Course Outline Form: Winter 2018

General Information

Course Code: ANSC*4650

Course Title: Comparative Immunology

Course Description: This course is designed to give an overview of the immune defense mechanisms of domestic species, and to compare common and unique defense strategies developed for resisting microbial and viral infections. Topics include innate and acquired immunity, evolution of the immune system, immunoregulation, and the host response to pathogen invasion.

Credit Weight: 0.5

Course Prerequisite: ANSC*3080 or equivalent

Academic Department (or campus): Animal Biosciences

Campus: Guelph

Semester Offering: Winter 2018

Class Schedule and Location: 11:30 a.m. - 12:20 p.m. Mondays, Wednesday, Friday in MCLN 102

Instructor Information

Instructor Name: Dr. N.A. Karrow
Instructor Email: nkarrow@uoguelph.ca
Office location and office hours: ANNU123, and office hours will be at the ANNU coffee cart
Wednesdays 1:30 p.m. - 3:15 p.m.

GTA Information

GTA Name: Sanjay Mallikarjunappa
GTA Email: smallika@uoguelph.ca
GTA office location and office hours: ANNU043 and arrange by email

GTA Name: Samantha Dixon
GTA Email: sdixon01@uoguelph.ca
GTA office location and office hours: ANNU043 and arrange by email

Course Content

Students will attend three hours of lecture per week, and the following learning objectives will be assessed through two midterms, inquiry-based learning (IBL) assignments, and a final exam. By the end of this course you should have completed the following specific learning objectives that are designed to get you to think and communicate as immunologist.

Specific Learning Outcomes:

1) Students will be expected to **explain** the concepts of innate and acquired immunity and **recall** examples of humoral and cellular components provided in the instructor's course material. Assessment will be carried out by midterm and a final exam.

2) Students will be expected to **distinguish** innate and acquired immune system differences across vertebrate species that were provided in the instructor's course material. Assessment will be carried out using a midterm and a final exam.

3) Students will be expected to **recall** examples of cross-talk between the innate and acquired immune systems provided in the instructor's course material. Assessment will be carried out using a midterm and a final exam.

4) Students will be expected to **explain** how the immune response is regulated by **recalling** examples provided in the instructor's course material, and **predict** how immune dysregulation can lead to disease. Assessment will be carried out using a midterm and a final exam.

5) Students will be expected to **illustrate** how genetic diversity contributes to variation in the host immune response by **recalling** examples provided in the instructor's course material. Assessment will be carried out using a midterm and a final exam.

6) Students will be expected to **apply** the course material to **predict** how the immune system specifically targets parasitic, viral, fungal and bacterial infections. Assessment will be carried out using a midterm and final exam.

7) Inquiry-based learning (IBL) topics will be covered in class, and students will be expected to **recall** and **clarify** the assigned *questions*. In a class setting, students will be expected to **discuss** *prior knowledge* of the topics, and to **identify** *knowledge uncertainties*. Students will then be expected to individually **create** *hypotheses* to address the questions, then **research** only peer-reviewed *literature* to **identify** *pertinent information* to address knowledge uncertainties. Students will then be expected to individually **summarize** and **critically evaluate** these *research findings*, **attempt** to *answer the question*, and **reflect** on *remaining uncertainties* and the *learning process*. When composing this IBL summary, please use the "Example Inquiry Based learning Summary.doc" posted on Courselink as a formatting template document; including reference format. If you exceed 600 words (references not included in the word count), you will be penalized 10%. **Note:** Only your best three IBL summary assignments will be included in your final mark.

