper	80%
Two In-course tests	20%

### 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.

### Recommended readings:

Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2<sup>nd</sup> Ed. 2007. Pearson

Saferstein, Richard *Criminalistics: An Introduction to Forensic Science* 9<sup>th</sup> Ed. 2007. Pearson

Forensic Science International

Journal of Forensic and Legal Medicine

Journal of Forensic Sciences

**FSCI6102**

**Crime Scene Management**

3 Credits

Semester

1

**Pre-requisite**

**Course Objectives:**

This course will provide an in-depth study of crime scene procedures including recognition, protection, documentation techniques, and collection of biological and physical evidence; crime scene documentation (photography, crime scene sketching, information gathering, report writing, measurements, fingerprint processing, blood pattern analysis, ballistics, scene search procedures; and reconstructions from evidence and scene patterns), chain of custody. Scene investigations will include burglary, homicide, arson, motor vehicle, and sudden and unexplained death. 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 will be able to:

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

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 hours

**Evaluation:**

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

**Prescribed text(s):**

Fisher, B. J. and D. Fisher. *Techniques of crime scene investigation* 7<sup>th</sup> Ed. 2003 CRC Press  
Stuart, James H. and Jon J. Nordby *Forensic Science: An Introduction to Scientific and Investigative Techniques* 3<sup>rd</sup> Ed. 2009.

**Recommended reading(s):**

Sutton, Raul and Keith Trueman (Eds.) *Crime Scene Management: Specific Methods*. 2009. John Wiley and Sons, Ltd.  
Jackson, Andrew R.W. and Julie M. Jackson *Forensic Science* 2<sup>nd</sup> Ed. 2007, Pearson.  
Swanson C., N. Chamelin, L. Territo and R. Taylor. *Criminal Investigation*. 10<sup>th</sup> Ed. 2009. McGraw Hill.  
Forensic Science International  
Journal of Forensic Sciences

**FSCI6103****Forensic Laboratory Quality Assurance**

2 Credits Semester 1

**Course Objectives:**

To introduce the principles of quality assurance, current industry standards for quality systems in forensic science disciplines.

**Learning Objectives:**

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

1. Outline the history, philosophy, concepts and benefits of a Laboratory Quality Management System.
2. Identify the essential components of forensic laboratory quality management systems and explain their significance in terms of the reliability of analytical results.
3. Apply the ISO/IEC 17025 requirements to improve laboratory performance.
4. Use statistical methods to ensure the quality of the results.

**Course Structure:**

1. A lecture course of 24 hours

**Evaluation:**

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

**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.

**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](http://www.forensicnetbase.com/ejournals/books/book_summary/summary.asp?id=22)

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

**FSCI6201****Legal and Ethical Issues in Forensic Science**

3 Credits

**Pre-requisite****Course Objectives:**

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 will 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 Crown Court trials.
5. Understand how the adversarial system of justice works and the procedure for trials held in the criminal courts.
6. Appreciate the importance of the forensic science report prepared for use in court.
7. Outline the role of the forensic scientist instructed to appear in court as an expert witness.
8. Discuss the legal issues regarding the 'scientific' interpretations and analyses of physical evidence

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 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*. 2<sup>nd</sup> 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* 2<sup>nd</sup> Ed. 2007. Pearson  
Hodgkinson T *Expert evidence law and practice*. 3<sup>rd</sup> Ed. 2009. Sweet and Maxwell Publishers.  
Ellner, P. *The biomedical scientist as expert witness*. 2006 ASM Press  
Journal of Forensic and Legal Medicine

<b>FSCI6202</b>	<b>Moot Court</b>
	2 Credits
<b>Pre-requisite</b>	FSCI 6202

**Course Objectives:**

This interactive 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 actively 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 will 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.

**Course Structure:**

1. A lecture course 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*. 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

**Recommended reading(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

Ellner, P. *The biomedical scientist as expert witness*. 2006 ASM Press

**FSCI6301**                      **Statistical Analysis of Forensic Evidence**  
3 Credits                      Semester                      1

**Pre-requisite**

**Course Objectives:**

In this course students will be introduced to those basic statistical concepts that will provide the necessary foundations for the evaluation of forensic evidence. Students will discuss the statistical and probabilistic evaluation of forensic evidence. Among the areas to be covered are: laws of probability, conditional probability, genetic variation in human populations, likelihood ratio, Hardy-Weinberg equilibrium, Bayes theorem, evaluation of evidence, sampling and interpretation of statistical results. Statistical analysis in transfer evidence, paternity testing and mixtures, and presenting evidence.

