School of Environmental and Life Sciences

FSHN2100: Microbiology, Food Safety and Immunology

Ourimbah

Semester 2 - 2023

COURSE OUTLINE

OVERVIEW

Course Description

Focuses on the understanding of introductory microbiology and immunology for application to food and nutritional sciences.

The course provides foundation concepts in microbiology and immunology that leads to a thorough understanding of these disciplines relevant to a broad range of sciences. It covers issues relevant to the food and nutrition industry including Microbial diversity, metabolism, microbial genetics and human microbiology and immunology.

Assumed Knowledge

HUBS1401; HUBS1416

Contact Hours

Ourimbah

Laboratory
Face to Face On Campus
3 hour(s) per Week for Full Term

Lecture
Face to Face On Campus
2 hour(s) per Week for Full Term

Tutorial
Face to Face On Campus
1 hour(s) per Week for Full Term

Unit Weighting

10

Workload

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

Ourimbah
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Consultation: By appointment

Teaching Staff

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School Office

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9am-5pm (Mon-Fri)

SYLLABUS

Course Content

1. **Microbial Diversity and Growth**
   a) Major groups (virus, bacteria, archaea, eukaryotes)
   b) Cell structure
   c) Metabolism and growth

2. **Microbial Interactions with the Human Body**
   a) Normal microbiota
   b) Probiotics
   c) Immune response

3. **Microbial Genetics**
   a) DNA as the genetic material and its replication
   b) Mutation and repair
   c) Gene transfer mechanisms

4. **Applied Food Microbiology**

Course Learning Outcomes

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

1. Demonstrate an understanding of the general characteristics of microorganisms.
2. Demonstrate a thorough understanding of the physico-chemical factors that determine microbial growth.
3. Show familiarity with the interaction of microorganisms with the human body and the role of immune response to foreign agents.
4. Apply knowledge of microorganisms and human immune function to an understanding of common pathological disease processes.
5. Demonstrate an understanding of microbial metabolism.
6. Demonstrate knowledge of microbial genetics.

7. Demonstrate a knowledge of the concept of probiotics.
8. Show familiarity with a range of common food microbiology issues.
9. Develop an informed attitude towards the 3 domains of life encompassed by microbiology.
10. Develop an awareness of how microorganisms are important in the maintenance of good health.
11. Develop an informed attitude towards microbial metabolism and growth.
12. Develop an informed attitude towards the importance of microbes to gene technology.
13. Develop an awareness of human immune response to foreign bodies.
14. Demonstrate the knowledge and skills to monitor and maintain food safety.
15. Demonstrate skills in laboratory methods applied in analytical and experimental tasks involving microbiology and immunology.
16. Demonstrate understanding of the occupational health and safety responsibilities residing in scientific work.

Course Materials

Other Resources:

UoNline site
Students enrolled in the course can login http://uonline.newcastle.edu.au/ to access the UoNline site used to support this course. You need to visit the UoNline site on a regular basis.

Recommended Text:

- Prescott's Microbiology, 11th Edition; Eds. Willey, Sandman & Wood
- Prescott's Microbiology, 8, 9, 10th Editions; Eds. Willey, Sherwood & Woolverton
- Prescott, Harley and Klein's Microbiology, 7th Edition; Eds. Willey, Sherwood & Woolverton

SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	17 Jul	Module 1 - Microbial Diversity Lecture 1: Course Introduction Lecture 2: Microbial Diversity - Viruses	NO TUTORIAL Lab Safety Induction 2pm. SL1 121	Lab Safety Induction Module on Canvas. Must be completed before commencement of Lab 1 in Week 2.
2	24 Jul	Lecture 3: Microbial Diversity - Bacteria Lecture 4: Microbial Diversity - Fungi	TUTORIAL 1 LAB: 1. Introduction to Microscopy and Simple Visualisation Techniques. LAB 2: Differential Staining	
3	31 Jul	Lecture 5: Microbial Diversity - Protozoa, Algae Lecture 6: Nutritional Types and Nutrient Uptake	TUTORIAL 2 LAB 3. Bacterial Culture and Enumeration Techniques	
4	7 Aug	Lecture 7: Metabolism Lecture 8: Control of Microorganisms	TUTORIAL 3 LAB 4. Identification of an Unknown Bacterial Sample	
5	14 Aug	Module 2 - Microbial Genetics Lecture 9: DNA Replication/Cell Cycle Lecture 10: Genes/Genetic Code	TUTORIAL 4 LAB 5. Food Microbiology - Examination of Milk	Online Quiz 1: Multiple Choice Questions from Module 1 (Quiz open for 7 days)
6	21 Aug	Lecture 11: Gene Expression/Regulation Lecture 12: Protein Synthesis	TUTORIAL 5 LAB 6. Food Microbiology - Examination of Meat	Lab Report 1: Identification of an Unknown Bacterial Sample. Due Friday 5pm 25 August
7	28 Aug	Lecture 13: Mutation Lecture 14: Detection of Mutation/Repair	TUTORIAL 6 LAB 7. Carbohydrates: Fermentation and B-galactosidase activity (Genetic Regulation)	
8	4 Sep	Lecture 15: Conjugation/Genetic Exchange Lecture 16: Viral Life Cycle / Lysis v Lysogeny / Transduction	TUTORIAL 7 LAB 8. Water Microbiology	Lab Report 2: Food Microbiology: Examination of Milk and Meat. Due Friday 5pm 8 September
9	11 Sep	Module 3 - Human & Applied Microbiology Lecture 17: Normal Human Microbiota Lecture 18: Probiotics / Microbial Infections	TUTORIAL 8 LAB 8. Water Microbiology - Results	Online Quiz 2: Multiple Choice Questions from Module 2 (Quiz open for 7 days)
10	18 Sep	Lecture 19: The Immune Response Lecture 20: Antimicrobials 1	TUTORIAL 9 Oral Presentations Commence	Oral Presentations - Due 1pm Friday 22 September
Mid Term Break				
Mid Term Break				
11	9 Oct	Lecture 21: Antimicrobials 2 Lecture 22: Microbiology of Food	TUTORIAL 10 Oral Presentations	Lab Report 3: Carbohydrates (Genetic Regulation). Due Friday 5pm 13 October
12	16 Oct	Lecture 23: Microbiology of Food Lecture 24: Microbiology of Food	TUTORIAL 11 Oral Presentations (if required)	Online Quiz 3: Multiple Choice Questions from Module 3 (Quiz open for 7 days)
13	23 Oct	NO LECTURES	NO TUTORIAL	
Examination Period				
Examination Period				

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Tutorial Quizzes (Online)	Weeks 5, 9 and 12	Individual	15%	1, 2, 3, 4, 5, 6, 7, 8, 9, 11,
2	Formal examination	Formal Exam Period	Individual	30%	1, 2, 3, 4, 5, 6, 7, 8, 12, 13
3	Laboratory Experiments and reports	Lab Report 1: Friday 5pm 25th August (Week 6) LabReport 2: Friday 5pm 8th September (Week 8) Lab Report 3: Friday 5pm 13th October (Week 11)	Individual	45%	1, 2, 8, 9, 10, 11, 14, 15, 16
4	Presentation- Individual (Oral)	Weeks 10, 11 & 12 (if required)	Individual	10%	1, 2, 3, 4, 5, 6, 7, 8

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Tutorial Quizzes (Online)

Assessment Type Quiz
Purpose The purpose and benefit of the online quiz is to provide the students with feedback on student learning. These quizzes assess the individual student's knowledge of the course material and highlights potential areas of concern, which may stimulate discussion with tutors and lecturers.
Description 3 x Online quizzes. Multiple choice questions from Modules 1-3
Weighting 15%
Due Date Weeks 5, 9 and 12
Submission Method Online
Online through Canvas
Assessment Criteria The online quizzes will assess the individual student's knowledge of the course material within each module. Assessment criteria will be made available on Canvas
Return Method Online
Feedback Provided Online

Assessment 2 - Formal examination

Assessment Type Formal Examination
Purpose The final formal examination is designed to test the individual student's knowledge of the course material and their ability to describe, analyse and hypothesise from this material. Marks are awarded in accordance with Table 1 from the Workload Assessment Marking and Grading Policy (Policy 000649) at http://www.newcastle.edu.au/policy/000649.html
Description
Weighting 30%
Length .
Due Date Formal Exam Period
Submission Method Formal Exam
Assessment Criteria The final formal examination is designed to test the individual student's knowledge of the course material and their ability to describe, analyse and hypothesise from this material. Mark allotted for each question will be provided, satisfactory answers will merit full marks. Partial marks maybe awarded.
Return Method Not Returned
Feedback Provided No Feedback

Assessment 3 - Laboratory Experiments and reports

Assessment Type Tutorial / Laboratory Exercises

Purpose The purpose of group laboratory activity is to enable peer-to-peer learning; develop oral communication skills and the ability to record data, synthesise an opinion and convey this clearly in a well-presented and articulate manner. Lab reports meet the course objectives of knowledge acquisition and demonstrated assimilation of data, upon reflection and analysis, to produce articulate and concise reports, which convey evidence-based understanding of the concepts and topics.

Description 3 x Lab Reports
Reports for three (3) laboratory practicals will be prepared. Students will be advised of labs to be reported on. (3 x 15%).

