



## **MICR\*3090 Mycology**

Fall 2019

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 2.00 - September 11, 2019

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### **1 Course Details**

#### **1.1 Calendar Description**

This course provides an introduction to the fungal lifestyle and to classification and evolution of the major groups of fungi, including microfungi, yeasts and other eukaryotic microbes. The characteristics of fungal cell structure, genetics and metabolism will be presented, and fungal reproduction and sporulation processes discussed with reference to the life cycles of representative forms. The ecological and economic importance of fungi will be demonstrated by considering fungal ecology, symbiotic relationships, mycotoxins and pathogenic fungi and industrial applications of fungi and yeasts. Laboratory work will provide familiarity with procedures for culturing, examining and identifying fungi and yeasts.

**Pre-Requisites:** BOT\*2100 or MICR\*2430

**Equates:** BIOL\*3050

#### **1.2 Timetable**

**Lectures:** Tuesday and Thursday; 11:30 am – 12:50 pm in ANNU 204

#### **1.3 Final Exam**

5/12/2019 14:30-16:30

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### **2 Instructional Support**

#### **2.1 Instructional Support Team**

**Instructor:** Rebecca Shapiro  
**Email:** shapiror@uoguelph.ca  
**Office:** SSC 3248

## 2.2 Teaching Assistants

**Teaching Assistant:** Jordan Willis  
**Email:** jwillis@uoguelph.ca

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## 3 Learning Resources

### 3.1 Required Resources

#### **Courselink (Website)**

<https://courselink.uoguelph.ca>

MICR\*3090 Mycology has a Courselink site, which you can use to review material from lecture powerpoint slides, track grades, and access information about the lab work. Important information about laboratory work WILL be posted here, so please check Courselink regularly! The "Discussion" function allows you to ask questions or post comments for the instructors ...AND your fellow students. Others may want to know the same things you do, so asking a question can be a valuable public service to your classmates! You are encouraged to use "Conferencing" as your first route for questions. (However, if your question concerns a personal/private matter, then certainly email Debra Flett directly.)

### 3.2 Recommended Resources

#### **The Fungal Kingdom (Textbook)**

The Fungal Kingdom (2017) Joseph Heitman, Barbara J. Howlett, Pedro W. Crous, Eva H. Stukenbrock, Timothy Y. James, Neil A. R. Gow. ASM Press. (ISBN 9781555819583)

#### **21st Century Guidebook to Fungi (Textbook)**

21st Century Guidebook to Fungi . David Moore, Geoffrey D. Robson, Anthony P.J. Trinci. Cambridge University Press, 2011. ISBN 978-0-521-18695-7

[http://www.davidmoore.org.uk/21st\\_Century\\_Guidebook\\_to\\_Fungi\\_PLATINUM/index.htm](http://www.davidmoore.org.uk/21st_Century_Guidebook_to_Fungi_PLATINUM/index.htm)

#### **Slayers, Saviors, Servants, and Sex: An Exposé of Kingdom Fungi (Readings)**

Slayers, Saviors, Servants, and Sex: An Exposé of Kingdom Fungi. David Moore 2001. ISBN 978-0-387-95098-3

### 3.3 Note

By way of explanation – either book is an excellent choice as a text for the course, assuming that you actually read the one you select! Both are available in paperback and the price is not bad for the quality and quantity of information you are getting. If you are buying one new, the

"21<sup>st</sup> Century" is less expensive (and has a CD). The focus of the course is to understand the materials presented and discussed in class. Both texts were used to some extent for designing some of the lectures, while several other lectures will be based on primary literature. Texts are therefore supplementary or for clarification.

### 3.3 Useful References

Alexopoulos, C.J., C.W. Mims and M. Blackwell. 1996. Introductory Mycology, 4e, John Wiley and Sons, NY - ISBN 047 1522295 [QK603 A55] "Alexopoulos" was the mycology text for many years, with wonderful drawings to explain things. The Webster and Weber textbook is probably the successor in terms of a taxonomic treatment of the fungi – with information from molecular biology incorporated into the classification scheme.

Kendrick, B. 2000. The Fifth Kingdom, 3e. Mycologue Publications (see website link).

Barron, G. 1999. Mushrooms of Ontario and Eastern Canada. Lone Pine Field Guide. Great photographs and short descriptions of local fungi – we might see them on the "fungus walk" in September.

The Mycota: A Comprehensive Treatise on Fungi as Experimental System for Basic and Applied

Research, 1997 K. Esser and P.A. Lemke (Series Eds.) Springer Verlag ISBN 0387580050 [QK

603.M87] A series of books, collectively entitled "The Mycota", with reviews by different authors on a general theme, such as plant relationships, genetics and biotechnology, animal and human relationships, etc. The Library has several volumes.

Mycologist: Journal title, available through the UG Library. Short review articles on topics in mycology.