**Learning Objectives:**

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

1. Explain the basic concepts of statistical methodologies
2. Interpret data relevant to forensic evidence
3. Apply the product rule to DNA profiles and calculate the random match probability
4. Apply statistical laws of probability to the analysis of forensic evidence
5. Apply likelihood ratio to the analysis of transfer evidence
6. Apply Bayesian inference to the analysis of forensic evidence
7. Explain the weight of scientific and statistical evidence in court

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 hours

**Evaluation:**

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

**Prescribed text(s):**

Lucy, David. *Introduction to Statistics for Forensic Scientists*. 2005. John Wiley & Sons, Ltd.

**Recommended reading(s):**

Aitken, Colin and Franco Taroni. *Statistics and the evaluation of evidence for forensic scientists*. 2<sup>nd</sup> Ed. 2004. John Wiley & Sons, Ltd  
Forensic Science International  
Forensic Science International: Genetics

**FSCI6302**                      **Population Genetics**  
3 Credits

**Pre-requisite****Course Objectives:**

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 will 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.

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 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*. 3<sup>rd</sup> 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

**FSCI6401**                      **Research Methods and Project**  
6 Credits

**Pre-requisite**

**Course Objectives:**

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 will 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

**Course Structure:**

1. A lecture course of 24 hours

**Evaluation:**

MSc Research paper	80%
Two In-course tests	20%

**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

**FSCI6402**                      **Graduate Seminar**  
2 credits

**Pre-requisite**

**Course Objectives:**

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. Attendance at all seminars is compulsory.

**Learning Objectives:**

Upon completion of this course, the student will 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

**Course Structure:**

1. Seminars of 24 hours

**Evaluation:**

Research project presentation	40%
Case review	30%
Journal article presentation	20%
Attendance and participation	10%

**FSCI6501**                      **Forensic Chemistry I**  
3 Credits

**Pre-Requisite**

**Course Objectives:**

This course emphasizes the use of various sensitive analytical techniques including pyrolysis-GCMS, micro-FTIR, GPC, capillary electrophoresis, spectroscopy and microscopy in the analysis of trace evidence including paint, inks, dyes, fibers, explosives and plastics. Tool marks and serial number restoration, footwear and tyre mark impression evidence will be presented. 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 will be able to:

1. Describe appropriate techniques for collection, processing, storage and preservation of the integrity of evidence to be examined by chemical analysis.
2. Develop chain of custody procedures for managing evidence samples.
3. Discuss the principles of chromatographic separation (GC, HPLC, IC), factors that influence separation efficiency and the components, layout, functioning and optimization of typical instruments.
4. Describe specialized chromatographic techniques for analysing micro-samples and trace analytes.
5. Discuss the principles of atomic absorption and atomic emission spectroscopy (AAS, GFAAS, AES, ICP-AES), typical instrumentation, components and operating conditions.

**Course Structure:**

2. A lecture course of 24 hours
3. Tutorials of 12 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*. 2<sup>nd</sup> Ed. 2004. The Royal Society of Chemistry

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

Saferstein, R., *Criminalistics, An Introduction to Forensic Science*, 8<sup>th</sup> 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

## **FSCI6502                      Forensic Chemistry II**

3 Credits

### **Pre-Requisites:**

### **Course Objectives:**

This course will introduce students to the investigation of arson and fire investigations. Students will also be introduced to explosive materials and the investigations of explosions. Sampling protocols, packaging, recovery, analytical techniques and data analysis will also be discussed.

### **Learning Objectives:**

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

1. Describe appropriate techniques for collection, processing, storage and preservation of the integrity of evidence to be examined by chemical analysis.
2. Explain the dynamics and development of a fire.
3. Describe the steps required in a fire investigation, burn patterns and identify fire spread.
4. Describe the appropriate techniques and tests for analysing fire and explosives.
5. Interpret chromatographic data.

### **Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 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*. 2<sup>nd</sup> Ed. 2004. The Royal Society of Chemistry.

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

Saferstein, R., *Criminalistics, An Introduction to Forensic Science*, 8<sup>th</sup> 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.



**FSCI6503                      Forensic Chemistry Laboratory**

2 Credits

**Pre-Requisites:**        FSCI6502

**Laboratory Objectives:**

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.

Students will learn to:

- apply chromatographic techniques to the identification and quantification accelerants from arson debris, components of explosives and also selected toxicants;
- apply spectroscopy techniques to analysis of trace evidence associated with gunshot residues, paints, fibres, glass, bone, metal fragments.

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.
- 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.

**Evaluation:**

Case Report	60%
Two In-course tests	20%
Laboratory reports	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)* 1<sup>st</sup> Ed. 2009. Wiley-Interscience

**FSCI6601                      Forensic Serology**

3 Credits

**Pre-requisite**

**Course Objectives:**

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 will be able to:

1. Outline the composition and biological function of each of blood, semen and saliva.
2. Describe the presumptive tests used to determine whether a body fluid found at a crime scene is blood, semen or saliva.
3. Explain the basis on which serological tests work, with particular reference to their use in various types of blood testing.
4. Explain the importance of bloodstain pattern analysis in the investigation of scenes of violent crime.

