MEDSCI 202
Microbiology and Immunology

Disclaimer: This is a living document. Information provided is based on best available data at the time of preparation. Subsequent updates may not be reflected, thus this document should only be considered as general reference.

Official Calendar Description
An introduction to the nature and roles of bacteria, viruses, fungi and parasites as the causative agents of human diseases.

Microbiology topics include: introduction to bacteriology, virology, mycology and parasitology; microbial pathogenesis; virulence mechanisms; epidemiology of infectious diseases; nosocomial infections and mechanisms of antibiotics.

Immunology topics include innate and adaptive immune responses; autoimmunity and allergy and immune deficiencies.

Overview
This is the fundamental second-year microbiology and immunology course at the University of Auckland which teaches students for more advanced study in a wide range of professional programs (including biomedical science, medicine, nursing, optometry, pharmacy, sports science etc.). The maximum capacity for this course is 240 students.

MEDSCI 202 is taught by staff in the Department of Molecular Medicine and Pathology.

Course outline from previous years
Course outlines from previous years are unavailable. The course has improved (and will continue to improve) slightly over the years, however the breadth and depth of the topics covered has remained (and will remain) relatively consistent. The learning outcomes and competencies are considered comparable from year to year.

Prerequisites and restrictions for MEDSCI 202
The University of Auckland officially named the course MEDSCI 202. In the University of Auckland Calendar, BIOSCI 107 and MEDSCI 142 are listed as prerequisites. OPTOM 241 and PHARMACY 203 are listed as restrictions (i.e. students who have taken OPTOM 241 or PHARMACY 203 are not normally permitted to take MEDSCI 202).

Intended Learning Outcomes (ILOs) of the course
1. Explain the microbiological features of important bacterial, viral, fungal and parasitic human pathogens using clinical examples
2. Know about important pathogenic bacteria, including Staphylococcus aureus, streptococci, Escherichia coli and Mycobacterium tuberculosis and how they cause disease.
3. Learn about important bacteria infectious diseases, including skin and soft tissue infections, toxic shock syndrome, urinary tract infections, diarrhoea, tuberculosis and sexually transmitted diseases.
4. Know important viruses, such as HIV, herpesvirus, hepatitis B virus and how they cause disease.
5. Acquire a basic understanding of fungi and parasites and their role in disease.
6. Learn about nosocomial infections and infections in clinical practice.
7. Explain the main classes of antimicrobials and their use in treatments
8. Be able to perform and analyse important microbiological and biochemical assays to identify microbes in the laboratories
9. Understand the basics of the human immune system and how it is regulated.
10. Understand how vaccination activates the immune system to prevent disease
11. Understand how inflammatory diseases and immunodeficiencies are acquired.
12. Use and develop your intellectual and cognitive skills to complete associated ‘on-task’ activities
13. Communicate your knowledge and understanding as a future healthcare and/or scientific professional with fellow students, the academic faculty and the community
14. Plan and evaluate your own progress towards achieving personal and professional goals

Upon successful completion of the course, students should be able to:
1. Show competency in declaring and applying specialist knowledge;
2. Communicate as a future healthcare or scientific professional with fellow students and the academic faculty;
3. Plan and evaluate their own progress towards achieving personal and professional goals, through the use and development of generic intellectual and cognitive skills.

**Course content and format of delivery**

**Microbiology**
The bacterial, viral, fungal and parasitic pathogens of man will be introduced with particular reference to how they cause infection. Clinical examples will be given in both lectures and laboratories. The main classes of antimicrobials and their use will be introduced. The laboratories are practically oriented with relevance to clinical cases.

**Immunology**
The basics of the immune system and how it is regulated, and responds to microbial challenge will be introduced. The way the immune system can be stimulated in the form of vaccination to prevent disease will be covered. There will be an introduction into inflammatory diseases and immunodeficiencies that are acquired or inherited.

**Lectures**
There are 30 lectures in this course, 20 microbiology and 10 immunology lectures. The lectures explore extensively the aspect of microbiology, and provide fundamental and essential coverage in immunology. Clinical examples and recent research advances are incorporated where appropriate.

**Laboratory (practical) classes**
A programme of eight 2-hour laboratory sessions accompanies the lectures. These are:
- Introduction to Basic Techniques
- Microscopy of Bacteria and Fungi
- Microorganisms in our environment
- Principles of Sterilisation and Disinfection
- Identification of Gram-positive Cocci
- Identification of Gram-negative Rods
- Gram-negative Bacteria & Antibiotic Resistance
- Allergy Testing and Blood Grouping

The laboratories teach essential practical techniques, which are widely used in clinical and diagnostic laboratories. It also provides wet-lab based “hands-on” learning opportunities designed to complement the theoretical concepts taught in lectures, and facilitates the achievement of the learning outcomes.

The lab sessions are assessed by 6 lab assessment reports. The marks for these assessments will contribute to 15% of the overall course mark (see below).
Achievement of laboratory intended learning outcomes is also assessed in the mid- and end-of-semester tests.