**Web Sources** -There are many web-sites devoted to the fungi!

- MOULDS by Dr. David Malloch: [website.nbm-mnb.ca/mycologywebpages/moulds/Moulds.html](http://website.nbm-mnb.ca/mycologywebpages/moulds/Moulds.html)
  - "The Fifth Kingdom" – Mycologue Publications, Dr. Bryce Kendrick: [www.mycolog.com/](http://www.mycolog.com/)
  - George Barron's Website on Fungi: [www.uoguelph.ca/~gbarron/](http://www.uoguelph.ca/~gbarron/)
  - Doctorfungus (human pathogenic fungi): [www.doctorfungus.org](http://www.doctorfungus.org)
  - Tom Volk's Fungi (all sorts of fungal stories – a fun site): [www.botit.botany.wisc.edu/toms\\_fungi/](http://www.botit.botany.wisc.edu/toms_fungi/)
- CABI Bioscience [www.speciesfungorum.org/](http://www.speciesfungorum.org/) Link to the Index Fungorum, the database of fungal names and taxonomic positions.

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## 4 Learning Outcomes

### 4.1 Course Learning Outcomes

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

1. Explain the diversity and identify the major fungal Phyla.
  2. Describe the development of fungal structures during growth.
  3. Describe molecular responses of fungi to its environment.
  4. Describe the molecular interactions of fungi with animal and/or plant hosts.
  5. Describe the industrial importance of fungi.
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## 5 Teaching and Learning Activities

### 5.1 Tentative Lecture Schedule (Subject to Change)

#### Section I: FUNGAL CHARACTERISTICS, STRUCTURE and GROWTH (~8 lectures)

- Introduction to Fungi & Fungal groups
- Fungal cell structures and growth
- Fungal morphogenesis
- Fungal sex

#### Section II: FUNGAL PATHOGENS and SYMBIONTS (~10 lectures)

- Fungal pathogens of humans (adhesion, invasion, biofilm growth, virulence)
- Fungal pathogens and symbionts of plants
- Fungal pathogens of insects and other animals and mechanisms of virulence
- Antifungal drugs and antifungal drug resistance
- Host-pathogen interactions

#### Section III: INDUSTRIAL MYCOLOGY and FUNGAL INTERACTIONS (~3 lectures)

- Fermentations and Food Fungi
  - The fungal mycobiome
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## 6 Assessments

### 6.1 Assessment Details

#### Midterm Exam (30%)

**Date:** Tue, Oct 1, In Class

**Learning Outcome:** 1, 2, 3, 4

Written exam during lecture time slot

#### Midterm Exam (30%)

**Date:** Tue, Nov 5

Written exam during lecture time slot

Optional - OR writing assignment

#### Writing assignment (30%)

**Date:** Tue, Nov 5

Fungi are remarkable organisms that have had major impacts on human society. The goal of this assignment is to learn about and dig into some biology of these amazing species

Slayers, Saviors, Servants and Sex: An Exposé of Kingdom Fungi is a short book (<150 pages) that describes some of these species for a general audience

Choose one species of interest and write a ~3 page paper (<1000 words) detailing the relevance of this organism, and describing its biology (this will require some research outside of the book)

Optional - OR Midterm 2

#### Final Exam (40%)

**Date:** Thu, Dec 5, TBA

**Learning Outcome:** 1, 2, 3, 4, 5

2-hour written exam.

### 6.2 Important

1. The final examination will be cumulative.
2. If you do not write one of the midterm examinations or writing assignment (for whatever reason), the 25% value will automatically be transferred to the final (which will then contribute 75% to your final grade); no documentation is needed if you miss the midterm exam. **THERE IS NO "MAKE-UP" MIDTERM.**

3. Midterm papers may be returned for correction of grading errors **within one week** of the return of the paper to the student. The entire exam will be re-graded.
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## 7 Course Statements

### 7.1 Course Evaluation

As part of the faculty evaluation process in the Department of Molecular and Cellular Biology, students are reminded that written comments on instructors' teaching performance may be sent to the Chair, Department of Molecular and Cellular Biology, at any time. Such letters must be signed; a copy will be made available to the instructor after submission of the final grade.

### 7.2 Exam Procedure

Leave your phone in your knapsack—if it is in your knapsack, make sure it is turned off. Phones that ring during exams will be put outside of the examination room. No materials may be brought to the exam except for pencils, pens and an eraser. No calculators, electronic devices (including cell phones), pencil cases, purses, bags, tissue boxes or other containers may be present. All materials are subject to inspection. Always bring photo ID to exams.

## 8 Department of Molecular and Cellular Biology Statements

### 8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

### 8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides

support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

## 8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. <https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.selfregulationskills.ca/>

## 9 University Statements

### 9.1 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.

### 9.2 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 grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

### 9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester.

This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

## 9.4 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.

## 9.5 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 can be found on the SAS website

<https://www.uoguelph.ca/sas>

## 9.6 Academic Integrity

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 encourages academic integrity. 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.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

## 9.7 Recording of Materials

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

## 9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

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