Centre for Forensic Science

2011 Guidebook

Undergraduate Unit

Mysteries of Forensic Science (FNSC2200)
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome and Introduction</td>
<td>2</td>
</tr>
<tr>
<td>General Information</td>
<td>3 - 4</td>
</tr>
<tr>
<td>Unit Outline</td>
<td>5</td>
</tr>
<tr>
<td>Assessment</td>
<td>5</td>
</tr>
<tr>
<td>Lecture Outline</td>
<td>6 - 7</td>
</tr>
<tr>
<td>Reading List</td>
<td>7</td>
</tr>
<tr>
<td>Timetable</td>
<td>8</td>
</tr>
<tr>
<td>Centre for Forensic Staff</td>
<td>9</td>
</tr>
<tr>
<td>Teaching Staff</td>
<td>10</td>
</tr>
<tr>
<td>Student Feedback</td>
<td>11</td>
</tr>
</tbody>
</table>
Welcome

Welcome to the Mysteries of Forensic Science. This booklet will give you an overview of the unit and supply you with key information about the Centre for Forensic Science.

‘Mysteries of Forensic Science’ is an introduction and insight into Forensic Science and its different components. It is designed to introduce you to the crime scene and demonstrate the application of science as a crime fighting tool. Experts from all areas of science have come together to share their knowledge and hopefully, as this semester progresses, you will have a much better perspective on how crimes are solved.

Introduction

Forensic Science is the application of scientific knowledge and understanding to help solve crimes. Today, science and forensically intelligent policing is at the forefront of crime fighting. As criminals find new ways to commit crime and cover their tracks, scientists have to constantly develop new technologies to unravel their modus operandi.

The Centre for Forensic Science introduced its first Postgraduate Programmes in 1999. In 2002 the Master/PhD in Forensic Science programme was introduced. Also in 2002, the Centre offered this undergraduate unit as an elective for students in the Faculty of Life and Physical Sciences. In 2004 students from other universities were able to enrol in Mysteries of Forensic Science under the cross-institutional enrolment scheme.

For more information on our postgraduate programmes in Forensic Science, access our web site www.forensicscience.uwa.edu.au or contact the Administrator, Alexandra Knight, on 6488 7286 or forensic@uwa.edu.au

Information in this guidebook was compiled from July 2011, but is subject to change from time to time. In particular The University of Western Australia and/or the Centre for Forensic Science reserves the right to change the content and/or the method of presentation and/or the method of assessment of any unit of study, to withdraw any unit of study or programme which it offers, to impose limitations on enrolment in any unit or programme, and/or vary arrangements for any programme.
General Information

Office Location: The Centre for Forensic Science is located on Myers St, in the Myers St building. The reception is on the first floor.

Office Hours: Monday to Friday 8.30am – 5.00pm

Contact Details: Centre for Forensic Science, M420 University of Western Australia 35 Stirling Highway Crawley WA 6009

T: (08) 6488 7286
F: (08) 6488 7285

E: forensic@uwa.edu.au

W: www.forensicscience.uwa.edu.au

Unit Coordinator: Winthrop Professor Ian Dadour
All queries should be directed to the Administrator on 6488 7286 or forensic@uwa.edu.au

Assignments: Your assignment must be handed into the Centre’s Office by 5.00pm on the due date (Tuesday 1st November). All assignments must be accompanied by a blue coversheet (available from the Office or the website at www.forensicscience.uwa.edu.au – please print on blue paper).

An after hours box for assignments is located on the right hand side of the Centre’s front door (this is emptied daily, including weekends). Students are expected to keep an electronic copy of their assignments.

Extensions: Requests for extensions must be applied for in writing to the Administrator, at least 1 working day PRIOR to the due date. You must include the reason for the extension and the length of extension required. If an extension is required on medical grounds, it must be accompanied by a medical certificate. Response to extension requests will be by email. Students are NOT to request extensions directly from the Lecturer.

Late assignments: If an extension is not requested and granted prior to the due date, a penalty of 5% for each late day (including weekends and public holidays) will be deducted for late assignments. After five days (25%), late assignments will not be marked.
Appeals: Students should familiarise themselves with the UWA Procedures for Appeals against Academic Assessment, which can be found online at the following website: http://handbooks.uwa.edu.au/undergraduate/poliproc/Student Procedures/AssessmentandExamination/Assessment/Appeals

Attendance: Attendance at all lectures is compulsory unless you are absent for medical reasons. A written explanation accompanied by a medical certificate must be forwarded to the Administrator. Marks will be deducted for non-attendance.

