
FOOD MICROBIOLOGY 534

SEMESTER 1, 2012

UNIT DETAILS

Unit Index No:	314118
Credit points:	25 credit points are awarded on successful completion of this unit.
Pre-requisite Units:	Relevant undergraduate degree as per the course entry requirements.
Tuition pattern	2.0 hour lecture weekly for 12 weeks 3.0 hour practical/tutorial weekly for 10 weeks.
Mode of Study	Internal only
Unit Controller	Dr David Townsend
Email	d.townsend@curtin.edu.au
Office	308.227
Phone	(08) 9266 7423
Address	School of Biomedical Sciences Curtin University of Technology GPO Box U1987 PERTH WA 6845
Phone	The phone is connected to a Voice Answering system which will prompt you to leave a message when there is no one is available to take your call. Clearly state your name, contact number and suggested time to ring back. If possible give a brief description of your inquiry so that a response can be prepared to your query.
Fax:	(08) 9266 2342

UNIT STATUS

This is a **core unit** for students enrolled in the Master of Science (Food Science and Technology); failure on more than two occasions may lead to termination from the course.

UNIT SYLLABUS

This unit examines the source, types, growth and effects of microbes in food and their impact on food quality and safety; food spoilage and preservation; sterilization, disinfection and sanitation relevant to food production; microbial intoxications and infectious diseases transmitted in food and water; effluent and wastewater treatment from food production facilities; use of predictive microbiology to determine safe storage and distribution of food and the role of microbiology in establishment quality control programs for production of safe food.

LECTURE PROGRAM

Topics	Lects	Dates	
Microbes in food: impact of processing, source, types, factors affecting their growth, effects on food quality and safety.	1-2	28/2/2012	DT
Role of microbes in food spoilage.	3-4	6/3/2012	DT
Microbes in food processing: probiotics, single cell protein, food additives.	5-6	13/3/2012	RC
Traditional and rapid methods for the detection of microbes in food and compliance with Food Standards Australia New Zealand (FSANZ).	7-8	20/3/2012	SM
Microbes in food processing: preservation of food to prevent microbial spoilage by fermentation, chemical and physical methods	9-10	27/3/2012	DT
Mid-semester test		3/4/2012	
Week free from tuition			
Effluent treatment and wastewater disposal.	11-12	17/4/2012	DT
Principles and use of predictive microbiology to provide safe storage and distribution of foods.	13	24/4/2012	DT
Aetiology of several major infectious diseases transmitted in food and water including bacterial, viral, parasitic and prion diseases.	14-16	24/4/2012-1/5/2012	DT
Role of microbes in food-borne intoxications including botulism, staphylococcal food-poisoning and fungal mycotoxins.	17-18	8/5/2012	DT
Principles and use of sanitization and disinfection to maintain production of safe food.	19-20	15/5/2012	DT
Final test		22/5/2012	

DT: David Townsend / RC: Ranil Coorey / SM: Steven Munyard

PRACTICAL PROGRAM

Students are required to bring the course notes and practical manual (from Blackboard) to the laboratory sessions and pre-read the relevant practical material. Each practical exercise lists a series of questions that need to be answered over the course of the program. The practical exam will include questions taken from this list.

PC2 Laboratory Safety

All practicals will be conducted in PC2 laboratories. Laboratory coats are required and will be supplied to all students. Coats are not to leave the laboratory and the School of Biomedical Sciences makes arrangements for regular laundering of coats. Students must wear protective shoes and have long hair tied back. Keep your personal belongings to a bare minimum.

A comprehensive section on laboratory safety is to be found in the Curtin publication *Food Microbiology 233/532: Laboratory Manual* by D.E. Townsend (2008). It is recommended that you read this prior to attending the laboratory sessions.

Practical Exercises

1.	Revision of microbiology techniques: Use of the microscope; wet preparations, Gram staining. Isolation of mixed cultures, plating for single colonies.
2.	Standard plate count: Sampling and analysis of food using serial dilutions and spread and pour plate techniques.
3.	Fermentation: preservation of food and examination of the changes in microbial flora and organoleptic qualities of food as it undergoes the fermentation process. Weekly samples are plated onto selective and non-selective media, stained and examined microscopically.
4.	Analysis of food for coagulase-positive staphylococci: use of selective to media to detect numbers of a pathogen, confirmatory testing and interpretation.
5.	Isolation and identification of <i>Salmonella</i> : Use of enrichment techniques to detect presence of a pathogen, confirmatory testing and identification.
6.	Modern rapid techniques for the detection of food-borne infections including viruses and parasites. Demonstration of fluorescent antibody staining, PCR detection of microbial DNA.
7.	Coliform count: membrane filter and MPN techniques for coliform estimation.
8.	Sampling techniques for estimating microbial contamination of air, surfaces and food processing equipment.
9.	Isolation and detection of <i>Listeria monocytogenes</i> .

