



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. Course: BIOLOGY 435 – Biology of Fungi

Lecture Sections: L01 MWF 15:00-15:50 EEEL Fall 2018

Course Coordinator/

Instructor: Dr. H. Addy EEEL 235C 220-8963 addy@ucalgary.ca

Desire 2 Learn (D2L) course name: BIOL 435 L01 – (Fall 2018) –
Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

2. PREREQUISITE(S): Biology 313 and Biology 331. A student may not register in a course unless they have a grade of at least C- in each prerequisite course. See section 3.5.C in the Faculty of Science section of the online Calendar (<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)

BIOL 435 Learning Outcomes. After completion of this course, the successful student will be able to demonstrate the following skills, knowledge and abilities:

1. Course content mastery

- contrast the features that distinguish fungi from plants, animals and bacteria
- describe the phyla of fungi and their life histories
- explain the factors responsible for the characteristic shape of a fungal mycelium, and describe how the mycelium differentiates as it develops; compare and contrast the roles played by different parts of the mycelium in terms of nutrient acquisition and reproduction
- explain the links between fungal lifestyle and reproductive biology
- explain the ecological roles and global importance of fungi as saprotrophs, symbionts, and sources of food, antibiotics, allergens and toxins
- work safely with fungal cultures using sterile technique

2. Collaborative learning skills

- Work effectively as part of a team, as reflected in Peer Feedback Assessments of five key competencies identified as critical to team effectiveness:
 - *Commitment* - take on fair share of and demonstrate commitment to team's work; be prepared for team meetings; deliver complete, accurate work
 - *Communication* - communicate clearly and share information; ask for and act on feedback
 - *Knowledge, skills and abilities* - acquire new skills and/or knowledge to improve team's performance; learn about teammates' tasks and roles
 - *Uphold high standards for quality of team's work* (- encourage and motivate team; care about quality of team's work; express and support belief that team will achieve high standards)
 - *Focus*- monitor conditions affecting the team and notice problems; give teammates specific, timely and constructive feedback; help team plan and organize work
- Contribute effectively to team products as reflected in scores for tRATs and team assignments
- Provide constructive feedback to team members via Peer Feedback Assessments

3. Scientific communication skills

- Independently find, assess and summarize sources of scientific information
- Translate two-dimensional representations of fungal structures into three-dimensional representations, and vice versa
- Interpret and explain figures from research articles to peers and non-expert audiences
- Communicate scientific concepts effectively to non-expert audiences in written and visual formats

4. Self-regulated learning skills

- Independently acquire, retain and retrieve new knowledge
- Plan, monitor and evaluate your own learning and thinking
- Accurately assess strengths and weaknesses of your work as well as yourself as a learner and understand what strategies work best for you to accomplish a given task

Assessment of Learning Outcomes. The following information indicates how each learning outcome will be assessed in BIOL 435:

1. Course content mastery: Assessed via *iRATs, tests, individual lab assignments and lab handbooks*

a) *individual Readiness Assurance Tests* (iRATs) occur at the start of each unit in the course. Each iRAT consists of ~10 multiple-choice questions based on the assigned readings. As described on p. 9 of the syllabus, iRATs are followed by *team RATs* (tRATs), in which your team re-takes the same test together. Thus, tRATs assess course content mastery but also team effectiveness and so are included under Collaborative Learning Skills below.

b) There are two *tests*, a midterm and a final test, both of which occur during your regular lab period and both of which involve integration of lab material with readings and class material. The midterm is in your lab period during the week of Oct. 22nd, and the final test is in your lab period during the week of Dec. 3rd.

c) Each week, there is an *individual lab assignment* to be handed in before you leave the lab; these assignments consist of one or more drawings and related questions. You can choose how many of these assignments to complete, as described in the requirements for each letter grade below.

d) *Lab Handbooks* are optional assignments that you can choose to complete, depending on the grade you want to earn in this course. Successful completion of one of the two Handbooks is required for the A grade. Completion of the handbooks will help you prepare for the lab & lecture tests. The goal of this assignment is to produce a Lab Handbook that would help next year's students learn the lab material and integrate that lab material with the readings and class material for either the first half or the second half of the course. Further information is provided on D2L.

