

# BIOL 442

## Evolutionary Medicine

Winter Term (2016-17)

### CALENDAR DESCRIPTION

An exploration of human disease, illness, and injury, and the symptoms and treatments of medical conditions, with an evolutionary framework.

LEARNING HOURS 120 (24L;20T;10O;66P)

PREREQUISITE BIOL 206/3.0 and a minimum GPA of 2.0 in the Biological Foundations List

EQUIVALENCY BIOL 522/3.0.

### SCHEDULE

Refer to SOLUS for details.

|                           |  |
|---------------------------|--|
| <b>Instructor</b>         | <b>Dr. Fran Bonier</b>   |
| <b>Instructor Contact</b> | <a href="mailto:bonierf@queensu.ca">bonierf@queensu.ca</a> , Biosci 3523 |
| <b>Office Hours</b>       | TBA or by arrangement  |
| <b>TA:</b>                | TBA  |

### Learning Objectives

The goal of Biology 442 is to guide students in applying an evolutionary framework to better understand human medical conditions and illnesses, and to deepen students' understanding of fundamental evolutionary concepts. In the process, students will improve their critical thinking and communication skills through participation in in-class and tutorial discussions, writing independent and group projects, and delivering an oral presentation to their tutorial section.

### Learning Hours

| <i>Teaching method</i>     |                        | <i>Average hours per week</i> | <i>Number of weeks</i> | <i>Total hours</i> |
|----------------------------|------------------------|-------------------------------|------------------------|--------------------|
| In-class hours             | Lecture                | 2                             | 12                     | 24                 |
|                            | Seminar                |                               |                        |                    |
|                            | Laboratory             |                               |                        |                    |
|                            | Tutorial               | 2                             | 10                     | 20                 |
|                            | Practicum              |                               |                        |                    |
|                            | Group learning         |                               |                        |                    |
|                            | Individual instruction |                               |                        |                    |
| Other                      | Online activity        | 1                             | 10                     | 10                 |
|                            | Off-campus activity    |                               |                        |                    |
|                            | Private study          | 6                             | 11                     | 66                 |
| <b>Total hours on task</b> |                        |                               |                        | <b>120</b>         |

## **Course Outline**

More information can be found at the course OnQ site

Overview of some topics to be covered in the course:

1. The scientific method and hypothesis testing
2. Fundamental evolutionary theory
3. Why Evolutionary medicine?
4. Pathogen diversity and human evolution
5. Human genetic variation of medical relevance
6. Life history tradeoffs and human health
7. Parasites and pathogens
8. Evolution of virulence
9. Antibiotic resistance
10. Pathogen evolution & vaccines
11. Disease emergence
12. Cancer

## **Textbooks/Readings**

Required text: *Evolutionary Medicine* (first edition, 2016) by Stearns and Medzhitov – students can opt to purchase a hard copy book (available at the Queen’s Bookstore, and through other vendors) or an e-copy (available at coursesmart.com as well as other vendors).

Other required readings from the primary literature to be provided on the OnQ site

## **Grading Scheme**

| <b>Component</b>             | <b>Weight (%)</b>     |
|------------------------------|-----------------------|
| Pre-test                     | 2%                    |
| Quizzes                      | 35%                   |
| Major projects               | 35%                   |
| Tutorial & other assignments | 18%                   |
| Tutorial participation       | 5% (0.5% per session) |
| In-class participation       | 5%                    |

### **Grading Method**

In this course, all components will be graded using numerical percentage marks. Your course average will then be converted to a final letter grade according to Queen's Official Grade Conversion Scale:

| <b>Grade</b> | <b>Numerical Course Average (Range)</b> |
|--------------|---|
| A+           | 90-100                                  |
| A            | 85-89                                   |
| A-           | 80-84                                   |
| B+           | 77-79                                   |
| B            | 73-76                                   |
| B-           | 70-72                                   |
| C+           | 67-69                                   |
| C            | 63-66                                   |
| C-           | 60-62                                   |
| D+           | 57-59                                   |
| D            | 53-56                                   |
| D-           | 50-52                                   |
| F            | 49 and below                            |

### **Academic Integrity and Queen's Code of Conduct**

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments and conduct conform to the principles of academic integrity. Information is available in the Arts and Science Calendar (see Academic Regulation 1 - <http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations>, on the Arts and Science website (see <http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity>), on the Biology Department website (<http://biology.queensu.ca/academics/undergraduate/prepare-yourself/>), and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions that contravene the regulations on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

### **Accommodation Policy, Exam Conflicts, and Other Conflicts**

Students who feel they need accommodations for disabilities or extenuating circumstances should consult the University Student Accessibility Services (<http://www.queensu.ca/studentwellness/accessibility-services>). Students with a conflict between exams, lectures, or other course requirements should consult the Biology Department's website for details about how to proceed (<http://biology.queensu.ca/academics/undergraduate/prepare-yourself/>). In general, the earlier the instructor is apprised of an extenuating circumstance, the more likely an accommodation can be made. Students are encouraged to be proactive in anticipating difficulties, when it is possible to do so.

Students may request a make-up or deferred assignment deadline or quiz if they have a conflict with off-campus travel associated with a field course (e.g. BIOL-307/3.0) that is held during the winter term.

Make-up quizzes will not be offered, but students who have made **PRIOR** arrangements with the instructor might be permitted to have quizzes pro-rated if they are missed due to illness, family emergencies, or other extenuating circumstances, dependent on approval by the instructor.

Assignments must be submitted by the posted deadlines, barring any prior arrangements approved by the instructor due to extenuating circumstances. Assignment marks will be reduced by 5% for each day late up to 3 days, then 10% per day up to 7 days. Assignments will be assigned a mark of 0 if they are submitted more than 7 days after the posted deadline.

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### **Accommodation of Disabilities**

*Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact the Queen's Student Accessibility Services (QSAS) and register as early as possible. For more information, including important deadlines, please visit the QSAS website at: <http://www.queensu.ca/studentwellness/accessibility-services/how-register/current-returning-students>*