TUITION TIMES AND VENUES

Lectures: Tuesday: 3.00 – 5.00 pm, 405.204

Practicals: Friday 9 – 12 in 308.261

REQUIREMENTS TO COMPLETE THE UNIT

PREREQUISITE SKILLS

The content covered in Food Microbiology 233 assumes that you:

- Have successfully completed *Introduction to Microbiology 132* or have equivalent experience in introductory microbiology. This is important as there are potential hazards involved in practical work with micro-organisms and your safety may be at risk. Please notify the unit coordinator if you fall into this category.
- Have good written and verbal communication skills.
- Can effectively source, access and use library resources (printed and electronic).
- Are familiar with the use of a computer.

TECHNOLOGY

It is helpful, but not essential, that you have access to:

- A computer with an Internet connection. Remote access to Curtin's computer network is available for your home computer or you can access the computing facilities on campus.
- Email, telephone or a fax machine to contact your tutor and other students studying the same unit.

AIMS

Today, employers seek university graduates capable of working independently, who can plan and organise their workload to achieve pre-determined goals. Graduates are expected to be able to retrieve, analyse and evaluate information, to solve problems and make sound decisions, to have effective written, verbal and interpersonal communication skills and to work as part of a team.

This unit is designed to develop these skills in the context of learning about fundamental concepts in Microbiology. This unit will provide you with an opportunity to develop both as an independent learner and as part of a team with other students and your unit coordinator.

UNIT OUTCOMES

LEARNING OUTCOMES (CONTENT KNOWLEDGE)

On successful completion of this unit you should be able to:

1. Apply and integrate the principles and practices of food microbiology to the production, preservation and distribution of safe and healthy food.
2. Select, perform and interpret appropriate microbial analytical methods for monitoring food safety and quality.
3. Access, analyse and evaluate relevant and recent information in food microbiology.
4. Demonstrate scientific presentation skills in a peer group environment.
5. Demonstrate professional behaviour and skills independently, collaboratively and in an ethical manner.

PROFESSIONAL SKILL OUTCOMES

1. Review journals, texts and internet resources describing recent developments in the microbiology / biotechnology of food science.
2. Use written, verbal and electronic media to communicate microbiological principles and practices as they relate to food science.
3. Demonstrate organizational skills to study, research, revise and review unit materials in food microbiology
4. Access, analyze and evaluate relevant and recent information in food microbiology.
5. Demonstrate professional behavior and skills independently, collaboratively and in an ethical manner.

ASSESSMENT DETAILS

Assessment	Date	Venue	Material to be examined	Worth %
Mid-semester test	3/4/2012	405.204	Lectures 1-10	20%
Final test	22/5/2012	405.204	Lectures 11-20 and researched essay topic	30%
Practical Assignment	18/5/2012	308.250	Assignment	20%
Practical exam	25/5/2012	308.250	All laboratory exercises	30%

MID-SEMESTER AND FINAL TESTS

The questions for these tests will be taken from the questions provided at the end of each lecture. Students not able to attend at the designated times will require prior approval to sit the test on another date or a medical certificate.

During the semester you will review the literature on cholera, a food and water-borne disease, focusing on its aetiology, pathogenesis, treatment and prevention. In the final test you will be given an hour to compose a short essay on a topic relevant to cholera.

PRACTICAL ASSIGNMENT

During the semester you will be asked to download and use a microbiology predictive program to analyse certain foods for potential growth of food-borne pathogens under prescribed conditions. In week 12 you will bring the output from the program to an exam room and write a short report on the program's output and answer several questions about the predictions produced by the program.

PRACTICAL EXAM

This exam is a series of spot tests and questions taken from the laboratory program and manual. Students are given a set amount of time to examine materials and perform laboratory techniques before moving to the next position or spot. Answers to the questions at the end of each exercise may be examined.

The practical exam is an open book exam and students will be required to bring along their laboratory notes.

LECTURE AND PRACTICAL NOTES

FOOD MICROBIOLOGY 233/532: LABORATORY MANUAL.

The Laboratory manual for this unit will be available on Blackboard. You will need to bring the practical notes to the laboratory sessions.

The URL for the Blackboard home page at Curtin University is:

<http://lms.curtin.edu.au>

You may also find useful information at the Home Page of the School of Biomedical Sciences.

<http://wbiomed.curtin.edu.au/>

REFERENCES

GENERAL MICROBIOLOGY REFERENCES

Batzing, B. (2002) *Microbiology: an Introduction*, Brooks/Cole Thomson Learning.

Black, J.G. (2005) *Microbiology: Principles and Explorations*, 6th edition, Prentice-Hall.

Bauman, R (2004) *Microbiology*. Pearson Benjamin Cummings.