2. Collaborative learning skills: Assessed via *tRATs* and *team assignments*, and completion of *Peer Feedback Surveys*.

a) *team Readiness Assurance Tests* (tRATs): as indicated above, your team will complete a tRAT at the start of each unit in the course, immediately after you complete the iRAT individually.

b) Your team will also work on *team assignments* in class and in lab, which provide opportunities to work on sample test questions and also help you develop science communication skills. Most of these team assignments are for feedback only (i.e. the grade your team receives indicates the mark your answer would earn on an exam) but the *Exam Review Assignments* (completed in the review labs) and the *Capstone Team Assignment* (in class at end of term) must be successfully completed, meaning that you must be present and involved with your team's work on these assignments to meet the requirements for this component.

c) *Peer Feedback Surveys*: there are three of these, all of which must be completed to meet the requirements for this component.

- *Early Team Assessment*: in the third week of the term, you will complete a brief *Team Assessment* to report on how well your team is working together and flag any issues/conflicts that have arisen.
- *Peer Feedback and Team Dynamic Assessment* via ITP Metrics: before Reading Week and again at the end of term, you will complete these surveys, which allows team members to gain insight regarding their teamwork competencies. You receive a peer score, which indicates your average score on five competencies divided by the average score for your teammates, as well as written feedback from each teammate.

3. Scientific communication skills: Assessed via *Core Concept Assignments* and a *Final Project*. All of these assignments will focus on communication of a key concept in fungal biology to a general public audience.

a) *Core Concept Assignments*: there are **three** in total; you can choose how many of these you wish to complete, as described in the requirements for each letter grade below. Each assignment is either a brief written explanation OR a simple infographic that will explain the concept to a non-expert audience. Due dates are provided in the schedule at the end of this syllabus.

b) *Final Project*: **all** components of the Final Project are required for an A grade, while the *Project Proposal* alone is required for a B grade. This project builds on the skills in explaining scientific concepts to a non-expert audience. For the project, you will identify a *specific topic* related to the course content that you want to learn more about, and will explain this topic to a designated non-expert audience either in writing or as an infographic. There are three stages for this project, each with a **firm** due date; you will also complete reflections about the process of doing this project. More information is provided on D2L.

4. Self-regulated learning skills: Assessed via *Course Goals Reflections*, and *Class Preparation Questions*

a) There are three *Course Goals Reflections*, one at the beginning of term, one roughly at mid-semester, and one at the end of term. The A, B and C grades must complete all three of these; the D grade must complete the first and second ones. Due dates are provided in the course schedule at the end of the syllabus.

- *Course Goals Reflection #1*: In this assignment, you outline your goals for this course and also provide me with information about your background that is useful to me in developing course material.
- *Course Goals Reflection #2*: this includes a reflection on your midterm exam preparation & performance, your mid-semester peer score and team feedback and your progress towards your course goals
- *Course Goals Reflection #3*: asks you to reflect on to what extent you met the personal goals that you outlined in the first Reflection at the beginning of the term.

b) *Class Preparation Questions*: these are brief answers to one or two questions relating to specific topics in the readings you completed for the RAT that will help you be prepared for the team activity relating to that topic. All class prep questions are due at the start of class on the designated date (advance notice will be given) and will be graded on the basis of completion only; free passes cannot be used to submit these assignments late. You can choose how many of these you complete, as described in the letter grade requirements below.

