



LONDON SOUTH BANK
UNIVERSITY

unit guide

Microbiology

Unit Ref. SBS-1-131

Blackboard site

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

2006/07

become what you want to be

Table of contents

1.0	UNIT DETAILS	3
2.0	SHORT DESCRIPTION	3
3.0	AIMS OF THE UNIT	3
4.0	LEARNING OUTCOMES	4
4.1	KNOWLEDGE AND UNDERSTANDING	4
4.2	INTELLECTUAL SKILLS	4
4.3	PRACTICAL SKILLS	4
4.4	TRANSFERABLE SKILLS	4
5.0	INTRODUCTION TO STUDYING THE UNIT	5
5.1	OVERVIEW OF THE MAIN CONTENT	5
5.2	OVERVIEW OF TYPES OF CLASSES	5
5.3	IMPORTANCE OF STUDENT SELF-MANAGED LEARNING TIME	5
6.0	THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT	6
7.0	ASSESSMENT OF THE UNIT	8
8.0	LEARNING RESOURCES	8
8.1	CORE MATERIALS	8
8.2	OPTIONAL MATERIALS	8

1.0 UNIT DETAILS

Unit Title:	Microbiology
Unit Level:	1
Unit Reference Number:	SBS-1-131
Credit Value:	1 Credit = 15 CATS points
Student Study Hours:	150 Hours
Contact Hours:	30 Contact hours
Private Study Hours:	120 Student managed learning hours
Pre-requisite Learning (If applicable):	none
Co-requisite Units (If applicable):	none
Course(s):	[Click and replace]
Year and Semester	
Unit Coordinator:	
UC Contact Details (Tel, Email, Room)	
Teaching Team & Contact Details (If applicable):	Dr N. L. Morgan 0207 815 7956, morgannl@lsbu.ac.uk Room E233
Subject Area:	Bioscience & Food
Summary of Assessment Method:	100% Examination

2.0 SHORT DESCRIPTION

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.

The unit is an introduction to microbiology, beginning with some historical aspects and going on to examine the range of microorganisms (viruses, archaeans, eubacteria, fungi, algae and protozoa), their classification, structure, growth and nutrition. The application of microbiology is also introduced. For example, in the fields of medicine and public health, food production and hygiene, agriculture and the environment and in the use of microorganisms for the provision of useful products and services such as waste-water treatment.

3.0 AIMS OF THE UNIT

- 1 To define and introduce microbiology, firstly through a brief history of the subject and then a review of the organisms that constitute the microbial world.
- 2 To provide an introduction to microbial diversity, cell structure and function

- 3 To examine fundamental aspects of microbial nutrition, growth and death.
- 4 To give a clear perception of the role of microorganisms in the environment, disease and biotechnological processes.

4.0 LEARNING OUTCOMES

4.1 KNOWLEDGE AND UNDERSTANDING

As many students will have relatively little knowledge of microbiology, this unit is primarily designed to give them the opportunity to develop a microbiology vocabulary and on completion of the unit students will be able to:

- 1 define the term 'microorganism' and appreciate the diversity of microorganisms.
- 2 be aware of the differences between the main groups of microorganisms (archaeans, eubacteria and eukaryotic microorganisms) and to be able to describe their structures.
- 3 understand concepts relating to microbial growth and the influence of nutrition and environmental factors.

4.2 INTELLECTUAL SKILLS

In this unit the student must develop a structured, disciplined and focussed approach to independent investigations. In addition they will discuss the role of microorganisms in the environment, in disease, and in providing products and services for humankind. They will also analyze and manipulate quantitative data relating to microbial growth and enumeration, e.g. logarithms, indices, dimensions, dilutions, etc.

4.3 PRACTICAL SKILLS

There is are no practicals directly associated with this unit

4.4 TRANSFERABLE SKILLS

Within this unit there will be opportunities to develop:

Use of information and communications technology; this unit gives the student the opportunity to use library resources, including electronic sources of information in the consolidation and expansion of the material introduced through the lectures and tutorials.

Data handling and presentation skills; this unit supports the core skills.

