

MICR 337, Virology: Course Outline 2018

Paper Title: Virology	Teaching Staff: Dr Matloob Husain (<i>Convenor</i>)
Point Value: 18 points	Dr Mihnea Bostina
Prerequisites: MICR 221, MICR 223 or GENE 211	Prof Andy Mercer
Restrictions: None	Prof Vernon Ward
Lectures: Thursday, Friday 13.00-13:50 (ARCH2/4)	

Course prescription: Molecular aspects of virus entry, replication and assembly in host cells. Mechanisms by which viruses manipulate the hosts to multiply and cause disease.

Course objectives:

1. Provide the molecular understanding of how viruses with different structures and genomes enter, replicate, assemble, and release from the host cell.
2. Examine the systemic effects of viral infection on the host and highlight the mechanisms viruses employ to evade host defence.
3. Integrate information from virus replication and virus-host interactions and provide the basis of vaccine and antiviral strategies.
4. Develop hands-on research experience with virological methods and techniques.
5. Promote independent thinking and enable research and critical assessment of a topic. Foster the oral communication skills and develop the ability to work as a team.

The course contact time involves two lectures per week for 13 teaching weeks of the second semester. There are two laboratory classes per week during academic weeks 9 – 12 of the second semester for a total of 48 hours, including lab work outside these hours as required.

Reference textbooks: Principles of Virology, Flint *et al* (3rd and 4th edition); Introduction to Modern Virology, Dimmock *et al* (6th and 7th edition). *In addition to hard copy, both are available as e-books in Health Sciences Library and Science Library.*

Assessments:

a. Presentation and essay (10%). In this self-learning exercise, students will research a given virology topic on their own, give a short group presentation to the class, and write an individual 1000-word essay.

b. Two laboratory assignments (20%). In the laboratory classes, students will isolate and purify their own virus from an environmental sample, determine its growth characteristics and host range, and identify it by visualizing it under an electron microscope. The assignments will be based on laboratory experiments. **Failure to attend & complete the lab classes means you may not sit the final exam.**

c. Final examination (70%). Students are given 9 questions beforehand (listed below), 6 of which will form the basis of 3 h final examination. The exam format will be “answer three either/or questions”.

1. Describe the mechanisms used by viruses to enter host cells.
2. Discuss the structural basis of virus assembly.
3. How do viruses maximise the protein coding potential of their genomes?
4. How do viruses control the production of host cell proteins?
5. Describe the intracellular pathways viruses utilise for assembly and release.
6. Describe the key characteristics that enable viruses to establish chronic infections.
7. Compare the life cycles of an orthomyxovirus and a coronavirus from entry to release.
8. Describe the mechanisms by which viruses cause cancer.
9. What mechanisms do viruses use to evade host defence responses?

Students must achieve a 50% average to pass MICR 337.

Presentation and Essay Topics

You are required to write a maximum 1000-word essay as well as give an oral presentation on a given virology topic. The written assessment will be individual and the oral presentation in groups with both parts of the assessment being used to create an overall mark worth 10% of your final grade. *Groups are allocated randomly.* We are looking for your opinions and ideas as well as facts to support your arguments on the topic. You will be required to research your topic on your own. The aims of this exercise are, to promote independent thinking, enable you to research and critically assess a virology topic, to foster oral communication skills, and to develop your ability to work as a team.

The topics are:

1. What is Zika virus and why should New Zealand be worried about it?
2. What were the fundamental differences between SARS and swine flu pandemics?
3. The emergence and epidemiology of chikungunya virus.
4. The evolution and emergence of new strains of human noroviruses.
5. The use of reoviruses for the treatment of cancer in humans.
6. Ebola virus: where does it come from and how can it be controlled?
7. What is the best polio vaccine and what are the major barriers to final eradication of poliovirus?
8. Virophages: what are they and what is their host?
9. Bats as reservoirs of human viruses: should we be worried?
10. The consequences of a future pandemic caused by avian influenza A (H5N1) or (H7N9) virus.
11. Currently available cervical cancer vaccines and their effectiveness in preventing cervical cancer.
12. Epstein-Barr virus: the discovery, the disease, and the treatment.
13. HIV vaccine: are we there yet?
14. The potential of "bacteriophage therapy" in the treatment of bacterial infections.
15. Hepatitis C antivirals: why do we need them, what is available, and what is being developed?
16. The emergence and epidemiology of Middle East Respiratory Syndrome virus.

Each person is expected to write their own individual essay while the presentation will be as a group.

Group Presentations: these will be held on **2nd, 3rd and 9th August 2017**. *The groups are randomly selected for presentation each day, therefore, your group should be prepared to speak on any of the above three days.* The presentations will start promptly at 1 pm and 3rd August session will run for 100 minutes. You will have a maximum of 8 – 9 minutes for your oral presentation plus a further 3 – 4 minutes for Q&A. All group members are expected to contribute. You are encouraged to make your presentation as professional as possible using appropriate visual aids. You should use PowerPoint-based computer presentations, and they must be on a portable USB drive. You will not have time to set up your own computers, so make sure you are prepared and ready to go.

Individual Essays: these are due by **5 pm on Thursday, 16th August 2017**. Essays are to be submitted electronically to Blackboard (under Assignments) **as well as** by email to 300-level Teaching Fellow, Dr Jennifer Robson (jennifer.robson@otago.ac.nz) as .doc, .docx or .pdf files. Please contact Jennifer if you need an extension for some unavoidable reasons. ***Late submissions will be penalised at 5% per day.***

University of Otago Academic Integrity Policy and Responsibilities of Students

If not already, please familiarise yourself with the University of Otago's Academic Integrity Policy (<http://www.otago.ac.nz/administration/policies/otago116838.html>) and your responsibilities as a student:

- (a) 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.
- (b) Students shall be deemed to have received any information:
 - i. provided in scheduled classes, regardless of attendance;
 - ii. sent to their student email address;
 - iii. made available via Blackboard or other University-approved learning management systems.
- (c) 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.
- (d) Students are expected to be aware of, and to act in accordance with, the University's Academic Integrity Policy.