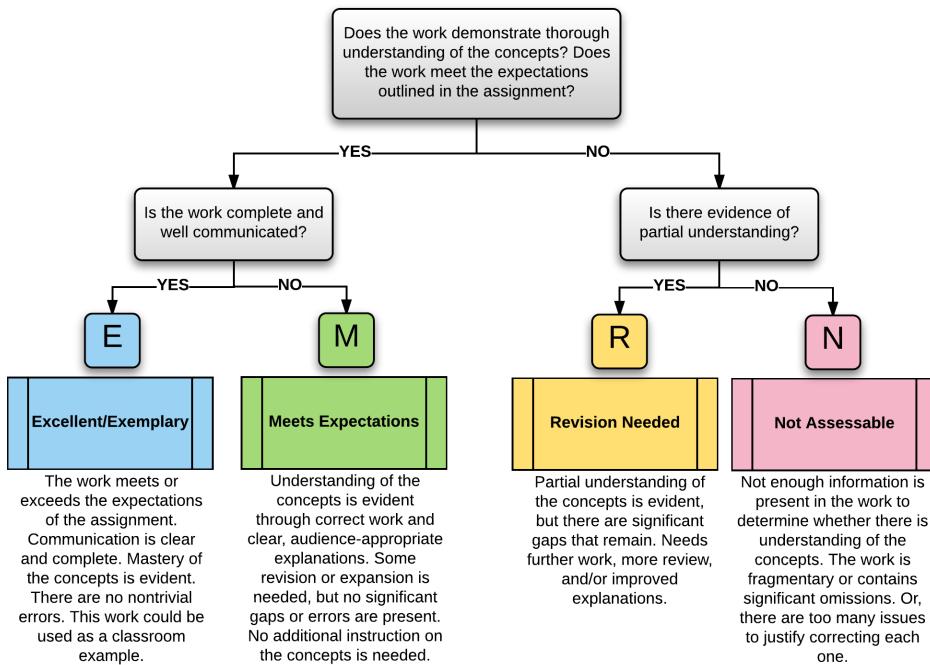
3. Grading:

The University policy on grading and related matters is described in sections [F.1](#) and [F.2](#) of the online University Calendar.

In this course, your work will be evaluated in one of three ways, depending on the type of work:

- tests and RATs will be marked using points
- peer surveys, team assignments, and class preparation questions are marked for completion
- individual lab assignments, lab handbooks, Core Concept Explanations, Reflections, and all components of the Final Project are marked using the **EMRN rubric** below. Assignments that earn marks of E or M earn credit (“pass”) and marks of R or N do not earn credit (“fail”). Work that does not earn credit on a first try can be re-submitted using a free pass as described on page 6, thus I use the terms “**Acceptable**” and “**Not Yet Acceptable**” rather than Pass-Fail. For each assignment that is graded with this rubric, the expectations are clearly outlined in the assignment description posted on D2L.

Courtesy Robert Talbert.



EMRN rubric based on the EMRF rubric, due to Rodney Stutzman and Kimberly Race: <http://eric.ed.gov/?id=EJ717675>

Grades of E or M are awarded only if there are no significant errors and only if the number of minor errors is minimal. That is, a small number of minor errors can be tolerated as long as they do not cast doubt on your understanding of the concept, or cause the work to fail to meet the expectations of the assignment, or cause the work to be incomplete or poorly communicated. However, large numbers of minor errors, or a single instance of a major error, will result in the work being marked "R" or lower.

But note that it is possible to earn an E or M grade on an assignment even if you have a few errors in it. **That is, "passing" does not mean "perfect"!** An Acceptable ("passing") grade (E or M) means that your work has demonstrated understanding of the concept, has met the expectations for the assignment, and it is complete and well-communicated.

Note that with the exception of the tests and your final peer score, none of the work in this class is assessed using points. **Your progress towards a grade in the course is determined by the number of assignments you choose to complete, the quantity of passing marks you earn on those assignments and the number of E and M grades you receive on assignments marked with the EMRN rubric.**

For a D: The work required to earn this grade reflects minimal mastery of most of the course outcomes; it indicates that you have a basic understanding of some course content, adequate teamwork skills and some experience in self-regulated learning. The specific requirements are:

Content Mastery:

1. Earn a minimum weighted average score of **60%** on iRATs (lowest iRAT score is dropped), the midterm and the final test.
2. Successfully complete 2 out of 6 individual lab assignments to an Acceptable level.

Collaborative Learning:

1. Earn a final peer score of 0.75 or higher, and a minimum average score of 75% on tRATs.
2. Successfully complete all three *Peer Feedback Surveys*.
3. Successfully complete the *Team Review Lab* assignments and the *Capstone Team Assignment*, as well as other in-class and in-lab team assignments.

Self-Regulated Learning Skills:

1. Successfully complete *Course Goals Reflections #1 and #2* to an Acceptable level.
2. Successfully complete 4/8 Class Preparation Questions.