5.0 INTRODUCTION TO STUDYING THE UNIT

5.1 OVERVIEW OF THE MAIN CONTENT

Indicative Content:

- A Introduction to microbiology and its history, and how we study and handle microorganisms (15% of unit time).
- B Examination of microbial classification, taxonomy and diversity (15% of unit time).
- C Microbial structure, nutrition and growth (40% of unit time).
- D Control (inhibition) of microbial growth (10% of unit time).
- E Introduction to the application of microbiology (20% of unit time).

5.2 OVERVIEW OF TYPES OF CLASSES

The course will be presented in a series of 24 lectures (2 hours per week), plus tutorials (1 hour every second week). In addition, there will be a programme of student centred activities including guided reading and audio-visual aids.

5.3 IMPORTANCE OF STUDENT SELF-MANAGED LEARNING TIME

In preparation for each lecture, and to increase your microbiological vocabulary, you should read and make key notes from the specific guided reading material from within the recommended core textbook (see the Lecture programme below). By carrying out this preparation you will find that you will be able to follow the lectures much more successfully and produce a more coherent set of lecture notes. As there are limited numbers of the core text (Madigan *et al* (2002) *Biology of Microorganisms*) in the University Library, you are strongly advised to purchase this book. In addition, you will also have to prepare material for the tutorials, which take place every other week. For most tutorials the reading within the Tutorial Guide gives the basic information, however, for some tutorials this will need to be supplemented by material that can again be found in the core textbook.

6.0 THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Timetable (Thursday 2.00 - 5.00)

	Lectures in room B230		Tutorials
Week No.	2.00 - 3.00	3.00 - 4.00	4.00 - 5.00
1		NLM	<u>Note:</u> You will be assigned to a specific tutorial group at the beginning of the unit.
2		NLM	
3		NLM	
4		NLM	
5		NLM	
6		NLM	
7		NLM	
8		NLM	
9		NLM	
10		NLM	
11		NLM	
12		MJW	
Christmas vacation=====			
13	revision week NLM/		
14	examinations		

Lecture Programme (Thursday pm, room B230)

	(except week 11) 2.00 - 3.00		NLM (except week 12) 3.00 - 4.00
1	Introduction to microorganisms Archaea (archaeobacteria), eubacteria, fungi (yeasts and filamentous fungi/moulds), protozoa, algae and viruses. Pages 1 - 8, 22 - 37 and 336 - 337.	2	History of Microbiology Spontaneous generation and the discovery of microorganisms. Contributions made by van Leewenhoek, Pasteur, Koch, etc. Pages 9 - 20.
3	Microbial Taxonomy & Classification Pages 29 - 37 and 341 - 350.	4	Viruses Structure and function. Pages 231 - 237, 246 - 247 and 255 - 263.
5	Prokaryotic cell structure Vegetative cells and spores Pages 63 - 71 and 90 - 100.	6	Units and measurement Units of length and mass in the microbial world. Scientific notation.
7	Eubacterial cell envelopes Gram positive and Gram negative bacterial cells. Pages 74 - 81.	8	Microbial Growth 1 Binary fission in prokaryotes. Phases of growth (cellular growth, division and death) and the cell cycle. Pages 138 - 140.
9	Eukaryotic microbial cell structure. Focus on fungal cells - comparison with prokaryotes. Pages 473 - 479 and 486 - 490.	10	Microbial Growth 2 Measurement of growth, estimation of cell numbers and biomass (plate counts, haemocytometry, etc.). Pages 145 - 148.
11	Microbial growth physiology 1 Nutrition - elemental requirements; and autotrophy, chemotrophy, heterotrophy, phototrophy. Pages 103 - 110.	12	Microbial Growth 3 Batch growth (lag, log, stationary and death phases - growth curve) and continuous growth. Pages 142 - 145 and 148 - 151.
13	Microbial growth physiology 2 Effects of environmental parameters; temperature, pH, etc. Responses to O ₂ . Extremophiles. Pages 151 - 166.	14	Microbial Growth 4 Batch growth kinetics. Graphical representation, etc. Pages 142 - 145.
15	Environmental Microbiology Elemental cycling and environmental/agricultural aspects of microbial activities. Pages 652 - 668 and 685 - 687.	16	Microbial culture media Composition, design and formulation. General, minimal, selective, differential, etc. Pages 107 - 110.
17	Control of Microorganisms 1 Disinfectants, antiseptics and antibiotics. Pages 703 - 707 and 712 - 713.	18	Control of Microorganisms 2 Sterilization using heat, chemicals, radiation, etc. Pages 697 - 703.
19	Food spoilage and its prevention Types of food spoilage and food preservatives. Traditional and modern methods of preservation. Pages 951 - 964.	20	Public Health Microbiology Contributions by Jenner, (vaccination), Snow (clean drinking water), etc. Pages 862 - 871, 935 - 937 and 940 - 948.
21	Medical Microbiology 1 (Pathogenicity & Epidemiology) Pathogenicity factors, e.g. toxins. The infectious disease cycle and modes of transmission Pages 847 - 858.	22	Medical Microbiology 2 Examples of microbial diseases (viral, bacterial and fungal). Pages 728 - 742.
23	Industrial Microbiology 1 Beneficial roles of microorganisms; Food products, chemicals, health care products, biodegradation of wastes, etc. Pages 966 - 967.	24	Industrial Microbiology 2 Negative effects of microbial activities (biodegradation of materials). Pages 972 - 993 and 1008 - 1012.

