



MICR*3090 Mycology

Fall 2018
Section(s): C01

Department of Molecular and Cellular Biology
Credit Weight: 0.50
Version 1.00 - August 24, 2018

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-Requisite(s): BOT*2100 or MICR*2430
Equate(s): BIOL*3050

1.2 Timetable

Lectures: Tuesday and Thursday; 11:30 am – 12:50 pm in MCKN 233

Laboratories: Tuesday *OR* Wednesday; 2:30 - 5:20 pm in SCIE 4110

**Labs start on September 11 *OR* 12. Please check to which lab section you have been assigned.

1.3 Final Exam

Currently slotted for December 5, 2018, 19:00-21:00.

2 Instructional Support

2.1 Instructor(s)

Debra Flett
Email: dflett@uoguelph.ca
Telephone: +1-519-824-4120 x52533
Office: SSC 3504

2.2 Teaching Assistant(s)

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

3 Learning Resources

3.1 Required Resource(s)

Mycology Lab Manual (Lab Manual)

For sale from the "MCB Boutique" (SSC 3302) which is open for only a few days at the beginning of the semester. Please check the posted signs. (\$10 ca\$h)

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.)

Laboratory Coat (Equipment)

3.2 Recommended Resource(s)

21st Century Guidebook to Fungi (Textbook)

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

Introduction to the Fungi (Textbook)

Introduction to the Fungi, 3rd Edition (2007) John Webster and Roland Weber. Cambridge (ISBN: 0-521-01483-2 paperback)

Loose Leaf Binder (Equipment)

A **loose-leaf binder** is recommended as a convenient means of organizing your laboratory instructions, working notes, data and drawings, and you will be submitting this binder for marking at the end of the laboratory exercises.

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 "21st Century" is less expensive (and has a CD). If you can find a second-hand copy of the "Introduction" at a good price, it is an excellent book, organized a bit more strictly along taxonomic lines. 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
- "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/

• CABI Bioscience www.speciesfungorum.org/ Link to the Index Fungorum, the database of fungal names and taxonomic positions.

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.

6. Culture and examine a variety of fungi using traditional mycological techniques.

5 Teaching and Learning Activities

5.1 Tentative Lecture Schedule (Subject to Change)

Section I: FUNGAL CHARACTERISTICS & DIVERSITY (~11 lectures)

- Introduction to Fungi & Fungal groups
- Fungal phyla: Zygomycota, Glomeromycota, Ascomycota, Basidiomycota
 - Macroscopic and microscopic characteristics of fungi
 - Spores and Specialized Structures
 - Fungal interactions
 - Fungal life cycles

Section II: FUNGAL CELL STRUCTURE & GROWTH (~6 lectures)

- Molecular mechanisms of hyphal growth
- Chemotropism & gravitropism
- Spore formation & dissemination

Section III: INDUSTRIAL MYCOLOGY (~3 lectures)

- Fermentations and Food Fungi

Section IV: MYCOSES (~4 lectures)

- Fungal Adhesion
- Tissue invasion & damage

5.2 Laboratory Work (25% value)

The laboratory work is a **required component** of the course. Students working in the laboratory are required to know and follow the laboratory safety rules, as well as any special safety instructions given by the instructors. Moulds and spores can present a significant amount of airborne contamination and trigger allergic responses. **Students who anticipate or who experience allergy problems with handling fungi should consult with the instructors.** For working in the mycology laboratory, you will need to wear a suitable laboratory coat.

The laboratory exercises are intended to provide the student with the opportunity to **culture and examine a variety of fungi** using traditional mycological techniques. Reference cultures and natural isolates will be examined and some experiments on growth, metabolism and ecology will be included. The laboratory topics to be covered and the schedule for the work are indicated below. Specific instructions are provided in the laboratory manual, available from the Department. **A loose-leaf binder** is recommended as a convenient means of organizing your laboratory instructions, working notes, data and drawings, and you will be submitting this binder for marking at the end of the laboratory exercises.

Detailed schedule information and instruction sheets are found in the Laboratory Manual.

5.3 MICR*3090 Lab Schedule F18

Week	Date	Topic	Due Date	Value
1	Sept 11,12	Check-in; Safety		
2	Sept 18,19	Macrofungi	Nov 20,21 (lab book)*	
3	Sept 25,26	Continue Macrofungi		
4	Oct 2,3	Fungus Walk – Arboretum		
5	Oct 9,10	NO LAB – THANKSGIVING BREAK		
		Growth Rates	Nov 20,21 (lab book)*	
		Identification of filamentous fungus	Nov 13,14	
6	Oct 16,17	Natural isolate 1	Nov 13,14	6
		Set up fungal succession	Nov 27,28	1.5
		Soil Enumeration		5
7	Oct 23,24	Continue filamentous fungus	Nov 20,21 (lab book)*	
		Succession observations		

		Dimorphism		
		Natural isolate 2		
8	Oct 30,31	Continue filamentous fungus	Nov 20,21 (lab book)*	
		Succession observations	Nov 13,14	1.5
		Yeast		
9	Nov 6,7	Continue filamentous fungus		2
		Succession observations		
10	Nov 13,14	Continue yeast		
11	Nov 20,21	Finish yeast	*Lab book due for marking (in lab)	9*
12	Nov 27,28	Clean-up		

Nov 20,21 (lab book)* The remaining 9 marks of the 25 mark total will be from your lab book. It will be marked for completeness as well as for specific exercises.

6 Assessments

6.1 Assessment Details

Lab Work (25%)

submitted reports, slides, data records, skills

Midterm Exam (35%)

Date: Tue, Oct 16, TBD - will be announced in class

Written exam during lecture time slot

Final Exam (40%)

Date: Wed, Dec 5, TBA
2-hour written exam.

6.2 Important

1. The final examination will be cumulative.
 2. If your performance (%) on the final examination is better than on the midterm, the final examination grade will contribute 55% (40% + 15%) and your midterm examination contribute 20% (35% - 15%) to your final grade. (*This adjustment will be made automatically if it is to your benefit.*)
 3. If you do not write the midterm examination (for whatever reason), the 35% 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.**
 4. 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.uoguelph.ca/~ksomers/>

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 regulations and procedures for [Academic Consideration](#) are detailed in the Undergraduate Calendar.

9.3 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.

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: www.uoguelph.ca/sas

9.6 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.

9.7 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.

9.8 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.