For a C: The work required to earn this grade reflects satisfactory mastery of the course outcomes: it builds upon the requirements for a D to help ensure that you have a solid understanding of course content, satisfactory teamwork skills and have gained more practice in communication of scientific concepts. In addition, completion of reflections assignments will help you reflect on both the course material and how you learn it. The specific requirements are:

Content Mastery:

1. Earn a weighted average score of **70%** on iRATs (lowest iRAT score is dropped), the midterm and the final test.
2. Successfully complete 3 out of 6 individual lab assignments to an Acceptable level.

Collaborative Learning:

1. Earn a final peer score of 0.80 or higher, and a minimum average score of 80% on tRATs.
2. Successfully complete all three *Peer Feedback Surveys*.
3. Successfully complete the *Team Review Lab* assignments and the *Capstone Team Assignment*, as well as other in-class and in-lab team assignments.

Scientific Communication: Complete **1 out of 3 Core Concept Explanations** to an Acceptable level as defined by the rubric.

Self-Regulated Learning Skills:

1. Successfully complete all three *Course Goals Reflections* to an Acceptable level.
2. Successfully complete 5/8 Class Preparation Questions.

For a B: The work required to earn this grade reflects good mastery of the course outcomes: it builds upon the requirements for a C to ensure that you have a good understanding of course content and strong teamwork skills. In addition, completion of additional reflections will help ensure that you reflect on both the course material and the process of learning it, helping you leave the course with a good mastery of both the course material and how you best learn it, so you can pursue the subject matter effectively in the future. The specific requirements are:

Content Mastery:

1. Earn a minimum average score of **75%** on iRATs (lowest iRAT score is dropped), the midterm and the final test. The relative weights of the iRATs, the midterm and the final test are 5 points, 15 points and 10 points, respectively.
2. Successfully complete 4 out of 6 individual lab assignments to an Acceptable level.

Collaborative Learning:

1. Earn a final peer score of 0.90 or higher, and a minimum average score of 85% on tRATs.
2. Successfully complete all three *Peer Feedback Surveys*.
3. Successfully complete the *Team Review Lab* assignments and the *Capstone Assignment*, as well as other in-class and in-lab team assignments.

Science Communication:

1. Successfully complete **2 out of 3 Core Concept Explanations** to an Acceptable level.
2. Successfully complete the *Proposal* for the *Final Project* to an Acceptable level.

Self-Regulated Learning Skills:

1. Successfully complete all three Course Goals Reflections to an Acceptable level.
2. Successfully complete 6/8 Class Preparation Questions.

For an A: The work required to earn this grade builds upon the requirement for a B to help ensure that you have not only mastered the course material but also that you can apply it, research additional related material, synthesize it to address an authentic need, and reflect on the process you underwent to produce the product.

Content Mastery:

1. Earn a minimum average score of **85%** on iRATs (lowest iRAT score is dropped), the midterm and the final test. The relative weights of the iRATs, the midterm and the final test are 5 points, 15 points and 10 points, respectively.
2. Successfully complete 5 out of 6 individual lab assignments to an Acceptable level, earning an Exemplary designation on at least three.
3. Successfully complete 1 out of 2 Lab Handbooks to an Acceptable level.

Collaborative Learning:

1. Earn a final peer score of 0.95 or higher, and a minimum average score of 90% on tRATs.
2. Successfully complete all three *Peer Feedback Surveys*.
3. Successfully complete the *Team Review Lab* assignments and the *Capstone Assignment*, as well as other in-class and in-lab team assignments.

Science Communication:

1. Successfully complete **2 out of 3 Core Concept Explanations** to an Acceptable level, earning an **Excellent** grade on at least one.
2. Successfully complete *all* components of the *Final Project* **and** complete the required Reflections on the process of completing this project to an Acceptable level. If you successfully complete the Proposal and both Reflections to an Acceptable level but neither the draft nor the final project earn an acceptable score, the highest grade possible is a **B⁺**.

Self-Regulated Learning:

1. Successfully complete all three *Course Goals Reflections* to an Acceptable level
2. Successfully complete 7/8 Class Preparation Questions.

See also the table on p. 7 that summarizes the requirements for each letter grade.

