The University of Southern Queensland

**Course specification**

**Description: Introductory Microbiology**

| Subject | Cat-nbr | Class | Term | Mode | Units | Campus |
|---|---|---|---|---|---|---|
| BIO | 2205 | 44291 | 2, 2005 | ONC | 1.00 | Toowoomba |

**Academic group:** FOSCI
**Academic org:** FOS002
**Student contribution band:** 2
**ASCED code:** 010911

## STAFFING

Examiner: Michael Kotiw
Moderator: Bernadette McCabe

## REQUISITES

Pre-requisite: BIO1101 and BIO2103

## OTHER-REQUISITES

Recommended prior study: BIO2201

## RATIONALE

Microbiological considerations are important in most areas of biology including medical sciences, animal, plant and microbial biotechnologies and general plant and environmental sciences. It is thus important that professionals in any of these fields become aware of the potential involvement of micro-organisms in their fields of study and become sufficiently familiar with the subject to gain an appreciation of the role played by micro-organisms in our daily lives and the environment.

## SYNOPSIS

This introductory study in microbiology is aimed at providing knowledge to professionals on the relevance of this subject to different fields of biology and the impact it can have on improving our daily lives and the environment. Explored in this course are the history and diversity of micro-organisms, cell structure and function, metabolism and growth, genetics of microbes and its relevance to different areas of biomedical, rural and environmental biotechnology, factors affecting the interactions of micro-organisms including bacteria, viruses, fungi and protists with plants, animals and humans and their impact on the environment including public health, significance to industrial microbiology, and the way the human or animal body defends itself against attack by foreign invaders.

## OBJECTIVES

On successful completion of this course students will be able to:

1. show sufficient familiarity with the history of the study of microbiology to explain past misconceptions and current conventional wisdom;
2. make meaningful comments about each of the microbiological terms encountered during the course;
3. demonstrate a useful knowledge of the taxonomy and morphological features of the various organisms normally regarded as microorganisms - viruses, bacteria, fungi and protozoa;
4. illustrate the structure, reproductive processes, pathogenicity and genetics of bacteria and viruses;
5. show an understanding of the various metabolic processes found in bacteria and the role of these in ecological, biotechnological and pathogenic functions;
6. describe the unique features of the genetics of bacteria and appreciate benefits of recombinant DNA technology;
7. demonstrate appreciation of the ecological role played by the microorganisms in soil and the atmosphere;
8. describe the microbiology of foods and the industrial applications of microbiology;
9. demonstrate appreciation of the contributions of microbes to genetic engineering and biotechnology including bioremediation;
10. explain the basic principles of immunology as applied to human or animal health;
11. demonstrate sufficient manipulative competence to be judged safe and efficient in common laboratory procedures;
12. demonstrate skills and knowledge required to perform laboratory experiments safely with appropriate equipment.

## TOPICS

| | Description | Weighting (%) |
|---|---|---|
| 1. | History and diversity of microorganisms | 6.00 |
| 2. | Overview of cell structure and function | 6.00 |
| 3. | Growth and control of microorganisms | 6.00 |
| 4. | Microbial metabolism | 10.00 |
| 5. | Microbial genetics | 12.00 |
| 6. | Microbial ecology - Symbiosis and animal microbial ecology | 4.00 |
| 7. | Microbial ecology - Land use microbiology | 6.00 |
| 8. | Microbial ecology - Microbial interactions in the environment | 10.00 |
| 9. | Classification and reproduction in Fungi | 14.00 |
| 10. | Virology | 16.00 |
| 11. | Determinants of microbial infections and defence mechanisms against bacterial or viral infections in animals or humans | 10.00 |

## TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone

+61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at http://bookshop.usq.edu.au click 'Semester', then enter your 'Course Code' (no spaces).

Black, JG 2004, *Microbiology: Principles and Explorations*, 6th edn, John Wiley & Sons Inc, ISBN 0471420840 (Trade Cloth).

Mukkur, TKS 2005, *Laboratory Exercises in Microbiology*, USQ Publication, Toowoomba.

## REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.


Ackerman, V & Dunk-Richards, G 1991, *Microbiology - An Introduction for the Health Sciences*, WB Saunders, Sydney.

Alexopoulos, CJ, Mims, CW & Blackwell, M 1996, *Introductory Mycology*, 4th edn, Wiley & Sons, New York.

Benjamini, E et al 2000, *Immunology: A short course*, 4th edn, Wylie, New York.

Bergey, D 1993, *Bergey's Manual of Determinative Bacteriology*, 9th edn, Lippincott Williams and Wilkins, Baltimore.

Black, JG 2002, *Microbiology, Principles and Explorations*, 5th edn, John Wiley & Sons, New York.