Cancellations: Mysteries of Forensic Science is a dynamic course with many of the lecturers involved in case work. As scientists, they are sometimes called to crime scenes. During this course, some lecturers may not be able to attend with little or no notice. You will be notified by email if a lecture needs to be cancelled or rescheduled. Please make sure you check your email before attending each class.

Lecture material: Due to the sensitive nature of Forensic Science, many lecturers will NOT issue handouts or lecture notes, and most material will NOT be available on WebCT. The lectures will NOT be recorded via Lectopia. Where handouts are available, they will usually be distributed at the beginning of each lecture.

Plagiarism: Students are required to familiarise themselves with the penalties imposed for plagiarism and other forms of academic misconduct. Please see the UWA policy on academic conduct, available at http://www.teachingandlearning.uwa.edu.au/staffnet/policies/conduct
Unit Outline

Mysteries of Forensic Science FNSC2200
6 points
Semester 2

Unit description:
This unit introduces students to the application of science to a key public arena - solving crime. By moving from the scene of crime through the different sciences, students experience the contextual application of each science discipline to problem solving. The unit calls on Western Australia’s leading forensic experts, including the police Forensic Division and lecturers who are leaders in their fields.

Contact hours:
Lectures: 2 x 1 hour lectures per week (on Tuesday and Thursday evenings)

Attendance:
An attendance list will be taken at the Crime Scene Practical on Tuesday 9th August. Students will have 10% deducted from their final mark if they do not attend.

Assessment

1) 2 hour exam based on the lecture material. The exam consists of a combination of multiple choice and short answer questions and is worth 70% of the unit grade.

2) One written assignment of 2000 – 3000 words. The written assignment is worth 30%. There is not a set question for this written assignment. Students are expected to choose one of the lectured areas of Forensic Science that interests them and write an assignment on the chosen area. Students should commence research on their chosen area at the beginning of the semester. The assignment is due by 5pm on Tuesday 1st November.

Guidelines to note when completing the assignment:

- You should write your assignment in a scientific style
- You need to use headings and sub headings
- Your references should be done in 'Vancouver' style

If more than 20% of your references are internet references, YOU WILL RECEIVE 0% FOR THE ASSIGNMENT

If you use Wikipedia or any other FREE content website encyclopedias as references, YOU WILL RECEIVE 0% FOR THE ASSIGNMENT
Lecture Outline

Western Australian Police
Crime scene investigation, fingerprint sciences, ballistics evidence, post blast examinations and document examinations.

Forensic Anthropology
Define physical, forensic, and biological anthropology. An overview of population differences & an overview of individual differences. Applications of forensic anthropology.

Forensic Archaeology
Forensic archaeology involves the application of archaeological theory and method to the excavation and recovery of skeletal material and artefacts from forensic contexts.

Blood Spatter Stains
Fundamentals of blood pattern analysis, stain types etc., case studies and discussion.

Toxicology
Detection and identification of illicit drugs. How to distinguish organic from inorganic substances, the analysis of mixtures, and the identification of individual components from their "chemical fingerprints".

DNA
Forensic biology (past, present and future) and the use of DNA in criminal investigations.

Entomology
What is Forensic Entomology? The science of Forensic Entomology – at the crime scene, at the mortuary, and in research.

Food Forensics
Food Science is the science behind the products we consume every day. Food scientists apply the principles of chemistry, biochemistry, nutrition, microbiology, forensic science & engineering to produce the next generation of food products, to improve food processing techniques & to ensure quality, safety and nutritional value of the food supply. Food safety is a significant global issue with enormous implication for public health.

Forensically Working the Crime Scene
Students will be shown a crime scene and introduced to the various forensic disciplines available to investigators at crime scenes, for example use of the pathologist, entomologist, etc., and the contribution these experts make to the investigation. Students will also be introduced to Criminal and Geographical Profiling, which complements the Forensic intelligence that investigators would use in setting their investigation parameters.

Microscopy and Microanalysis
Characterising our evidence. Evidence cannot be altered or destroyed. How modern microscopy addresses these challenges will be described and explained.
**Antibodies in Forensics**

Antibodies are proteins of the immune system that are produced in response to foreign antigens. These are produced naturally in response to natural infection or can be induced by vaccination. Antibodies are highly specific and can be used to discriminate polymorphisms of proteins and carbohydrate moieties. Traditional antibody methods are still in practise, and novel applications have been developed for specific applications, for example the differentiation between genetically identical twins.