** Students who *exceed all* expectations *for a given* letter grade will earn the “+”-letter grade. For example, a student aiming to complete the “B” letter grade requirements who completes 3 out of 3 Core Concept Explanations to an acceptable standard (rather than 2/3), 5 out of 6 Lab Assignments to an acceptable standard (rather than 4/6), submits 7/8 Class Preparation Questions (rather than 6/8) *and* who meets all other requirements for a B grade will earn a B+ letter grade. Students can also earn the “+”-letter grade by earning E grades rather than M grades on at least one Individual Lab Assignment and on Course Goal Reflections (and on the Final Project for the A grade, as indicated in the table on p. 7), as well as meeting all other requirements for a grade.

**To earn an A+, students must exceed *all* expectations for the A grade description (i.e., earn more than an average of 90% on iRATs and tests, earn a peer score greater than 0.90, complete 3/3 Core Concept Explanations, 6/6 Lab Assignments, 8/8 Class Preparation Mini-Assessments, all components of the Final Project, 2/2 Lab Handbooks, *and* all other requirements for an A grade, including earning an Excellent mark on both the Final Project and Final Project Reflection, as indicated in the table below.

** Students who do not successfully complete **one (and only one)** of the specifications for the **Individual Lab Assignments, Core Concept Assignments, Reflections or Class Preparation Questions** required for a given letter grade will earn the “-“-letter designation. This excludes:

- the Final Project, all components of which must be completed for the A grade
- the two tests,
- the Team Lab Review Assignments and Team Capstone Assignment, which must all be completed

For example, a student aiming to complete the “B” letter grade requirements, who completes only 3 individual lab assignments to an acceptable standard (rather than 4 out of 6) **or** who does not successfully complete the Final Project Proposal will earn a B- letter grade. Students not successfully completing **more than one** of the requirements for a letter grade will be assessed as **not having met the requirements for that grade** and will drop to the next lower letter grade.

** Note that a grade of F will result if students do not successfully meet **all** of the requirements for a D grade.

** Students will be given **four ‘free passes’** that can be used to re-submit any written assignments (Reflection or Summary Assignment) to get the work to an “acceptable” standard. The free pass and re-submitted assignment must be submitted **within one week (7 days) of the graded assignment being returned or mark being posted**. There is only one re-submission per free pass and the free pass must be completed and attached to the re-submitted assignment. Re-submitted material must also be accompanied by the original graded assignment and a brief reflection (approximately one paragraph) describing how the student has revised their assignment in response to that feedback. A free pass can also be used to submit an assignment **other than a lab assignment or Class Preparation Question** within 7 days of the due date listed on the course schedule (pp. 10-12 of this syllabus). Free passes are **not** transferable to other students. **

Summary table of requirements for each learning outcome for each letter grade						
Outcome	Assessed by:	Requirements for each letter grade				
		D	C	B	A	
Content Mastery	Minimum average score on iRATs, midterm and final test (average score = total iRAT score/10 + midterm exam score/20 + final test score/20 for a total score/40, which is then converted to %. For the midterm and final tests, the individual component is out of 18 and the team component is out of 2).	60%	70%	75%	85% (A+ = 90%)	
	Individual Lab Assignments	2/6	3/6	4/6	5/6	
	Lab Handbooks	X	X	X	1/2	
Collaborative learning	Minimum average score on tRATs (Note that your tRAT score is modified by your peer score on the final Peer Feedback Survey. Your peer score, which is your average score on five competencies divided by the average score for your teammates, is used as the multiplier to determine your final tRAT score).	75%	80%	85%	90%	
	In-class Team Assignments (Team Review Lab Assignments & Capstone Assignment must be successfully completed to earn completion for this component)	✓	✓	✓	✓	
	Lab Team Assignments	✓	✓	✓	✓	
	Peer Feedback Surveys: completion of three surveys, one in-class at end of September and two on-line via ITP Metrics (at mid-semester and end of term).	✓ Final peer score ≥ 0.75	✓ Final peer score ≥ 0.80	✓ Final peer score ≥ 0.90	✓ Final peer score ≥ 0.95	
	'Core Concept Explanations	X	1/3	2/3	2/3 and earn E score on at least 1	
Scientific Communication	Final Project Proposal	X	X	✓	✓	
	Draft of Final Project & Reflection on Project Draft	X	X	X	✓	
	Final Project & Reflection on Final Project	X	X	X	✓ (A+ requires E score on both)	
	Course Goals Reflections (at beginning, mid-semester and end of course)	2/3 (Beginning and mid-semester)	3/3	3/3	3/3	
Self-regulated learning	Class preparation questions	4/8	5/8	6/8	7/8	

4. Missed Components of Term Work: The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is a student's responsibility to familiarize herself/himself with these regulations. See also [Section E.6](#) of the University Calendar

5. Scheduled out-of-class activities: There are no out-of-class activities for this course; tests will be held during your regular lab time.
REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.

