



LONDON SOUTH BANK  
UNIVERSITY

# unit guide

## **Forensic Biology**

Unit Ref. SFO-2-154

Blackboard site

**Faculty of Engineering,  
Science and Built  
Environment**

2008/9

**become what you want to be**

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# 1.0 UNIT DETAILS

<b>Unit Title:</b>	Forensic Biology
<b>Unit Level:</b>	2
<b>Unit Reference Number:</b>	SFO-2-154
<b>Credit Value:</b>	1 Credit = 15 CATS points
<b>Student Study Hours:</b>	150 hours + 1 week field course in semester 2
<b>Contact Hours:</b>	51 hours
<b>Private Study Hours:</b>	99 hours
<b>Pre-requisite Learning (If applicable):</b>	None
<b>Co-requisite Units (If applicable):</b>	None
<b>Course(s):</b>	Forensic Science Programme
<b>Year and Semester</b>	2004/5, Semester 1
<b>Unit Coordinator:</b>	Dr Neil Morgan
<b>UC Contact Details (Tel, Email, Room)</b>	Room E233, 020-7815-7956, <a href="mailto:morganni@lsbu.ac.uk">morganni@lsbu.ac.uk</a>
<b>Teaching Team &amp; Contact Details (If applicable):</b>	Dr Alan Beeby Room E227, 020-7815-7912 <a href="mailto:beebya@lsbu.ac.uk">beebya@lsbu.ac.uk</a> Dr Anne-Marie Brennan Room E228, 020-7815-7929 <a href="mailto:brennan@lsbu.ac.uk">brennan@lsbu.ac.uk</a> Prof. Martin Chaplin Room E229, 020-7815-7970 <a href="mailto:chaplifm@lsbu.ac.uk">chaplifm@lsbu.ac.uk</a>
<b>Subject Area:</b>	Forensic Science
<b>Summary of Assessment Method:</b>	50% examination, 50% coursework

This guide is designed to help you structure your learning by providing an indicative structure and content for the unit. It is a guide and not a Definitive statement of what you will be taught. We will try to follow this Published schedule as far as possible, but there may be some variation as The unit develops and as we try to match the pace and content of our Teaching to student needs.

## 2.0 SHORT DESCRIPTION

The unit will introduce some of the major biological indicators found in forensic science and will supply background knowledge e.g. Mendelian genetics for future units in DNA fingerprinting. The laboratory practicals will cover serological identification of human and non human samples, blood and blood grouping, pollen and insect identification. A field course in Portugal will compose the coursework element. Students not going to Portugal will be given similar exercises to complete at Southbank.

## 3.0 AIMS OF THE UNIT

- 1.0 To give the students an appreciation of the role of biology in forensic science.
- 2.0 To transmit a body of factual knowledge on types of biological samples.
- 3.0 To introduce the student to biological identification techniques.

## 4.0 LEARNING OUTCOMES

### 4.1 KNOWLEDGE AND UNDERSTANDING

After completing this unit the student will

1. Have knowledge of biological materials which may be used as forensic indicators.
2. Understand the analytical techniques used for analyzing a range of common biological materials.
3. Have experience of biological identification techniques with specific methodology for material comparison.
4. Understand the precautions necessary when dealing with biological samples particularly with regard to personal safety and in terms of the preservation of evidence.
5. Develop a personal development profile.

### 4.2 INTELLECTUAL SKILLS

*Learning how to learn*; there are numerous aspects to this skill developed e.g. time management, finding information, analysing information critically.

### 4.3 PRACTICAL SKILLS

Within the practical programme students will develop skills in serological techniques, biological identification methods. On the field course students will develop personal skills in working and living together.

### 4.4 TRANSFERABLE SKILLS

*Numeracy skills*: will be acquired during the laboratory and field course sessions.

*Use of information and communication technology*: the use of Web Of Science (WOS) data base and the Internet and CD-ROMs will be expected. Word processing is required for the production of the field course report.

*Ability in critical analysis*; this key intellectual skill is a major learning outcome of this unit and a main indicator of attainment of graduate status. In the unit the critical case study and data analysis of practicals will help develop this skill.

*Understanding methodologies*; this will be developed as a result of practical classes

## 5.0 INTRODUCTION TO STUDYING THE UNIT

### 5.1 OVERVIEW OF THE MAIN CONTENT

#### 1 **Biological principles**

Basic structures and function of: DNA, chromosomes, proteins, enzymes, isoenzymes. Human genetics relating to population, Mendelian systems, differences in genetic character of different human populations.

#### 2 **Role of Biology in forensic science**

Appreciate the wide role indicators can have in an investigation. e.g. blood, type, place at scene of crime. Role in insect infestation being used to calculate the postmortem interval

#### 3 **Biological indicators**

Structure of human blood, blood groupings, antibodies and antigens enzymes and isoenzymes, saliva, semen, urine, finger prints, ear print. Wood, pollen, soil, leaves seeds starch grains, insects, algae and miscellaneous biological traces.

