

Biology of Microorganisms (Biology 2711)

Course instructor: Kam Tin Leung, CB4024 (Office hour - Monday 11:00-12:00 noon)

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Lab instructor: Michael Moore, CB3011

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This course gives an overview of the biology of microorganisms. Two areas will be covered in this course. Theme 1 includes microbial cell structure and metabolism. Theme 2 includes principle microbial genetics and viruses. Specific disciplines of microbiology will be offered in the 3rd and the 4th years (e.g. Pathogenic bacteriology, Applied and Environmental Microbiology, Biology of Fungi, Food Microbiology, Biology of Food Safety, Molecular Genetics, Invertebrate zoology, Internship and Honours Thesis).

Michael Moore is the lab instructor of the Biology of Microorganisms course. The lab is an integral part of this course. Students will learn the basic skills to work with bacteria, proper use of microscope, staining and aseptic techniques, characterize and identify microorganisms.

There will be a group project for this course. Students will form their own group (about 5 students/group) in the second week (Sept. 21) and a project topic will be assigned to each group in the third week (Sept. 28). Each group is required to present a 10-minute presentation (with 2-3 minute questioning period) and to submit a 5-page term paper on its project (1.5 spacing, excluding references).

There will be 2 mid-term exams (15% each). Final exam will include materials covered during the whole term and is worth 25%.

Textbook

Microbiology by Nester et al. 6th ed.

Lab book

Lab manual

Lecture

Mon & Wed, 1:00-2:30 pm, RC0005.

Lab

CB 3010B

2 midterm exam (30% total)

Oct. 7 and Nov. 9

Group project (15% total)

Term paper due Nov 16,

Presentation dates: Dec. 2 and 3.

Final exam (25%)

To be arranged

Laboratory (30%)

Total = 100%

Lecture schedule for Biology of Microorganisms (Biol. 2711)

- May change depending on progress of the class.

DateTopic

Sept. 14

Sept. 16

Course outline and video

Introduction and history of microbiology

Sept. 21

Sept. 23

Introduction and history of microbiology

Cell structure and function

Sept. 28

Sept. 30

Cell structure and function

Cell structure and function

Oct. 5

Oct. 7

Microbial metabolism

1st Mid-term exam

Oct. 12

Oct. 14

Thanksgiving

Microbial metabolism

Oct. 19

Oct. 21

Microbial growth

Sterilization, disinfection and antimicrobial agents

Oct. 26

Oct. 28

Sterilization, disinfection and antimicrobial agents

Antibiotics

Nov. 2

Nov. 4

Selective examples of microbial pathogens

Molecular genetics: DNA replication

Nov. 9

Nov. 11

2nd Mid-term exam

Molecular genetics: DNA replication

Nov. 16

Nov. 18

Gene expression and regulations

Gene expression and regulations

Nov. 23

Nov. 25

Bacterial genetics

Viruses

Nov. 30

Dec. 2

Viruses

Presentations

Dec. 3

Presentations

Introductory Microbiology (Biology 2711)

1. Escherichia coli O157:H7
2. "Flesh-eating" streptococci
3. Helicobacter pylori and ulcer
4. Influenza virus / Spanish influenza pandemic
5. Bird flu
6. Swine flu
7. SARS
8. Ebola virus
9. Prions and Mad Cow Disease
10. Gut bacteria and flatulence
11. Microbial life in hydrothermal vent communities
12. Oil spill bioremediation
13. Bacillus thuringiensis biotechnology (biocontrol and GM-crops)
14. Gene chips/DNA microarray: theory and applications

Term paper

The 5-page term paper (1.5 space, excludes references) should include: 1) an Abstract (i.e. summary); 2) a text that broken into sections; 3) a Conclusion (challenges and future directions); and 4) a References section with at least 10 refereed reference papers. Please use Applied and Environmental Microbiology OR Journal of Bacteriology review paper format.

Styles of references

Journal articles

Arendsen, A. F., M. Q. Solimar, and S. W. Ragsdale. 1999. Nitrate-dependent regulation of acetate biosynthesis by *Clostridium thermoaceticum*. *J. Bacteriol.* 181:1489-1495.

Book chapters

Green, P. N. and D. Hood. 1984. Taxonomic status of some methylotrophic bacteria, p. 251-254. In R. L. Crawford and R. S. Hanson (ed.), *Microbial growth on C1 compounds*. American Society for Microbiology, Washington, D.C.

Book

Dunne, W. M. 1997. Blood cultures III, p. 1-10. American Society for Microbiology, Washington, D.C.

Website

Bruce-Grey-Owen Sound Health Unit. 2000. The Investigative Report of the Walkerton Outbreak of Waterborne Gastroenteritis.
http://public/healthgreybruce.on.ca/_private/Walkerton/SPWalkerton.htm