6. Course Materials: There is no required textbook for this course; links to relevant and/or assigned readings will be provided on D2L.

Online Course Components: Some teamwork resources are provided by ITP Metrics, a University of Calgary-based system of secure web-based tools for forming teams and doing peer evaluations. These tools are free to all students and are not dependent on prior access.

7. **Examination Policy:** Students should read the Calendar, [Section G](#), on Examinations.
8. **Writing across the curriculum statement:** In this course, the quality of the student's writing on assignments will be a factor in the evaluation of those papers. See also [Section E.2](#) of the University Calendar.
9. **Human studies statement:** Students in the course are not expected to participate as subjects or researchers. See also [Section E.5](#) of the University Calendar. See also <http://www.ucalgary.ca/pubs/calendar/current/e-5.html>.
10. **Use of living and dead organisms:** Students will not be expected to handle organisms during this course.

11. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero-tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties.
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.
- (c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf.

Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Biological Sciences, Dr. H. Addy by email addy@ucalgary.ca or phone 403 220-3140.

- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>
- (f) **Student Union Information:** VP Academic Phone: 403 220-3911 Email: suvpaca@ucalgary.ca SU Faculty Rep. Phone: 403 220-3913 Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca;
- (g) Student Ombuds Office: 403 220-6420 Email: ombuds@ucalgary.ca; <http://ucalgary.ca/provost/students/ombuds>**Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed during class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

Department Approval _____ **ORIGINAL SIGNED** _____ Date _____ August 31, 2018 _____

Department Approval for
NO FINAL EXAM _____ **ORIGINAL SIGNED** _____ Date _____ August 31, 2018 _____

UNIVERSITY OF CALGARY—DEPARTMENT OF BIOLOGICAL SCIENCES
BIOLOGY 435—BIOLOGY OF FUNGI
COURSE SYLLABUS FALL 2018

Course Personnel

Instructor:

Dr. Heather Addy EEEL 235C 403-220-8963 addy@ucalgary.ca

Office Hours: Weds. 10-11 am but I am also available at other times of the week for individual or team assistance – please just email or phone me to arrange a time to meet.

Lab technician: Ms. Fran Cusack EEEL 301B

TAs: Mr. Nic Fournier and Mr. Neil Hickerson: contact information provided in first lab and on D2L

Overview of the course:

Most people don't know much about fungi, even though fungi play very important roles in our lives and in the world around us. If we think about fungi at all, it's usually in their role as decomposers. But there is so much more to these fascinating organisms: their symbiotic associations with plants and animals, their roles as sources of foods and medicines, and the promise they hold in bioremediation and even as building materials. There's the darker side of fungi too: many of them are pathogens and some cause serious diseases in humans and other animals, such as the “white-nose syndrome” that is decimating bat populations around the world. In this course, we will explore these and other topics as we discuss the diversity of fungi, their physiology, ecology, and interactions with other organisms, including humans. In the labs, you will have an opportunity to observe the diversity of fungi, learn the fundamentals of fungal identification, and investigate their ecological and economic roles.

Responsibilities and Expectations:

My philosophy of teaching is that it is my responsibility to create and maintain the conditions that support your learning. Feedback from students is very important to me so that I will know whether such conditions exist, how well the course is going and where problems are arising. In addition to a midterm and end-of-term course evaluation, I will also be meeting weekly with *class representatives*, students who volunteer to discuss all aspects of the course with me and raise any concerns communicated to them by other students. I use a team-based learning approach in this class to provide you the opportunity to develop and strengthen skills in working as part of a team. This approach has also been demonstrated to promote learning by giving students numerous opportunities to discuss course concepts with other students and the instructor, and to practice applying course concepts to answer questions and solve problems. As another source of support, we will also have peer mentors in this course. The peer mentors are students who have taken this course previously and done well in it; they will attend classes and provide guidance and help as your team works on assignments. You will meet the peer mentors in our first class.