#### 4 **Special problems associated with biological samples**

Sampling (protective clothing, sample security, documentation, consent, ethics, sample recording and disposal) and specific storage conditions prior to analysis, differences with chemical test samples etc.

### 5.2 OVERVIEW OF TYPES OF CLASSES

There will be 12 weeks with 2 hour lectures in each week. Each student will take part in one hour tutorial every second week. In addition, there will be 4 practical sessions, each of 3 hours duration. At the end of the unit there will be an additional 2 lectures devoted to revision.

### 5.3 IMPORTANCE OF STUDENT SELF-MANAGED LEARNING TIME

In preparation for each lecture you should the texts recommended for each lecture and practical. You are expected to do this. A blackboard site accompanies

this unit and will be given the password in the lectures. Numerous web sites e.g. FBI in USA are available for self study.

## 6.0 THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Week	10-11 Lecture	11-12 Tutorial	12-1 Lecture
1	NLM	NLM	AMB
2	NLM	NLM	AMB
3	NLM	NLM	AMB
4	NLM	NLM	AMB
5	NLM	NLM	NLM
6	NLM	NLM	NLM
7	MFC	NLM	ANB
8	MFC	NLM	ANB
9	MFC	NLM	ANB
10	MFC	NLM	ANB
11	MFC	NLM	ANB
12	To be arranged	NLM	NLM
Christmas			
16	Exams	Exams	Exams
17	Exams	Exams	Exams

### Weekly Teaching Programme

Friday ROOM B232

L = lecture

T = tutorial

Set texts

All references refer to these texts

Forensic Science A. W. Jackson, J. M. Jackson Peason ISBN 0-13-043251-2  
2004. **FS in text**

Practical skills in Forensic Science Langford. A, Dean. J, Reed. R, Holmes. D,  
Weyers. J, Jones. A Peason ISBN0 13114400-6 2005 **PS in text**

#### **Additional texts for reference**

Criminalistics 7th edition, Saferstein. R Prentice Hall 2001 ISBN  
0-13-013827-4

Biology 6th edition, Campbell N. Reece J.B.. Mitchell L.B. Pub Wesley Addison  
ISBN 0-8053-6573-7

### Week 1

#### **Private Preparation for lectures and tutorials**

Reread basic science practicals - year 1

Read the pages of the set text book identified with the lectures

FS c1, PS p407, 462, Criminalistics c1, Campbell c 13-16

[L] 10-11 NLM  
Introduction to the unit, assessment etc.  
Role of forensic biology in forensic science, biological markers.  
[T] 11-12 NLM Tutorial  
[L] 12-1 AMB  
Forensic botany and field course

## Week 2

### **Private Preparation for lectures and tutorials**

FS c5, PS 407, 462 Criminalistics c 12, Campbell c 43

[L] 10 - 11 NLM

Biological indicators

DNA, human blood, blood groupings, antibodies and antigens, enzymes and isoenzymes, saliva, semen, urine, finger prints, ear prints, wood, pollen, soil, leaves seeds starch grains, insects, algae and miscellaneous biological traces. Sampling and safety. Link to practical 1 in week 7.

[T] 11-12 NLM Tutorial

[L] 12-1 AMB

Forensic botany and field course. Link to practical 4 in week 10

## Week 3

### **Private Preparation for lectures and tutorials**

FS c5, PS 407,462 Criminalistics c 12, Campbell c 43

[L] 10-11 NLM

Forensic indicators

[T] 11-12 NLM tutorial

[L] 12-1 AMB Forensic botany and field course. Link to practical 4 in week 10

## Week 4

### **Private Preparation for lectures and tutorials**

FS c5, PS 407, 462, Criminalistics c 12, Campbell c 43

[L] 10-11 NLM

Blood, structure, groups role in forensic science. Link to practical 2 in week 8

[T] 11-12 NLM Tutorial

[L] AMB

Forensic Botany. Link to practical 4 in week 10

## Week 5

### **Private Preparation for lectures and tutorials**

PS 407

[L] NLM

Antibody production, antibody structure, ELISA systems.

[T] 11-12 NLM Tutorial.

[L] NLM

Immunological identification of human non human tissues. Link to practical 3 in week 9

## Week 6

### **Private Preparation for lectures and tutorials**

FS c6, Criminalistics c13, Campbell c13-15

[L] NLM

Basic genetics 1, Mendelian genetics, genotype, phenotype, dominance, Recessive

[T] 11-12 NLM Tutorial

[L] NLM

Application of Mendelian genetics to DNA finger printing

### **Week 7**

#### **Private Preparation for lectures and tutorials**

PS p415,436, Campbell c 16

[L] 10-11 MFC

DNA structure and function

[T] 11-12 NLM Tutorial

[L] 12-1 ANB Forensic entomology and field course. Link to practical

### **Week 8**

#### **Private Preparation for lectures and tutorials**

FS c6, PS p415,436, Campbell c 16

[L] 10-11 MFC

DNA structure and function

[T] 11-12 NLM Tutorial

[L] 12-1 ANB Forensic entomology. Link to practical

### **Week 9**

#### **Private Preparation for lectures and tutorials**

FS c6, PS p415,456, Campbell c 16

[L] 10-11 MFC

DNA structure and function

[T] 11-12 NLM Tutorial

[L] 12-1 ANB Forensic entomology. Link to practical.