Marking Scheme

5% Question being addressed
10% Summarize class knowledge prior to research
20% Identify knowledge uncertainties to be researched (listed in point form)
5% Create a testable hypothesis to address the question
20% Summarize research findings to address knowledge uncertainties
15% Critical evaluation
10% Reflect on remaining uncertainties and learning process
10% Spelling and Grammar
5% References (Include at least 3)

Lecture Content:

- Unit 1. Introduction to body defense
- Unit 2. Physical barriers at the host-microbe interface
- Innate Immunity
    - Unit 3. Danger signals and pattern recognition receptors/molecules
    - Unit 4. Sentinel cells
    - Unit 5. Sentinel cell products
    - Unit 6. The complement system
    - Unit 7. Effector cells of the innate immune system: neutrophils
    - Unit 8. Effector cells of the innate immune system: macrophages
    - Unit 9. The acute phase response
- Acquired immunity
    - Unit 10. Antigens and sites of antigen presentation
    - Unit 11. Antigen presenting cells and antigen presentation
    - Unit 12: Antigen receptor diversity: MHC
    - Unit 13. Effector and regulatory T cells
    - Unit 14. B cells and immunoglobulins

Unit 15: Antigen receptor diversity: BCR and TCR

Course Assignments and Tests:

Assignment or Test	**Due Date**	**Contribution to Final Mark (%)**	**Units Assessed**
First day of class	Jan. 8		
Unit 1	Jan. 8		
Unit 1	Jan. 10		
Unit 2	Jan. 12		
Unit 2 + IBL #1	Jan. 15		
Unit 3	Jan. 17		
Unit 3	Jan. 19		
Unit 3	Jan. 22		
IBL #1 Due	Jan. 22	10	2
Unit 4	Jan. 24		
Unit 4	Jan. 26		
Midterm 1	Jan. 27 Meet at ANNU 156 9:00 am	20	1-3
Unit 5	Jan. 29		
Unit 5	Jan. 31		
Unit 5	Feb. 2		
Unit 5 + IBL #2	Feb. 5		
Unit 6	Feb. 7		
Unit 6	Feb. 9		
Unit 7	Feb. 12		
IBL #2 Due	Feb. 12	10	5
Unit 7	Feb. 14		
Unit 7	Feb. 16		
Winter break	Feb. 19-23		
Unit 8	Feb. 26		
Unit 8	Feb. 28		
Unit 9	Mar. 2		
Unit 9 + IBL #3	Mar. 5		
Unit 10	Mar. 7		
Unit 10	Mar. 9		
Midterm 2	Mar. 10 Meet at ANNU 156 9:00 am	20	4-7

Assignment or Test	Due Date	Contribution to Final Mark (%)	Units Assessed
Unit 10	Mar. 12		
Unit 11	Mar. 14		
IBL #3 Due	Mar. 14	10	9
Unit 11	Mar. 16		
Unit 12	Mar. 19		
Unit 13	Mar. 21		
Unit 13	Mar. 23		
Unit 13 + IBL #4	Mar. 26		
Unit 14	Mar. 28		
Unit 14	Mar. 30		
Unit 14	Apr. 2		
IBL #4 Due	Apr. 2	10	13
Unit 15	Apr. 4		
Unit 15	Apr. 6		
Last day of class	Apr. 6		
Final exam	Check Web Advisor	30	8-15

Course Resources

Recommended Texts: Veterinary Immunology: An Introduction, Ninth Edition Ian R. Tizard (2013) Saunders-Elsevier. ISBN 978-1-4557-0362-3. A copy of the eighth edition will be made available to the students at the McLaughlin Library reserve desk.

Other Resources:

- An "Example Inquiry Based learning Summary.doc" will be made available through Courselink.
- Lecture slides and notes will be made available through Courselink.
- List of abbreviations

Course Policies

Grading Policies: Assignments are due at the beginning of the class scheduled above. Students submitting late assignments will receive a 5% late penalty per day.

Course Policy on Group Work: While students are encouraged to participate in an individual- and group-learning environment to better understand the course material, all assignments must reflect the work of each individual student.

Course Policy regarding use of electronic devices and recording of lectures: Since electronic recording of classes is useful for reviewing course material, it will be allowed with the consent of the course instructor. These recordings are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

University Policies

Academic Consideration: The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.

Academic Misconduct: The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before

submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Detailed information regarding the Academic Misconduct policy is available in Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.

Accessibility: The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or visit the Student Accessibility Services website (http://www.uoguelph.ca/csd/).

Course Evaluation Information: End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the Course and Instructor Evaluation Website for more information.

Drop period: The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in Section III (Schedule of Dates) of the Undergraduate Calendar.

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.