To make our time together as effective as possible, it is important that the lecture learning environment is one of mutual respect. I will do whatever I can to create and maintain that environment; **my expectations of student conduct** are outlined below:

- **Everyone has the right to learn as well as the responsibility to not deprive others of their right to learn.** Actions such as talking during instruction/lecturing, or using laptops and other electronic devices for non-class activities can be very distracting and affect others' learning. Please monitor your own behaviour during classes and restrict your use of laptops and other electronic devices to only those activities directly related to class to ensure that you do not distract others.
- **Please arrive at class on time.** Late arrivals and early departures can be disruptive and can result in you missing important information. I understand that there are special circumstances when you may have to arrive late or leave early; please make your arrival/departure as unobtrusive as possible and be sure to let your teammates know about your situation in advance of class.
- Please let me know right away if you are dealing with a problem or situation that is preventing you from performing at the level you want to be at in this class.
- Please treat your classmates, peer mentors and me with respect. There may be times when you are frustrated with something that is going on in the course and find it difficult to be patient. However, to maintain a respectful and constructive environment in this class, I ask that you are respectful of others in your words and actions.

What you can expect from me: we will do this section together in our first class!

Academic Integrity:

Each student in this course is expected to abide by the University of Calgary Code of Academic Conduct. You are encouraged to study together and to discuss information and concepts covered in class and assigned readings with other students, but all individual work that you submit in this course for academic credit must be your own work. In the case of team assignments, all members of the team are responsible for the honesty and integrity of the document.

Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. All work submitted for this class (whether as a draft or for final grading) is held to the strictest standards for intellectual honesty. A single offence may lead to a grade of zero for the assignment involved, disciplinary probation, suspension or expulsion. The Faculty of Science follows a zero-tolerance policy regarding dishonesty. In addition to reading the sections of the University Calendar under "Student Misconduct", I will assume that you have read and understand the information posted on the Dept. of Biological Sciences' webpage dealing with academic honesty: <https://www.bio.ucalgary.ca/undergrad/academichonesty.html>. In particular, be sure that you understand what constitutes plagiarism—test yourself by taking the on-line quiz.

Team-Based Learning:

In this class, we will be using a Team-Based Learning (TBL) approach, in which you will spend many classes working in teams applying what you've learned from the assigned readings. Teams in TBL are different than the kind of group work you may have done in other classes: I form the teams (as described below) that work together throughout the term and that also evaluate each other's contributions to the team throughout the term. Before your team tackles an assignment, TBL uses short tests to make sure you've got the basics from the required readings. They're not ordinary tests, though: you take the tests both individually and as a team, and you get immediate feedback, so the tests function as learning tools. I will do some lecturing but a lot of our class time will be spent on applying what we've learned. Here are the basics:

1. Prior to the first class, I will send you a link to a web-based tool (ITP Metrics) that we will use to form the teams and to do peer assessments during the term. It is important that the teams as diverse as possible, so you will be asked to answer some survey questions about your background, your major/year, problem-solving styles and other factors that will help us form successful teams. You will meet your teammates in the first class.
2. For each major unit in the course, you will be assigned some readings and/or videos; I prepare a reading guide for all assigned readings/videos to help you focus on the most important points in the assigned readings. At the beginning of the unit, you will individually take a short (~10-15 questions) multiple-choice test called an "Individual Readiness Assessment Test" (iRAT) to see how well you've understood the concepts in the assigned reading. I will drop your lowest iRAT score for the term. iRATs missed without a valid excuse (medical or family emergency) will be awarded a mark of zero. Missed RATs may not be written at a later time.
3. Right after taking the iRAT, you will take the same test with your team. This is called a "Team Readiness Assessment Test" (tRAT). For the group test, you'll use a special "scratch-off" answer sheet that immediately tells you whether you have the correct answer for full marks. If your team doesn't choose the correct answer on the first try, you make a second choice for partial credit. If it takes you three tries to get the correct answer, you again earn partial credit for the item. As for the IRATs, quizzes missed without a valid excuse will be awarded a mark of zero; missed RATs may not be written at a later time.
4. When you've finished the tRAT, your team provides written feedback as to which concepts are still unclear or for which you would like more information.
5. I'll use the individual and team scores as well as the written feedback to determine what material needs to be discussed and clarified, which is what will happen in the next class meeting. I'll also incorporate any supplemental information that you'll need to complete the in-class team assignments that involve application of what you learned in the readings.
6. The final aspect of a module will be the Team Application Activities. These application activities are the most critical part of the course because they will involve real problems and applications of the material that I expect you to be able to do by the end of the module/course. During these activities, you will work with your teammates to bring all you've learned in the module together to solve a problem. One of my goals for you in this course is that you should be able to do something with the material you learn. These activities should help you achieve this and also allow you to see how I will examine your ability to apply the material on the tests, as these assignments are often sample test questions. All the teams will be working on the same problem and I will likely be asking teams to defend their answers in a class discussion.
7. At least three times during the semester, you will complete confidential assessments of how well your team is working together, so that any issues can be dealt with promptly. If you are having issues in your team, please don't hesitate to talk to me, the TAs or the Peer Mentors. Little problems can turn into big problems if not addressed. We are happy to facilitate a discussion with your team to help resolve issues.
8. The team nature of this class requires you to be in class and to do your part as a member of your Team. RATs and tests missed without a valid excuse (medical or family emergency) will be awarded a mark of zero. Missed RATs may not be written at a later time. The nature of team assignments is such that you can't do them individually, so you can't make them up. If you miss an in-

