



MICR*3220 Plant Microbiology

Fall 2018

Section(s): C01

School of Environmental Sciences

Credit Weight: 0.50

Version 1.00 - September 07, 2018

1 Course Details

1.1 Calendar Description

In this course the interaction between plants and microorganisms will be studied. Topics include molecular plant-microbe interactions, plant defenses, bacterial ice nucleation, interaction among plant microbes, root nodulation, mycorrhizae, wood decay, and decomposition of plant litter.

Pre-Requisite(s): BIOL*1040 or (BIOL*1070, BIOL*1090)

1.2 Course Description

In this course, the interaction between plants and microorganisms will be studied. Topics include molecular plant-microbe interactions, plant defenses, bacterial ice nucleation, interactions among plant microbes, root nodulation, mycorrhizae and decomposition of plant litter.

1.3 Timetable

Lecture Mon, Wed, Friday
4:30 pm - 5:20 pm Alex 028

1.4 Final Exam

Saturday December 8, 2018, 8:30 - 10:30
Location: TBD
Weight: 30%

2 Instructional Support

Instructor Name: Paul Goodwin
Instructor Email: pgoodwin@uoguelph.ca
Office location and office hours: Room 3239, Bovey Building, MWF, 3:30-4:30

3 Learning Resources

Recommended Texts (on reserve in library):

1. Plant Microbiology, by R. Campbell (phylloplane, parasites, rhizosphere).
2. Fungal Biology, by J. Deacon (pathogenicity, mutualism, biological control).
3. Plant Pathology, by G.N. Agrios (pathogens, host resistance, pathogen taxonomy).
4. Fortress plant : how to survive when everything wants to eat you. [electronic resource] (pathogens, disease resistance).
5. Plant surface microbiology, by A. Varma [electronic resource] (phylloplane adaptations, ice nucleation, grass endophytes)
6. Example paper for the review essay: Quorum sensing by bacterial plant pathogens and its potential inhibition by bacterial epiphytes.
7. Example paper for the review essay: Production of bacterial extracellular metabolites as a mechanism for suppression of early plant defense responses.

3.1 Required Resource(s)

Lecture Content: (Readings)

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Memorize the ecological and evolutionary concepts underlying plant-microbe interactions.
2. Describe examples of interactions of microbes with different types of plant tissues.
3. Evaluate examples of plant-microbe interactions to recognize similarities and differences between the various types of interactions.
4. Evaluate examples of plant-microbe interactions to integrate the ecological, molecular, physiological and cellular aspects of plant-microbe interactions.
5. Recognize the historical impacts of plant-microbe interactions.
6. Apply the concepts and examples from the course to describe and evaluate a recent primary research article concerning an aspect of a plant-microbe interaction.

5 Teaching and Learning Activities

5.1 Lecture

Fri, Sep 7

Topic(s):

Introduction
Types of microbes
Ecological and evolutionary concepts of plant microbiology
Phylloplane microbiology
Leaf and stem microbiology
Disease resistance
Root microbiology
Vascular tissue microbiology
Seed and fruit microbiology
Post-harvest microbiology
Conclusions

Class Schedule:

Friday, Sept. 7	First Class
Monday, Oct. 8	Thanksgiving (no class)
Wednesday, Nov. 28	Last Regularly Scheduled Class
Friday, Nov. 30 (Monday schedule)	Reschedule of Thanksgiving

6 Assessments

6.1 Marking Schemes & Distributions

Additional Notes:

- Hard copy only to be submitted for Approval of review essay topic and Review essay.
- Mid-term exams are taken in class periods.
- Exams are to be completed in pen only. Essay questions are to be completed using full sentences and paragraphs.
- Exams will be returned for review in class and then collected following its discussion. Please do NOT make notes directly on the graded exam. Notes can be made on a separate paper in pencil.
- Students can arrange with the instructor to review the correct exam answers from the grading key without potential re-grading of their exam. However, a request for a review of a student's own exam can result in an increase or decrease in the exam grade.

Approval of Review Essay Topic:

A hard-copy of your review essay title and selected references is required to approve your choice of topic and primary research article. The review essay topic approval included the title of the review essay which should be specific and directly related to the primary research article that is the focus of the review essay. Below the title on the same page, include the bibliographic information (authors, year, title, journal, volume, pages) of 5 selected pertinent references (but no more than 5) obtained from a computer search using AGRICOLA, CAB Abstracts, Life Sciences Database, and/or other databases in the library. One of these 5 must be your primary research article that was published in the last 4 years, which should be marked "PRIMARY RESEARCH ARTICLE" and MUST include the abstract from that article. All references must be available in the University of Guelph Library. A "resubmit" mark indicates that changes are required for the topic to be approved, and a revised version must be submitted to the instructor within the following 7 days from when it is returned. All review essays must have an approved review essay topic.

Review Essay:

Students are required to submit a 6-8 page hard copy of double-spaced text (6-8 pages excludes the cover page, references), which reviews a topic related to the mechanisms of how plants and microorganisms interact (not disease management, infection cycles, nor pathogen detection). The focus is a primary research article that was published in the last 4 years. A primary research article contains results/data. Primary research articles are the basis of all scientific knowledge in modern times, and the ability to read, analyze and place primary research articles in context is an important scientific skill. The review essay begins with an introduction of the specific topic followed by the relevant background needed to understand the results of the primary research article. That is followed by at least one full page of a general description of the results/data in the primary research article along with the conclusions of the primary research article. Do not include details about methods. Provide only enough of a general description of methods so that the results are understandable. The last part of the review essay is a description as to how the primary research article advances our understanding. Do not use any lecture notes or websites (other than e-journals) as reference material, and only minimal use (1-2 references at most) of textbooks. I would expect 12-24 references with the "PRIMARY RESEARCH ARTICLE" marked in the reference list as per the example essay paper on reserve in the library. Cover page, margins, type size and spacing must follow the example essay paper on reserve. No sub-headings or quotations allowed. No figures or tables are allowed. Because there is a close link between thought and expression, the review essay will be graded for the quality of written expression as well as for content.

6.2 Assessment Details

mid-term exam (24%)

Date: Fri, Oct 5

Approval of review essay topic (2%)

Date: Fri, Oct 12

2nd Mid term exam (24%)

Date: Fri, Nov 2

Review Essay (20%)

Date: Fri, Nov 16

7 University Statements

7.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

7.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The regulations and procedures for [Academic Consideration](#) are detailed in the Undergraduate Calendar.

7.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](#) are available in the Undergraduate Calendar.

7.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

7.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: www.uoguelph.ca/sas

7.6 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.

The [Academic Misconduct Policy](#) is detailed in the Undergraduate Calendar.

7.7 Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

7.8 Resources

The [Academic Calendars](#) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.
