



MICR*3090 Mycology

Fall 2023

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - September 07, 2023

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.

Pre-Requisites: BOT*2100 or MICR*2430

1.2 Course Description

This semester, MICR 3090 Mycology will be held in person.

This is a draft course outline and is subject to change up to the first day of classes, in keeping with the policy described in the University of Guelph Academic Calendar

1.3 Timetable

Lectures: Tuesday and Thursday; 11:30 am – 12:50 pm

1.4 Final Exam

No final exam.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Rebecca Shapiro
Email: shapiror@uoguelph.ca
Office: SSC 4459

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, etc.

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

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

http://www.davidmoore.org.uk/SlayersWEB/Slayers_00.htm

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

Available online: http://www.davidmoore.org.uk/SlayersWEB/Slayers_00.htm

3.3 Note

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.

Slayers, Saviors, Servants and Sex: An Exposé of Kingdom Fungi is a useful book for reference for the writing assignment.

3.3 Useful References

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

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

Books:

Entangled Life: How Fungi Make Our Worlds, Change Our Minds & Shape Our Futures

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 (~7 lectures)

- Introduction to Fungi & Fungal groups

- Fungal cell structures and growth
- Fungal morphogenesis
- Fungal sex

Section II: HUMAN FUNGAL PATHOGENS (~6 lectures)

- Fungal pathogens of humans
- Mechanisms of fungal pathogenesis (adhesion, invasion, biofilm growth, virulence)
- Antifungal drugs and antifungal drug resistance
- Host-pathogen interactions

Section III: PLANT-ASSOCIATED FUNGI and INDUSTRIAL MYCOLOGY (~4 lectures)

- Fungal pathogens of plants and mechanisms of virulence
- Fungal-plant symbiosis (lichens and mycorrhizae)
- Fermentations and food fungi

Lecture outline for MICR*3090 Mycology, Fall 2023

Subject to change

Lecture 1	September 7	Intro to class
Lecture 2	September 12	Fungal diversity
	September 14	No Class
Lecture 3	September 19	Fungal characteristics
Lecture 4	September 21	Fungal morphogenesis I
Lecture 5	September 26	Fungal morphogenesis II

Lecture 6	September 28	Fungal sex I
Lecture 7	October 3	Fungal sex II
	October 5	Midterm
	October 10	No Class
Lecture 8	October 12	Human pathogens I
Lecture 9	October 17	Human pathogens II
Lecture 10	October 19	Human pathogens III
Lecture 11	October 24	Human pathogens IV
Lecture 12	October 26	Antifungal drugs and resistance
Lecture 13	October 31	Plant pathogens
	November 2	No Class
Lecture 14	November 7	Plant symbionts
	November 9	Midterm
Lecture 15	November 14	Industrial fungi
Guest Lecture 1	November 16	Richard Preiss, Escarpment Labs, Biology of beer yeast and entrepreneurship
Lecture 16	November 21	Gene editing in fungi
Guest Lecture 2	November 23	Lauren Wensing, University of Guelph, Current research in human fungal pathogens

Guest Lecture 3	November 28	Psilocybin and magic mushroom
	November 30	Paper due

5.2 Guest Lectures

This class will feature a number of exciting guest lectures from leading experts in diverse fields of fungal biology and research

Lauren Wensing (PhD Candidate, Department of Molecular and Cellular Biology, University of Guelph) - Cutting-edge technologies and applications to study human fungal pathogens

Dr. Richard Preiss (Escarpment Labs, Guelph) - Brewing microbiology: studying and developing new yeast strains for beer

TBA (University of Guelph), Biology of magic mushrooms and psilocybin research

6 Assessments

6.1 Assessment Details

Midterm Exam (30%)

Date: Thu, Oct 5, Courselink

Learning Outcome: 1, 2, 3, 4

Written exam in class lecture time slot

Midterm Exam (30%)

Date: Thu, Nov 9, Courselink

Written exam in class during lecture time slot

Final writing assignment (40%)

Date: Thu, Nov 30

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

Choose one species of interest and write a ~5-6 page paper (double spaced, max 1500 words) detailing the relevance of this organism, and describing its biology.

6.2 Important

1. The second midterm will be cumulative, though mostly weighted towards the new material
 2. There are no makeup exams. If you are unable to write on the exams (for any reason) your grade will be weighted towards the other midterm (45%) and final paper (55%)
 3. Midterms 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.
 4. Late submission of final paper will result in loss of 5% of grade per day.
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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.

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/>

8.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar.
(<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

8.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

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>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/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 make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a

week ahead of time.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

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>

9.9 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).