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 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*. 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

**Recommended reading(s):**

Forensic Science International: Genetics

Journal of Forensic Sciences

**FSCI6602` Forensic Serology Laboratory**

2 Credits

**Co-requisite** FSCI6601

**Laboratory Objectives:**

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.

**Evaluation:**

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

**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.

**FSCI6603 Forensic Molecular Biology**

3 Credits

**Pre-requisite**

**Course Objectives:**

This course will discuss the theory and application of human genetics and molecular biology to testing of biological evidence. DNA structure, replication and organization of the human genome and types of genetic variation occurring in humans will be covered. The history of DNA analysis and current PCR based methods for testing of autosomal STR loci, Y chromosome STR loci and mitochondrial DNA will be covered. 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 DNA topics including SNPs, microbial DNA, mitochondrial DNA, 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 Objectives:**

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

1. Explain the nature of DNA and its relationship to genes.
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. Discuss the impact of DNA profiling on forensic investigations.

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 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

**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* 2<sup>nd</sup> Ed. 2007. Pearson  
Lucy, David. 2005. *Introduction to Statistics for Forensic Scientists*. John Wiley & Sons, Ltd.  
Forensic Science International: Genetics  
Journal of Forensic Sciences

<b>FSCI6604</b>	<b>Forensic Molecular Biology Laboratory</b>
	2 Credits
<b>Co-requisite</b>	FSCI6603

**Laboratory Objectives:**

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 analysis. 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.

**Evaluation:**

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

**FSCI6701**                      **Forensic Anthropology**  
3 Credits

**Pre-requisite:**

**Course Objectives:**

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 will 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.

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 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* 3<sup>rd</sup> 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

**FSCI6702**                      **Forensic Anthropology Laboratory**  
2 Credits

**Co-requisite:**                      FSCI6701

**Laboratory Objectives:**

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.

**Evaluation:**

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

**Prescribed text(s):**

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

**FSCI6703**                      **Forensic Pathology I**  
3 Credits

**Pre-Requisites:**

**Course Objectives:**

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 will 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

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 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*. 2<sup>nd</sup> 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

**FSCI6704                      Forensic Pathology II**

3 Credits

**Pre-Requisites:**            Forensic Pathology I

**Course Objectives:**

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 will 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

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 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 and Suzanna E. Dana. *Handbook of Forensic Pathology* (Paperback) 2<sup>nd</sup> 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

**FSCI6705                      Forensic Pathology Laboratory**

2 Credits

**Co-Requisites:**                      FSCI6704

**Laboratory Objectives:**

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.

**Evaluation:**

Case Report    60%

Two In-course tests    20%

Laboratory reports    20%

**Prescribed text(s):**

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

**FSCI6801                      Forensic Toxicology I**

3 Credits

**Pre-Requisites:**

**Course Objectives:**

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. An overview of 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 will 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.

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 hours

**Evaluation:**

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

**Prescribed texts:**

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

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

**Recommended reading(s):**

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

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

Journal of Analytical Toxicology

Journal of Forensic Sciences

**FSCI6802                      Forensic Toxicology II**

3 Credits

**Pre-Requisites:**            FSCI6801

**Course Objectives:**

This course will provide a study on the pharmacology, chemistry and toxicology of chemical toxins, poisons, illegal drugs, performance enhancing drugs and carcinogens. Analytical methods used in isolation and identification of illicit drugs and their metabolites in biological samples and other forensic evidence. 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 will 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 and use relevant analytical methods to isolate and identify e.g. illicit drugs and their metabolites in biological samples and other forensic evidence.
3. Apply chromatographic (HPLC) and tandem-chromatographic techniques (GC-MS, HPLC-MS, etc) to the identification and quantification of drugs and their metabolites in biological samples

**Course Structure:**

1. A lecture course of 24 hours
2. Tutorials of 12 hours

**Evaluation:**

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

**Prescribed text(s):**

Levine, Barry. *Principles of Forensic Toxicology* 2<sup>nd</sup> Ed. 2006. American Association for Clinical Chemistry.

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

**Recommended reading(s):**

Olson, Kent R. *Poisoning and Drug Overdose* 7<sup>th</sup> Ed. 2006. Lange.

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

Hoffman, Robert S et. al. *Goldfrank's Manual of Toxicologic Emergencies* 1<sup>st</sup> Ed. 2007. McGraw-Hill.

Journal of Analytical Toxicology

Journal of Forensic Sciences

**FSCI6803                      Forensic Toxicology Laboratory**

2 Credits

**Co-requisites:**              FSCI6802

**Laboratory Objectives:**

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/MC 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.

**Evaluation:**

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