

MICR 337, Virology: Course Outline 2015

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| Paper Title: Virology | Staff: Dr Matloob Husain (Convenor) |
| Point Value: 18 points | Prof Vernon Ward |
| Prerequisites: MICR 221, MICR 223 or GENE 211 | Prof Andy Mercer |
| Restrictions: None | Dr Mihnea Bostina |
| Lectures: Thursday, Friday 13.00-13:50 (ARCH3) | Dr Rita Przybilski |

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 oral communication skills and develop 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.

Essential textbook: Introduction to Modern Virology, Dimmock *et al* (6th edition).

Alternate reference textbooks: Principles of Virology, Flint *et al* (2nd or 3rd edition); Principles of Molecular Virology, Alan Cann (4th or 5th edition).

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 listed below beforehand, 6 of which will form the basis of 3h final examination. The exam format will be “answer three either/or questions”.

1. Discuss the structural mechanisms employed by viruses to enter host cells.
2. How do viruses maximise the protein coding potential of their genomes?
3. How do viruses control the production of host cell proteins?
4. Compare different types of subviral RNA particles with respect to their molecular biology and replication mechanisms.
5. Describe the mechanisms by which viral components are targeted to the site of viral assembly.
6. Compare the replication cycles of an orthomyxovirus and a coronavirus.
7. Describe the key characteristics that enable viruses to establish chronic infections.
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 were the fundamental differences between SARS and swine flu pandemics?
2. The emergence and epidemiology of chikungunya virus.
3. The evolution and emergence of new strains of human noroviruses.
4. The use of reoviruses for the treatment of cancer in humans.
5. Ebola virus: where does it come from and how can it be controlled?
6. What is the best polio vaccine and what are the major barriers to final eradication of poliovirus?
7. Virophages: what are they and what is their host?
8. Bats as reservoirs of human viruses: should we be worried?
9. The consequences of a future pandemic caused by avian influenza A (H5N1) or (H7N9) virus.
10. Currently available cervical cancer vaccines and their effectiveness in preventing cervical cancer.
11. Epstein-Barr virus: the discovery, the disease, and the treatment.
12. HIV vaccine: are we there yet?
13. The potential of "bacteriophage therapy" in the treatment of bacterial infections.
14. Hepatitis C antivirals: why do we need them and what is being developed?
15. 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.

The presentations will be held on **24th, 30th and 31st July 2015**. *Your group should be prepared to speak on any of these three days.* The sessions will start promptly at 1pm and *July 30th 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. *Please be organized because we will be strict on time.*

The written individual essays are due by **5pm on Monday, 10th Aug 2015**. Essays are to be submitted electronically to Blackboard (under Assignments) **and also by email** to Dr Rita Przybilski (rita.przybilski@otago.ac.nz) as .doc, .docx or .pdf files. If you need an extension for some unavoidable reasons please contact Rita. *Late submissions will be penalised at 5% per day.*