Weighting 45%

Due Date Lab Report 1: Friday 5pm 25th August (Week 6)
Lab Report 2: Friday 5pm 8th September (Week 8)
Lab Report 3: Friday 5pm 13th October (Week 11)

Submission Method Online
Specific Location
Electronic submission to Turnitin

Assessment Criteria Lab reports meet the course objectives of knowledge acquisition and demonstrated assimilation of data, upon reflection and analysis, to produce articulate and concise reports, which convey evidence-based understanding of the concepts and topics. Assessment criteria and marking rubric will be made available on Canvas.

Return Method Online

Feedback Provided Returned Work

Assessment 4 - Presentation- Individual (Oral)

Assessment Type Presentation

Purpose The purpose of an oral presentation assessment is to provide the students with an opportunity to research a topic of interest, relevant to the course, and present this in an articulate, concise and well researched manner. These presentations demonstrate the students understanding of concepts and topics.

Description Oral Presentation:
Students will be advised of available and allocated topics.

Weighting 10%

Due Date Weeks 10, 11 & 12 (if required)

Submission Method Online

Assessment Criteria The student's understanding of concepts and topics and presenting this in an articulate, concise and well researched manner. Assessment criteria and marking rubric will be made available on Canvas.

Return Method Not Returned

Feedback Provided In Person

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.

50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Attendance

Attendance/participation will be recorded in the following components:

Laboratory (Method of recording: By signing your attendance.)

Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.
- Face to Face: Communication will be provided via face to face meetings or supervision.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure. In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:
https://policies.newcastle.edu.au/document/view-current.php?id=236

Important Policy Information

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at
https://www.newcastle.edu.au/current-students/no-room-for/policies-and-procedures
that support a safe and respectful environment at the University.

Other Information

Contact Hour Requirements:

Laboratory Induction Requirement - Students must attend and pass the induction requirements before attending these sessions. To participate in this course students must complete a compulsory Safety and Risk Assessment induction. These will generally occur in the first week of each course or prior to a placement or field trip. Students will be advised of RA and H & S requirements by the Course Coordinator at the beginning of the semester.

Compulsory attendance and compulsory activity (Essential Criteria)

This course has an essential criterion. As well as an overall passing grade (50%) students must meet the established minimum requirements relating to attendance at laboratories and the submission of laboratory reports.

Laboratory Reports: This course has a high emphasis on laboratory competency. Students undertaking the course are required to demonstrate practical and theoretical competency in the laboratory by ***participating in a minimum of 80% of the scheduled laboratory sessions*** and obtaining an ***overall grade of at least 50% in the laboratory component of the course***. A final mark will be determined in the course based on all assessment items and it will be recorded whether the student has satisfied the essential criterion. Students who fail to satisfy the essential criterion (regardless of their final mark) will automatically have a failure recorded against their name.

Laboratory Safety, Risk Assessment and Health & Safety Requirements

The issue of safety for staff and students is taken very seriously by the University. Students studying courses requiring completion of a Risk Assessment Safety Induction or other Health & Safety requirement MUST complete all safety components. These will generally occur at the beginning of the semester. Students will be advised of Risk Assessment and Health & Safety requirements by the Course Coordinator at the beginning of the semester.

- Induction sessions generally occur in the first week of each course. Students should contact their Course Coordinator to find out more about sessions relevant to this course.
- Admittance to the labs will only be allowed to students who have attended the safety inductions and completed the safety questionnaires.
- Safety and Risk Assessment documents will be available on Blackboard throughout the semester.
- Before proceeding with laboratory activities students will be required to confirm that they have read and understood the Safety issues associated with the course and specific laboratory sessions in particular.

Submission And Return of Assessments

Submission of assignments is by 5pm of the Friday of the week they are due.

The school requires students to sign a declaration for all submitted assessments (on the assessment cover sheet) confirming a statement that:

1. The submitted work is original.
2. The submitted work has not been submitted previously for academic credit in this or any other course.
3. Acceptable acknowledgement of sources has been made through referencing appropriate to the discipline within the assignment; and
4. The student understands that the assessor of the assignment may, for the purpose of assessing this assignment:

   a) reproduce this assessment item and provide a copy to another member of the University and/or communicate a copy of this assessment item to a plagiarism checking service (which may then retain a copy of the item on its database for the purpose of future plagiarism checking); and

   b) submit the assessment item to other forms of plagiarism checking.

Students are required to attach an assignment cover sheet to all assignments and ensure it is signed by the student submitting the work. Academic staff will not mark assignments that lack a signed cover sheet.

Note that an assessment item is considered submitted when both item and cover sheet are handed in. Incomplete items might be subject to penalties in accordance with the relevant policies briefly described in this course outline. Cover sheets are available from the School Office and electronic copies can be found on Blackboard.

Arrangements for the return of assessments will be notified through Blackboard, or during laboratory sessions. All assessment items except the final examination will be returned to students within 3 weeks of the due date.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.