

Dept. of Science & Technology  
Grande Prairie Regional College

MI 2950  
Infection and Immunity

Course Outline

Instructor

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Course Description: This course introduces the principles and mechanisms of immunity in eucaryotes. It will provide an overview of the major groups of infectious agents (viruses, bacteria, parasites) and examine selected microorganisms within the context of the host response to pathogens and pathogen evasion strategies.

Credits: 3

Hours: 3-0-0

Pre-requisites: **MI 2650** - General Microbiology  
**BC 2030** - Introductory Biochemistry I

Objectives:

- a) To provide students with basic knowledge and understanding of the immune system and its response to pathogens.
- b) To allow students to enroll in advanced undergraduate courses in immunology and infectious disease biology.
- c) To provide students with the ability to understand media reports dealing with immunology and infectious diseases.

Textbook: There is no required text for this course, however certain chapters of ***Brock - Biology of Microorganisms*** (text for MI 2650) will be referred to during lectures. In addition, the following two books will be useful to students and will be made available on reserve in the GPRC Library.

**Immunobiology - The Immune System in Health and Disease**

Charles Janeway *et al*

Garland Publishing 5<sup>th</sup> Edition (2001)

**Principles of Virology - Molecular Biology, Pathogenesis and Control**

Jane S. Flint *et al*

American Society of Microbiology (2000)

Evaluation:

Mid-term I	30%
Mid-term II	30%
Final Exam	40%

The first mid-term exam will include questions on all material covered up until that point.

The second mid-term will include questions on all material covered since the beginning of the course.

The final exam will be comprehensive, with approximately 50% of the marks given to material covered on the first and second mid-terms.

## TOPIC SCHEDULE

1. Introduction; overviews of the immune system and its relationship to infectious organisms.
2. Cells and organs of the immune system.
3. Innate defenses.
4. Antigens and immunity.
5. Immunoglobulins.
6. Development of B-lymphocytes I.
7. T-cell development and antigen presentation I
8. T-cell development and antigen presentation II
9. Development of B-lymphocytes II.
10. Cell-mediated immunity.
11. Inflammation, lymphocyte trafficking and tolerance.
12. Parasitic infections with emphasis on malaria.

### MID-TERM EXAM I

13. *Vibrio cholerae*: virulence factors, toxins
14. *Corynebacterium diphtheriae*: toxins and vaccine development
15. Toxinosis: *Clostridium* and *Staphylococcus*
16. *Bordatella pertussis*: adherence and toxins
17. *Neisseria gonorrhoeae* and antigenic variation
18. *Pseudomonas aeruginosa* and the immuno-compromised host
19. Enterovirulent *Escherichia coli*: motility, colonization factors and toxins
20. *Listeria monocytogenes*: intracellular lifestyle
21. *Mycobacterium tuberculosis*: intracellular lifestyle
22. *Streptococcus pneumoniae*: inflammation
23. *Streptococcus pyogenes*: autoimmunity
24. Fungal infections

### MID-TERM EXAM II

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TOPIC SCHEDULE (continued)

25. Alternate lifestyles of viruses
26. Viral pathogenesis
27. Viral attachment and entry
28. Viral lifestyle and interaction with the immune system
29. Viral replication strategies I: DNA viruses and retroviruses
30. Viral replication strategies II: RNA viruses and mutation
31. Innate defenses against viruses
32. Cellular interactions in viral recognition
33. Viral escape from both innate and antibody defense
34. Viral interference in host immunity - cytotoxic T-cell escape
35. Viral evasion strategies
36. Emergence of new viruses