

# BIOS 3004 ANALYTICAL MICROBIOLOGY

**Credit Points** 10

**Legacy Code** 300866

**Coordinator** Oliver Morton ([https://directory.westernsydney.edu.au/search/name/Oliver Morton/](https://directory.westernsydney.edu.au/search/name/Oliver%20Morton/))

**Description** The unit provides a theoretical and practical introduction to wide range of microbiological techniques that are commonly used in medical science, industrial and food microbiology, environmental science, and research. Building on a basic understanding of microbiology the unit shows how microorganisms can be isolated, identified, and enumerated using traditional microbiological methods, modern variations on traditional methods, and more recent immunological and molecular methods. The laboratory component is an integral component of the unit as the students use a variety of techniques, methods and commercial systems that are applied in microbiological laboratories, and incorporates problem solving and inquiry based exercises.

**School** Science

**Discipline** Microbiology

**Student Contribution Band** HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees ([https://www.westernsydney.edu.au/currentstudents/current\\_students/fees/](https://www.westernsydney.edu.au/currentstudents/current_students/fees/)) page.

**Level** Undergraduate Level 3 subject

**Pre-requisite(s)** BIOS 2022

**Equivalent Subjects** BIOS 3031 - Analytical Microbiology

**Assumed Knowledge**

A good general knowledge of microbiology and having the technical skills needed to work safely with microorganisms.

## Learning Outcomes

On successful completion of this subject, students should be able to:

1. Describe the microbiological methods used to observe, enumerate, isolate, characterise, differentiate, tag and identify microbial populations.
2. Discuss the importance of rapid methods in medical microbiology with reference to factors such as cost, speed of diagnosis, accuracy, skill levels and accreditation.
3. Describe methods for characterising microbial populations in various environments.
4. Perform a variety of analytical techniques, complying with Occupational Health and Safety guidelines, to identify, characterise and enumerate microorganisms in environmental samples and foods.
5. Apply different analytical methods given the context, situations and/or scenarios.
6. Work cooperatively and constructively in groups to solve problems using the scientific method.
7. Read and interpret scientific articles in the field of analytical microbiology.
8. Create a valid hypothesis, and design and undertake an experimental protocol to test this hypothesis derived from a scientific question.

## Subject Content

1. The importance of microscopy, particularly fluorescent microscopy in analytical microbiology.
2. Physical and nutritional methods of selective enrichment of target microorganisms and the use of selective and differential media with emphasis on chromogenic media.
3. Chemical and physical methods to characterise and enumerate microorganisms.
4. The importance of biochemical analyses and computer aided identification systems to identify microorganisms.
5. Methods to determine antibiotic resistance in microorganisms.
6. The different methods of microbial identification based on immunological techniques such as ELISA, immunochromatography and immunofluorescence.
7. The application of molecular methods such as PCR, hybridisation, and NASBA, to detect, differentiate, monitor and target microorganisms quantitatively.
8. Chemical methods such as phospholipid fatty acid analysis and molecular methods such as Terminal RFLP to identify and characterise microbial populations.
9. Application of analytical microbiology in food, medical and environmental studies.

## Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Item	Length	Percent	Threshold	Individual/Group Task
Poster	1,000 words	20	N	Individual
Report	1,500 words	30	N	Individual
Quiz	2 x 30 minutes	20	N	Individual
Final Exam	1 hour	30	N	Individual

Teaching Periods

## Autumn Hawkesbury Day

**Subject Contact** Oliver Morton ([https://directory.westernsydney.edu.au/search/name/Oliver Morton/](https://directory.westernsydney.edu.au/search/name/Oliver%20Morton/))

View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=BIOS3004\\_22-AUT\\_HW\\_D#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=BIOS3004_22-AUT_HW_D#subjects))