

## MICR 331: Food Microbiology

Semester One 18 points

### Course overview

Microbiology is a critical component of the food industry as micro-organism can impact on a food's safety, shelf-life, texture, flavour, nutritional properties and production. This paper is jointly taught with the Department of Food Science and the course aims are to:

- develop an understanding of the relationship between microorganisms and food with an emphasis on food safety, quality and shelf life
- develop an understanding of the methods/regimes that may be implemented to enhance food safety, quality and shelf life

If you are interested in the epidemiology of the major food-borne pathogens and how they multiply and survive in food, and the role of microbes in spoilage and shelf life, how microbiology is used to enhance food safety and shelf life at a practical level and how food pathogens are detected, then this course will provide the theoretical and practical links to this field.



### Learning outcomes

- Demonstrate an in-depth knowledge of food microbiology and the technology used to ensure food safety and quality
- Demonstrate the ability to apply that knowledge in laboratory exercises and case studies

### Lecture course overview

- Foodborne pathogens: the major foodborne pathogens that cause infections - *Salmonella*, *Campylobacter*, *Escherichia coli* O157:H7 and *Listeria monocytogenes* - characteristics, epidemiology and sources, and their ability to multiply/survive in food. Toxin (*Staphylococcus aureus*) and spore-producing (*Clostridium perfringens*) foodborne pathogens and introduction to viral foodborne pathogens in particular noroviruses.
- Molecular and traditional methods of detection of foodborne pathogens and food spoilage organisms
- Hazard Analysis Critical Control point (HACCP) plans
- Factors affecting microbes in food: in particular intrinsic factors such as water activity, nutrient availability, biological structures and antimicrobial substances and extrinsic factors such as temperature, relative humidity, gaseous atmosphere, presence and activities of other microorganisms
- Food spoilage microorganisms associated with red meat, poultry, finned fish and dairy
- Methods of food preservation in particular heat, chemical preservatives and processing technologies such as microwave, UV light, pulsed bright light, ionising radiation, pulsed electric fields and high pressure
- Cleaning and sanitisation in food processing premises; the importance of preventing/removing biofilms in food processing plants

## Lab course overview

In the laboratory course you will detect, identify or enumerate microorganisms or their metabolic products in food and apply this knowledge to food product and processing evaluation. Over the 4-week lab course you will:

1. Preserve Greenshell™ mussels using an acidic marinade
2. Isolate and enumerate coliform bacteria from food and water
3. Use PCR to detect *Escherichia coli* in mayonnaise
4. Use an antibody based test to detect *Listeria* in milk
5. Determine the thermal death time for *Listeria* in fish

## Assessment

1. A hazard and assessment (HACCP) plan presentation (15%) - **May 25**
2. A laboratory skills test (15%) - **May 26 and May 27**
3. Final exam (70%) - **TBC**

## Textbooks

There is no required text for this course but you will be directed to relevant scientific papers during lectures.

## Teaching staff

- [Professor Phil Bremer \(Convenor\)](#)
- [Dr Robin Simmonds \(Convenor\)](#)
- [Associate Professor Roslyn Kemp](#)

## Workload expectations

An 18 point paper has a minimum expectation of 14 hours per week per paper (180 per semester). This is made up of formal contact times (lectures, tutorials, laboratories etc.) and independent study (studying, revision, assignments, reading etc.).

## Responsibilities of students

- Students are responsible for making themselves aware of all University rules and regulations pertaining to their rights and responsibilities as students and to the degree in which they are enrolled.
- Students shall be deemed to have received any information:
  - provided in scheduled classes, regardless of attendance;
  - sent to their student email address;
  - made available via Blackboard or other University-approved learning management systems.
- Students are expected to be aware of all information related to a paper that is made available to them, and, in a timely manner, to raise with staff any questions or concerns relating to this information.
- Students are expected to be aware of, and to act in accordance with, the University's [Academic Integrity Policy](#).

## Academic integrity and academic misconduct

Academic integrity means being honest in your studying and assessments. It is the basis for ethical decision-making and behaviour in an academic context. Academic integrity is informed by the values of honesty, trust, responsibility, fairness, respect and courage. Students are expected to be aware of,

and act in accordance with, the University's Academic Integrity Policy.

Academic Misconduct, such as plagiarism or cheating, is a breach of Academic Integrity and is taken very seriously by the University. Types of misconduct include plagiarism, copying, unauthorised collaboration, taking unauthorised material into a test or exam, impersonation, and assisting someone else's misconduct. A more extensive list of the types of academic misconduct and associated processes and penalties is available in the University's Student Academic Misconduct Procedures.

It is your responsibility to be aware of and use acceptable academic practices when completing your assessments. To access the information in the Academic Integrity Policy and learn more, please visit the University's Academic Integrity website at [www.otago.ac.nz/study/academicintegrity](http://www.otago.ac.nz/study/academicintegrity) or ask at the Student Learning Centre or Library. If you have any questions, ask your lecturer.

- Academic Integrity Policy ([www.otago.ac.nz/administration/policies/otago116838.html](http://www.otago.ac.nz/administration/policies/otago116838.html))
- Student Academic Misconduct Procedures (<http://www.otago.ac.nz/administration/policies/otago116850.html>)



**MICROBIOLOGY & IMMUNOLOGY**  
*Te Tari Moromoroiti me te Ārai Māte*