**Course assessment is divided as follows:**

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Percentage of Course Mark</th>
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<tbody>
<tr>
<td>Laboratory assessment</td>
<td>15%</td>
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<tr>
<td>Mid-semester MCQ test (1 hour)</td>
<td>15%</td>
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<tr>
<td>End-semester MCQ test (1 hour)</td>
<td>15%</td>
</tr>
<tr>
<td>Final examination (short answer questions) (2 hours)</td>
<td>55%</td>
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</tbody>
</table>

Feedback from previous students has led to formal assessment of the laboratory component. Assessment will be carried out during the laboratory sessions, and in both the mid- and end-semester MCQ tests and final examination. Therefore both the mid- and end-semester tests and final examination will include material from both lectures and laboratories. No bags, mobile phones, electronic equipment will be permitted in tests and examinations.

**Laboratory assessment (15%)**

There will be 6 assessed laboratory exercises spread throughout the course. Successful completion of each exercise will be worth 1 to 3% towards your final grade, as below. You will be told at the start of each laboratory which of the tasks will be assessed. Completed assessments have to be submitted online via Canvas, except assessment 2 (practical assessment). Assessment sheets can be downloaded from Canvas. Printed versions of the assessment sheets and further information will also be provided during the labs. Your mark for each task will appear on Canvas one to two weeks after completion of that laboratory. While some of the questions asked in laboratory exercises are not assessed, they nevertheless may be examinable in the term tests and final examination.

Exercise 3: 1 mark; exercise 6: 2 marks; exercises 1, 2, 4, and 5: 3 marks each.

**Mid-semester test (15%)**

This test will be in MCQ format. All the content of lectures (lecture notes and additional subject matter from lectures) and laboratories up to the date of the test is potentially examinable. This includes lectures 1 to 16 and laboratories 1 to 5. You will receive feedback via Pro-Results on how well you performed. If you think you might have problems attending the test, contact Prashant Sharma, or the course director as soon as possible.

**End-semester test (15%)**

This test will be in MCQ format. All the content of lectures (lecture notes and additional subject matter from lectures) and laboratories from the second half of the semester up to the date of the test is potentially examinable. This includes material given in lectures 17 to 30, and the last 3 laboratories. You will receive feedback via Pro-Results on how well you performed. If you think you might have problems attending the examination, contact Prashant Sharma, or the course director as soon as possible.

**Final examination (55%)**

The examination will be in a short answer format (there will be no MCQs). Each short answer question might have a different format e.g. a single question, multiple questions including sub-questions, diagram etc. All the content of the lectures (lecture notes and additional subject matter from lectures) and laboratories is potentially examinable. The content of exams will not be discussed with students other than in general terms. Previous examination papers are the best guide to the form of the final examination, and are available on the University library website (http://examdb.auckland.ac.nz/).
Course grades
You must achieve an overall pass mark, and have achieved a satisfactory performance in all your coursework in order to pass the course.

Final course grades are allocated using the University of Auckland grade boundaries, the **minimum thresholds** of which are listed in the table below. This means these mark thresholds must be cleared in order for a particular grade to be awarded.

*Grade descriptors relating to student attainment in SMS taught courses*

<table>
<thead>
<tr>
<th>Grade</th>
<th>%</th>
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<tbody>
<tr>
<td>A+</td>
<td>90-100</td>
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<tr>
<td>A</td>
<td>85-89</td>
</tr>
<tr>
<td>A-</td>
<td>80-84</td>
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<tr>
<td>B+</td>
<td>75-79</td>
</tr>
<tr>
<td>B</td>
<td>70-74</td>
</tr>
<tr>
<td>B-</td>
<td>65-69</td>
</tr>
<tr>
<td>C+</td>
<td>60-64</td>
</tr>
<tr>
<td>C</td>
<td>55-59</td>
</tr>
<tr>
<td>C-</td>
<td>50-54</td>
</tr>
<tr>
<td>D+</td>
<td>45-49</td>
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<tr>
<td>D</td>
<td>40-44</td>
</tr>
<tr>
<td>D-</td>
<td>0-39</td>
</tr>
</tbody>
</table>

The percentage of enrolled students, who passed the course in 2017, was approximately 96%.
Recommended Texts

**Microbiology**
- Murray et al.; Medical Microbiology 7th Ed, 2013

**Immunology**
- Male et al.: Immunology 8th Ed, 2013
(Note: Recommended texts are available on desk loan in the Philson Library. You are not required to purchase them, but if you do, so we suggest purchasing whichever you find most readable).

For lecture topics which are well-covered in the text, only brief notes and diagrams will be provided in the Course Guide. The lecturer will probably use images of textbook diagrams, and will refer to specific passages in the book, which all are examinable.

**Course Director & Course Coordinator**
Please direct all enquiries regarding MEDSCI 202 to the Course Director or Course Coordinator:

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The UoA’s Summative Evaluation Tool (SET) system evaluation from students
MEDSCI 202 course and its teaching staff were evaluated through the University’s SET (Summative Evaluation Tool) system. SET is an online system, which students access online and evaluate based on the questionnaires. MEDSCI 202 SET evaluation scored very high. In 2017, the students gave 97.7% for the quality of the course, which includes the lectures and the laboratories. Lots of positive feedbacks were given by the students and the course was commented to be one of the best and most enjoyable courses.