

# Unit Outline (Higher Education)

<b>Institute / School:</b>	Institute of Innovation, Science and Sustainability
<b>Unit Title:</b>	GENERAL MICROBIOLOGY
<b>Unit ID:</b>	SCMIC2001
<b>Credit Points:</b>	15.00
<b>Prerequisite(s):</b>	(SCBIO1001 or SCBIO1010)
<b>Co-requisite(s):</b>	Nil
<b>Exclusion(s):</b>	Nil
<b>ASCED:</b>	010911

## Description of the Unit:

The unit provides students with a strong foundation in microbiology. Students will gain the skills and knowledge needed to study higher level related subjects, and an understanding of the importance of microbiology in today`s society. Students will learn about the diversity of microorganisms, focusing on morphological, physiological and ecological characteristics. Important taxonomic groups will be covered, ensuring students have the theoretical knowledge to distinguish between key taxonomic groups. Students will be introduced to microbial growth, microbial genetics, mycology and virology. The theoretical knowledge will be supplemented by exercises that aim to develop capacity in the practical aspects of microbiology.

**Grade Scheme:** Graded (HD, D, C, P, MF, F, XF)

## Work Experience:

No work experience: Student is not undertaking work experience in industry.

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

**Course Level:**

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	■	■	■	■	■	■
Intermediate	■	■	✓	■	■	■
Advanced	■	■	■	■	■	■

### Learning Outcomes:

#### Knowledge:

- K1.** Outline the similarities and differences in cell structure and function within the various taxonomic groups of microorganisms; and compare microbial structure and function to that of more complex life forms.
- K2.** Describe the metabolic pathways unique to microorganisms and relate the diversity of pathways to the ubiquity of microorganisms.
- K3.** Describe reproductive/replicative strategies and nutritional needs of prokaryotes, fungi and viruses.
- K4.** List the mechanisms used by microorganisms to control the flow of genetic information.
- K5.** State the mechanisms prokaryotes and viruses use to increase genetic diversity and recognise the importance of these mechanisms in relation to topical issues such as antimicrobial resistance and evolution of novel pathogens
- K6.** Describe the interactions of microorganisms with human and non-human hosts, and relate to harmful, beneficial and neutral relationships
- K7.** Outline how we can control microbial populations.

#### Skills:

- S1.** Appraise the inherent risks associated with practical microbiology and devise strategies to ensure a safe work environment in the laboratory setting.
- S2.** Compare the nutritional and selective compositions of various growth media, and practise simulated growth and incubation of microorganisms to demonstrate skills in practical aspects of microbiology.
- S3.** Analyse and interpret results of simulated laboratory activities, and apply to analogous situations.
- S4.** Demonstrate communication skills, particularly through the appropriate reporting of simulated laboratory outputs.

#### Application of knowledge and skills:

- A1.** Apply theoretical knowledge in microbiology to simulated practical aspects of the unit, such as the ability to culture and differentiate key taxonomic groups of bacteria.
- A2.** Apply mathematical and graphical methods to enable the enumeration/quantification of microbial populations.

#### Unit Content:

Topics may include:

- The diversity of microorganisms
- Structure and function: viruses, bacteria, archaea and eukaryotic microbes
- Physiology and metabolic pathways in microorganisms
- Culture of microorganisms
- Control of microorganisms
- Microbial taxonomy and the identification of key taxonomic groups
- Practical applications of microorganisms

**FEDTASKS**

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	<p>Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in:</p> <ul style="list-style-type: none"> <li>Using effective verbal and non-verbal communication</li> <li>Listening for meaning and influencing via active listening</li> <li>Showing empathy for others</li> <li>Negotiating and demonstrating conflict resolution skills</li> <li>Working respectfully in cross-cultural and diverse teams.</li> </ul>	S3, S4	AT 2 - Written report(s) AT3 - Presentation
FEDTASK 2 Leadership	<p>Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>Creating a collegial environment</li> <li>Showing self-awareness and the ability to self-reflect</li> <li>Inspiring and convincing others</li> <li>Making informed decisions</li> <li>Displaying initiative</li> </ul>	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	<p>Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>Reflecting critically</li> <li>Evaluating ideas, concepts and information</li> <li>Considering alternative perspectives to refine ideas</li> <li>Challenging conventional thinking to clarify concepts</li> <li>Forming creative solutions in problem solving.</li> </ul>	K1 - K7 S1 - S3 A1 - A2	AT1 - Quizzes AT2 - Written report(s) AT3 - Presentation

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 4 Digital Literacy	<p>Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>Finding, evaluating, managing, curating, organising and sharing digital information</li> <li>Collating, managing, accessing and using digital data securely</li> <li>Receiving and responding to messages in a range of digital media</li> <li>Contributing actively to digital teams and working groups</li> <li>Participating in and benefiting from digital learning opportunities.</li> </ul>	K1 - K7 S1 - S4 A1 - A2	AT1 - Quizzes AT2 - Written report(s) AT3 - Presentation
FEDTASK 5 Sustainable and Ethical Mindset	<p>Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts</li> <li>Committing to social responsibility as a professional and a citizen</li> <li>Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses</li> <li>Embracing lifelong, life-wide and life-deep learning to be open to diverse others</li> <li>Implementing required actions to foster sustainability in their professional and personal life.</li> </ul>	K5, K6	AT3 - Presentation

### Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K3, K7, S1 - S4, A1, A2	Assessment of understanding of practical aspects of microbiology through the analysis and interpretation of (supplied) data	Written report(s)	10-20%
K1 - K6, S4	Assessment of understanding of microbial physiology by presenting on selected structures.	Presentation (recorded)	10-20%
K1 - K7, S1, S2, S3	Quizzes testing retention of knowledge	Quizzes, predominantly online	10-30%
K1 - K7, A1 - A2.	Theory Test	Test	40-60%

**Adopted Reference Style:**

Australian Harvard

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