Page numbers refer to guided reading from the Core Text: *Brock: Biology of Microorganisms*, 10th edition (2002)

7.0 ASSESMENT OF THE UNIT

The assessment will be on a basis of 100% end of unit examination (example examination paper attached to lecture supplements document).

8.0 LEARNING RESOURCES

8.1 CORE MATERIALS

Madigan, M. T., Martinko, and Parker, J. ***Brock: Biology of Microorganisms***, 10th edition, Prentice Hall (2002)

Note: Specific sections from this textbook are given as additional reading to support each lecture topic.

Tutorial Guide Document

8.2 OPTIONAL MATERIALS

Prescott, L. M., Harley, J. P. and Klein, D. A. ***Microbiology*** (5th Edition), Wm C. Brown (2002).

Dixon, B. ***Power Unseen: How Microbes Rule the World***, W. H. Freeman (1994)

Postgate, J. ***Microbes and Man***, 3rd edition, Cambridge University Press (1992)

Waites, M. J., Morgan, N. L., Rockey, J. S. and Higon, G. ***Industrial Microbiology: An Introduction***. Blackwell Science (2001).

NOTES

2006/7 Semester 1 Timetable for SBS_1_131

Micro1 Microbiology

Please note: This timetable is always subject to alterations.

Timetable last changed on 10 Jul 2006

	9:00 to 14:00	14:00	15:00	16:00				
Mon								
Tue								
Wed								
Thu		14:00 - 15:00 <i>Lect</i> in B230 with 57 Students Maidment, M , AS1P, HA1F, B1F, BB1F, BM1F, BH1F, BN1F, FN1F, BS1F, CH	15:00 - 16:00 <i>Lect</i> in B230 with 57 Students Morgan, N , AS1P, HA1F, B1F, BB1F, BM1F, BH1F, BN1F, FN1F, BS1F, CH	16:00 - 17:00 <i>Lect</i> in B328 with 8 Students Maidment, M B1F Wk: S1 Odd				
				16:00 - 17:00 <i>Tut</i> in B230 with 21 Students Morgan, N Wk: S1 Odd				
				16:00 - 17:00 <i>Lect</i> in B230 with 15 Students Morgan, N HA1F, BH1F, BS1F Wk: S1 Even				
				16:00 - 17:00 <i>Lect</i> in B328 with 13 Students Maidment, M BN1F, FN1F, CH Wk: S1 Even				
Fri								
<table><tr><td>Average hours per week</td><td><i>Lect</i> 3.46</td><td><i>Tut</i> 0.54</td><td>Total 4.00</td></tr></table>					Average hours per week	<i>Lect</i> 3.46	<i>Tut</i> 0.54	Total 4.00
Average hours per week	<i>Lect</i> 3.46	<i>Tut</i> 0.54	Total 4.00					

Main Courses Rooms Staff Units