**Odontology**

Forensic odontology is the field where dentistry meets the judicial system. This lecture will give a brief overview of the work carried out by the forensic odontologist. This includes identification of the dead and living, age estimation of both young and old, and bite mark analysis.

**Reading List**

Saferstein, R. *Criminalistics: An introduction to Forensic Science* (7th edition)

Goff, M.L. *A fly for the prosecution*

Freckelton, I. *The trial of the expert*

Thomas, C.C. *Human identification: Case studies in forensic anthropology* (eds. Rathburn, TA, Buikstra, JE)

*Forensic taphonomy: The post-mortem fate of human remains* (eds. Haglund, WD, & Sorg, MH)

*Studies in crime: An introduction to Forensic Archaeology*. (eds. Hunter, J; Roberts, C & Martin A)
**TIME:** All lectures are one hour in duration from **6.00pm – 7.00pm**, except the Crime Scene Practical which is 90 minutes in duration (6.00pm – 7.30pm).

**VENUE:** All lectures will be held in the **Wilsmore Lecture Theatre**, Room G108, in the Chemistry Building. Please meet in the lecture theatre before the Crime Scene Practical, which will actually be held outdoors.

**CANCELLATION OF LECTURES:** This timetable is subject to change, sometimes at short notice, and students will be advised of any changes via email. Cancellation of lectures only requires ½ a day notice so please check your email regularly.

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<tr>
<th>Week</th>
<th>Date</th>
<th>Staff</th>
<th>Subject</th>
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<tr>
<td>1</td>
<td>Tuesday 2 August</td>
<td>Dan Franklin</td>
<td>Housekeeping</td>
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<td></td>
<td>Thursday 4 August</td>
<td>WA Police</td>
<td>Crime Scene Theory</td>
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<td>2</td>
<td>Tuesday 9 August</td>
<td>WA Police</td>
<td>Crime Scene Practical</td>
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<td></td>
<td>Thursday 11 August</td>
<td>WA Police</td>
<td>Fingerprint Sciences</td>
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<td>3</td>
<td>Tuesday 16 August</td>
<td>WA Police</td>
<td>Blood Spatter Analysis</td>
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<td></td>
<td>Thursday 18 August</td>
<td>WA Police</td>
<td>Ballistics</td>
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<tr>
<td>4</td>
<td>Tuesday 23 August</td>
<td>WA Police</td>
<td>Post Blast Examination</td>
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<tr>
<td></td>
<td>Thursday 25 August</td>
<td>WA Police</td>
<td>Document Examination</td>
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<td>5</td>
<td>Tuesday 30 August</td>
<td>Ian Dadour</td>
<td>Forensic Entomology</td>
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<td></td>
<td>Thursday 1 September</td>
<td>Ian Dadour</td>
<td>Forensic Entomology</td>
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<td>6</td>
<td>Tuesday 6 September</td>
<td>Brendan Griffin</td>
<td>Microscopy &amp; Microanalysis</td>
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<td></td>
<td>Thursday 8 September</td>
<td>Brendan Griffin</td>
<td>Microscopy &amp; Microanalysis</td>
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<td>7</td>
<td>Tuesday 13 September</td>
<td>Peter Mack</td>
<td>International Forensics</td>
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<td></td>
<td>Thursday 15 September</td>
<td>Shane Burke</td>
<td>Forensic Archaeology</td>
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<td>8</td>
<td>Tuesday 20 September</td>
<td>Charles Oxnard</td>
<td>Now you see it, now you don’t</td>
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<td></td>
<td>Thursday 22 September</td>
<td>Dan Franklin</td>
<td>Forensic Anthropology</td>
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<td></td>
<td><strong>W/C Monday 26 September - Non-Teaching Study Break</strong></td>
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<td>9</td>
<td>Tuesday 4 October</td>
<td>Silvana Gaudieri</td>
<td>DNA Profiling</td>
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<td></td>
<td>Thursday 6 October</td>
<td>Silvana Gaudieri</td>
<td>Microbial Forensics</td>
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<td>10</td>
<td>Tuesday 11 October</td>
<td>Jenny Ball</td>
<td>Human Odontology</td>
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<td></td>
<td>Thursday 13 October</td>
<td>Guan Tay</td>
<td>Antibodies in Forensics</td>
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<td>11</td>
<td>Tuesday 18 October</td>
<td>Garry Lee</td>
<td>Food Forensics</td>
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<tr>
<td></td>
<td>Thursday 20 October</td>
<td>Garry Lee</td>
<td>Food Forensics</td>
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<td>12</td>
<td>Tuesday 25 October</td>
<td>Judith Fordham</td>
<td>Criminal Justice</td>
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<td></td>
<td>Thursday 27 October</td>
<td>Judith Fordham</td>
<td>Expert Evidence</td>
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<td>13</td>
<td>Tuesday 1 November</td>
<td>John Watling</td>
<td>Forensic Toxicology</td>
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<td></td>
<td>Thursday 3 November</td>
<td>John Watling</td>
<td>Forensic Chemistry</td>
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Centre for Forensic Science Staff

Alexandra Knight is the Administrator for the Centre for Forensic Science. She is your first point of contact for any enquiries.