FOOD MICROBIOLOGY REFERENCES

Adams, M.R. and Moss, M.O. (2004) *Food Microbiology*. Royal Society of Chemistry

Forsythe, S.J. (2000) *The Microbiology of Safe Food*. Blackwell Science.

Varnam, A.H. & Evans, M.G. (1991) *Foodborne Pathogens: An Illustrated Text* Wolfe Publishing Ltd.

Ray, B. (1996) *Fundamental Food Microbiology*. CRC Press.

Forsythe, S.J. and Hayes, P. R. (1998) *Food Hygiene, Microbiology and HACCP*. Aspen Pubs.

Food Science Australia: <http://www.foodscience.afisc.csiro.au/index.htm>

Food Standards Australia and New Zealand: <http://www.foodstandards.gov.au/>

Standards Australia Online: Available through Curtin University Library; go to *Specialised References Resources* then scroll down to *Standards: Australian Standards Online* (access via Gecko)

The above texts and many other introductory and food microbiology textbooks are available in the Curtin Library.

PLAGIARISM POLICY

Students need to be aware of the University's policy on plagiarism. It is not acceptable to simply copy the words of other students or authors when completing exercises and assignments in this unit. This constitutes plagiarism and is regarded as academic malpractice. The penalties for plagiarism can be very severe and may include termination from your course of study. All direct quotes must be correctly attributed to the author and should be kept to a minimum. Also, you should include a list of references to acknowledge the source(s) of information used to produce any written work. Refer to the Plagiarism Policy included in your Transition package or visit the web site listed below for full details.

UNIVERSITY POLICIES

You should refer to the following University statements regarding policies on

- Nature and unacceptability of academic dishonesty including cheating, plagiarism and the fabrication or falsification of data can be located at www.curtin.edu.au/corporate/governance/
- Copyright Requirements: As a student of Curtin you must be familiar with the requirements of the University's Copyright Procedures. Guidance is available to you at the following web page <http://lisweb.curtin.edu.au/copyright/> under the heading Information for All Students.
- Curtin's Copyright Procedures can be found under the heading Related Curtin Policies and Procedures whilst the Copyright Act can be accessed from the Additional information heading at that web site should you wish to understand the source of the Procedures. Failure to comply with the University's policies and procedures on Copyright and IT/IS use may include suspension or termination of enrolment, fines, withdrawal of privileges for use of the University's ICT facilities and services and, depending on what is copied, stored or communicated, may also render you liable to prosecution in the courts.
- Student Charter can be located at www.curtin.edu.au/corporate/governance/
- Grievance Procedures can be located at www.curtin.edu.au/corporate/governance/

ACCESS TO UNIT COORDINATOR

The unit coordinator can be contacted in the following ways about any aspect of the course material or problems that affect your attendance or performance in the unit.

- By email as provided above. This is probably the easiest method, however please don't expect detailed responses, as my typing is too slow!
- Leave a message on my office answering machine (ext 7474). Please clearly state your name, contact phone number, times when you can be contacted (office hours please) and your query.
- Raise queries during lectures or laboratory sessions.
- Make an appointment via the School's secretary for another time if required.

SUPPLEMENTARY EXAMINATIONS

Supplementary examinations are awarded only at the discretion of the Board of Examiners. The aim of a supplementary examination is to allow the student to correct **minor** problems /deficiencies in the initial assessment and **not** to gain extra study time or correct major problems. The number of supplementary examinations awarded will be kept to a minimum for any one examination period and course of study.

Supplementary examinations, if awarded, will be indicated on the official Curtin examination result statement posted to all students and will also be listed on the School (or Departmental) noticeboard 24 hours after the Board of Examiners meeting. It is **your** responsibility to check your status. A student who does not sit for a scheduled supplementary examination has no claim to a further examination. If you are awarded a supplementary examination it is imperative that you confirm the time and venue for the exam.

DEFERRED ASSESSMENT

Deferment of an examination is not automatic. Students may be permitted by the relevant Board of Examiners to defer an examination or other assessment where circumstances outside their control have arisen. However, a student's overall performance may be taken into account in granting permission to defer an examination.

Applications for deferment on health grounds or as a result of extenuating circumstances must be submitted not later than seven (7) days after the end of the relevant examination period or assessment date during the semester. **Detailed** medical certificates should be attached to the application where appropriate.

The prescribed application form may be obtained either from Admission and Student Records or your Course Administrator. Completed forms **must** be submitted to the Course Administrator. This includes applications for deferred assessment for units in your course of study conducted by **other** Schools.

MOBILE PHONES

As a courtesy to both lecturers and other students, if you have a mobile phone, please ensure that it is **TURNED OFF** during lecture, tutorial and practical sessions. Students who do not comply with this request can be asked to leave the class.