### **Week 10**

#### **Private Preparation for lectures and tutorials**

PS p415, 456, Campbell c 16

[L] 10-11 MFC

DNA structure and function

[T] 11-12 NLM Tutorial

[L] 11-12 ANB Forensic entomology. Link to practical

### **Week 11**

#### **Private Preparation for lectures and tutorials**

FS c6, FS 456Campbell c 16

[L] 10-11 MFC

DNA structure and function

[T] 11-12 NLM Tutorial

[L] 11-12 ANB Forensic entomology

Link to practical

### **Week 12**

#### **Private Preparation for lectures and tutorials**



FS 456, 462 Campbell c 16  
[L] 10-11 Diatoms  
[T] 11-12 NLM No tutorial  
[L] 11-12 NLM Revision

### **Week 16**

#### **Revision all staff**

#### **Practicals week 7-10 2-5 J302**

1. Enzyme assay acid phosphatase - human semen marker.
2. Blood identification of cells, human and non human red blood cells/ setting up a microscope.
3. Outerlony plating - identification of human proteins by serology
4. Biological samples pollen and insects preparation for the field course - microscopy.

#### **Tutorials in weeks**

##### **Group A**

**1, 4, 10**

##### **Group B**

**2, 7, 11**

##### **Group A and B**

**A = A-M surnames**

**B = N-Z surnames**

#### **Tutorial topics**

1. Cell structure
2. Forensic science and the Internet
3. Problems
  - a. Mendelian genetics problems relating to DNA finger printing
  - b. Use of blood groups for paternity analysis
4. Student lead tutorials will be given when required in the other weeks.

## **7.0 ASSESSMENT OF THE UNIT**

### **8.0**

The unit will be assessed by a 2 hour examination (50%) (Learning outcomes 1-4) and the report of the field course (50%).(Learning outcomes 3 and 4)

The **course work** will be the field course write up. To be submitted in March/April 2008. Those attending the field course in Portugal will carry out the experiments when there. Those not attending will perform equivalent experiments in semester 2 on a date to be arranged.

## 9.0 LEARNING RESOURCES

### 9.1 CORE MATERIALS

Forensic Science by Jackson R.W., Jackson J.M. Pearson ISBN 0 130 43251 2 2004

Criminalistics by Saferstein Forensic Science Handbook 7<sup>th</sup> edition Prentice Hall

Biology 6th edition, Campbell N. Pub 1993 Cummings ISBN 0-8053-6624-5

### 9.2 OPTIONAL MATERIALS

Pounder DNA in Forensic Science Ellis Horwood (1993)

Benjamini.E., Leskowitz.S. Immunology - A Short Course Alan R. Liss., New York (1998).

Roitt.I., Essential Immunology 8th edition Blackwell (1995)

Playfair J. Infection and Immunity. OUP (1995)

### NOTES

A blackboard site supports this unit.

## 2008/9 Semester 1 Timetable for **SFO\_2\_154**

### FBio2 Forensic Biology

**Please note: This timetable is always subject to alterations.**

Timetable last changed on 12 Jun 2008

	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
<b>Mon</b>								
<b>Tue</b>						14:00 - 17:00 <i>Wsp</i> in J302 with 54 Students <b>Morgan, N, Richmond, L</b> FS2F, CH FS.2 Weeks: 8-11,		
<b>Wed</b>						14:00 - 17:00 <i>Wsp</i> in J302 with 54 Students <b>Morgan, N, Richmond, L</b> FS2F, CH FS.2 Weeks: 7-10,		
<b>Thu</b>								
<b>Fri</b>	10:00 - 11:00 <i>Lect</i> in B232 with 54 Students <b>Morgan, N</b> FS2F, CH FS.2 Wk: S1 PartA		11:00 - 12:00 <i>Lect</i> in B232 with 54 Students <b>Morgan, N</b> FS2F, CH FS.2 Weeks: 1-12,		12:00 - 13:00 <i>Lect</i> in B232 with 54 Students <b>Brennan, A</b> FS2F, CH FS.2 Weeks: 1-4,			
	10:00 - 11:00 <i>Lect</i> in B232 with 54 Students <b>Chaplin, M</b> FS2F, CH FS.2 Weeks: 7-12,				12:00 - 13:00 <i>Lect</i> in B232 with 54 Students <b>Morgan, N</b> FS2F, CH FS.2 Weeks: 5-6,12,			
					12:00 - 13:00 <i>Lect</i> in B232 with 54 Students <b>Beeby, A</b> FS2F, CH FS.2 Weeks: 7-11,			

Average hours per week	<i>Lect</i> 2.77	<i>Wsp</i> 1.85	Total 4.62
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