Winthrop Professor Ian Dadour is the Director of the Centre and a Registered Forensic Practitioner. He is the State’s Honorary Forensic Entomologist at the PathWest and the only accredited Forensic Entomologist in Australia. He is used extensively by the Police Services of WA and other States to provide entomological evidence on post mortem interval.

Associate Professor Daniel Franklin is the Director of Studies at the Centre and is a physical anthropologist with a background in archaeology. His primary research involves using both traditional and geometric morphometric tools to improve the identification of human remains and to examine ways in which these methods can improve facial recognition based on the form of the facial skeleton. He currently works collaboratively with the FME Research Unit, Hull York Medical School. Dan coordinates the Forensic Anthropology and Forensic Archaeology units.

Winthrop Professor John Watling is a Registered Analytical Chemist with over 25 years experience in Forensic Science. He has developed a number of innovative accessories for use with a wide variety of instrumental analytical techniques and has pioneered research into the use of special distribution patterns (Fingerprinting) to establish provenance of forensic evidence. He is an expert witness in Spectrometric and Spectroscopic analysis and in data interpretation as applied to crime scene evidence.

Associate Professor Silvana Gaudieri is a lecturer with UWA and an Adjunct Senior Lecturer with the Centre for Clinical Immunology and Biomedical Statistics. Her main areas of research include characterisation of the Major Histocompatibility Complex in human haplotypes and other primates and pathogen host-viral interactions. She is also involved with developing new tools for mass screening and tracking HIV infection.

Associate Professor Judith Fordham is a lecturer at the Centre. Her background is in science and criminal law and she has worked as a criminal barrister for 15 years. Judith coordinates the case study unit of the Graduate Diploma of Forensic Science at UWA and is completing her PhD with the Centre. Her research examines the way jurors deal with complex scientific evidence.
Teaching Staff

CFS Teaching Staff – as above

Western Australian Police – Specialists from various divisions of WAPS will give lectures on the areas of crime scenes, blood spatter analysis, fingerprints, ballistics, post-blast investigations and document examinations.

Professor Brendan Griffin is a Professorial Fellow with the Centre for Microscopy and Microanalysis and has a teaching and research commitment to the development and application of scanning electron microscopy (SEM) and x-ray microanalysis. He is a leading authority on environmental SEM and has developed a new imaging procedure called charge contrast imaging or CCI.

Dr Jenny Ball has been in private dental practice for over 20 years and has also completed her Master of Forensic Science at UWA. Jenny occasionally assists the State’s Forensic Odontologist with identifications.

Emeritus Professor Charles Oxnard has worked in a number of areas including primate evolution, functional anatomy, biomechanics and clinical anatomy. He has been engaged in studies involving multivariate and geometric morphometrics for all of his academic life. These morphometric investigations have included studies on hard and soft tissues, behaviour, diet and ecology.

Dr Peter Mack has a Master of Dental Surgery and specialises in restorative dental surgery. He has a keen interest in the history of medicine (specifically aspects of the psychology of individuals in the war), and the origin of cracks in teeth. His early career involved forensic work on military aircraft incidents whilst in the RAF. In more recent years he has been involved in bite mark assessments and investigations of fatal and non-fatal dog attacks.

Dr Shane Burke is an Adjunct Senior Lecturer with the Centre. He uses his experience as an archaeologist to teach field survey techniques and data collection procedures applicable to forensic cases.

Associate Professor Guan Tay holds an Adjunct position at the Centre. His research interest focuses on the application of DNA and antibody-based tools in Forensic Science and biotechnology. He has established collaborative links with the biotechnology sector to specifically develop practical uses for these technologies.
Student Feedback

We would appreciate your feedback on this unit so that we can build on it.

Please let us have your comments, good and bad, about the unit.

Please hand/mail comments to:

The Administrator
Centre for Forensic Science
M420 - University of Western Australia
35 Stirling Highway
Crawley WA 6009

July 2011