Glazer, AN & Nikaido, H 1995, *Microbial Biotechnology*, WH Freeman and Company, New York.

Glick, RB & Pastemak, JJ 1994, *Molecular Biotechnology: Principles and Application of Recombinant DNA*, ASM Press, Washington, DC.

Holt, John G et al 1993, *Bergeys Manual of Determinative Bacteriology*, 9th edn, Lippincott Williams and Wilkins,

Ingraham, JL & Ingraham, CA 2004, *An Introduction to Microbiology: A case history approach*, Thomson Brooks/Cole, Australia.

Krieg, N ed 1984, *Bergey's Manual of Determinative Bacteriology*, William's and Wilkin's, Baltimore, Vol 1-4.

Martinko, JM, Madigan, MT & Parker, J 2003, *Brock Biology of Microorganisms*, 10th edn, Prentice Hall, Englewood Cliffs.

Murray, Patrick R 1999, *Manual of Clinical Microbiology*, 7th edn, American Society for Microbiology, Washington, DC.

Pelczar, MJ, Chan, ECS & Krieg, NR 1993, *Microbiology: Concepts and applications*, McGraw-Hill Inc, New York.

Perry, JJ, Staley, JT & Lory, S 2002, *Microbial Life*, Sinuaer Associates, MA, USA.

Prescott, LM, Harley, JP & Klein, DA 2002, *Microbiology*, McGraw Hill, New York.

Raven, PH, Evert, RF & Eichhorn, SE 1999, *Biology of Plants*, 6th edn, Worth, New York.

Roitt, I, Brostoff, J & Male, D 2001, *Immunology*, 6th edn, Mosby, Sydney.

Rose, NR, MacArio, E and Folds, JD (eds) 1997, *Manual of Clinical Laboratory Immunology*, 5th edn, ASM Press, Washington.

Tate, RL 1995, *Soil Microbiology*, Wiley & Sons, New York.

## STUDENT WORKLOAD REQUIREMENTS

| ACTIVITY | HOURS |
|---|---|
| Examinations | 5.00 |
| Laboratory or Practical Classes | 24.00 |
| Lectures | 26.00 |
| Private Study | 103.00 |
| Tutorials | 2.00 |

## ASSESSMENT DETAILS

| Description | Marks out of | Wtg(%) | Due date |
|---|---|---|---|
| 2HR OPEN PRACTICAL TEST | 20.00 | 20.00 | 19 Jul 2005 (see note 1) |
| 3 HOUR CLOSED EXAM | 80.00 | 80.00 | END S2 (see note 2) |

**NOTES**

1. Lecturer to advise the date for practical test.
2. Examination dates will be available during the Semester. Please refer to the examination timetable when published.

## IMPORTANT ASSESSMENT INFORMATION

1 Attendance requirements:
It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.

2 Requirements for students to complete each assessment item satisfactorily:
To complete each of the assignments satisfactorily, students must obtain at least 50% of the marks available for the test. To complete the examination satisfactorily, students must obtain at least 50% of the marks available for the examination. To complete the practical component satisfactorily, students must obtain at least 50% of the marks available in the practical test.

3 Penalties for late submission of required work:
If students submit assignments after the due date without prior approval then a penalty of 20% of the total marks available for the assignment will apply for each working day late.

4 Requirements for student to be awarded a passing grade in the course:
To be assured of a passing grade, students must demonstrate, via the summative assessment items, that they have achieved the required minimum standards in relation to the objectives of the course by satisfactorily completing all summative assessment items (the examination and tests).

5 Method used to combine assessment results to attain final grade:

The final grades for students will be assigned on the basis of the weighted aggregate of the marks obtained for each of the summative assessment items in the course.

6 Examination information:
In an Open Examination, candidates may have access to any material during the examination except the following: electronic communication devices, bulky materials, devices requiring mains power and material likely to disturb other students In a Closed Examination, candidates are allowed to bring only writing and drawing instruments into the examination.

7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held in the fourth week of the semester 1 of the following year and the examiner will advise students involved in writing of the date time and location of any such examination.

8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL http://www.usq.edu.au/corporateservices/calendar/part5.htm or in the current USQ Handbook.

## ASSESSMENT NOTES

9 In order to attend laboratory classes, students must provide and wear appropriate personal protective equipment. This shall include a laboratory coat, closed in shoes, and safety glasses. Such equipment must be approved by supervising staff. Failure to provide and wear the appropriate safety equipment will result in students being excluded from classes.

10 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete-Deferred Examintion); IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).

11 The examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances. The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media. The Faculty will NOT accept submission of assignments by facisimile. Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.