class quiz, test or assignment for medical reasons, the only documentation that will be accepted in BIOL 435 is a completed Physician/Counsellor Statement form (<https://www.ucalgary.ca/registrar/files/registrar/physcoun.pdf>), signed by your physician, provided to me within 48 hours from the date that you missed the class/quiz/test. The form can be downloaded from:

Specifications Grading

As you noted from reading the first part of this syllabus, assignments in this course are graded using a pass/fail scheme (i.e. there is no partial credit for assignments). The rationale for this approach to grading comes from research into adult learning: adults learn best when they have a flexible but challenging learning environment and when they have some choice in their learning experience. In this course, we will create a positive and challenging learning environment, in which we will uphold high expectations for work, with opportunities to revise work that does not yet meet expectations along with feedback and support from me, your teammates and the Peer Mentors to achieve your best work. The specifications or requirements for a pass on each assignment are clearly stated in the rubrics for each assignment and you will have examples of work that does and does not meet the specifications.

This course provides you choice in your learning experience both in terms of the topics for some of the assignments as well as which assignments to complete. While there are some tests in the course, there are no traditional midterms or final exams; instead, there are a variety of assignments from which you can choose how much to do in order to meet the requirements for the grade you plan to earn. We will talk more about specifications grading in the first two classes of the term, and you will have the chance to ask any questions or discuss any concerns then.

Lecture, Lab and Assignment schedule BIOL 435 Fall 2018

Note that the RAT dates may be moved back (i.e. to a later date), if we need additional time at the end of the previous unit to clarify any concepts. Any changes to RAT dates or assignment due dates will be announced in class and posted as an announcement on D2L.

*Assignments are described earlier in the syllabus; further information and rubrics provided on D2L.

Unit	Date	Topic	Assignments due*
Introduction to course	F Sept 7	Introduction to course and to team-based learning	
	M Sept 10	Introductory RAT	
	W Sept 12	Comparison of animal vs fungal life cycles	<i>Course Goals Reflection #1 due by 11:59 pm on D2L</i>
	T/R Sept 11/13	<i>Lab 1. Team-building activities; science communication. Set up trap cultures for Lab 3</i>	
Unit 1. Evolution & Diversity Part 1: Ancestral fungi and colonization of terrestrial habitats	F Sept. 14	Unit 1 RAT; sample Core Concept Explanation	
	M Sept 17	Clarification lecture & team activities—mycelial growth	
	W Sept 19	Team activities—mycelial differentiation	
	F Sept 21	Clarification lecture & team activities—zygomycetes	<i>Core Concept Explanation #1 due by 11:59 pm on D2L</i>
	T/R Sept 18/20	<i>Lab 2. Fungal growth forms.</i>	<i>Individual lab assignments due at end of lab.</i>
	M Sept 24	Team activities—summary of Unit 1	Team Feedback Survey (in-class)
	T/R Sept 25/27	<i>Lab 3. Fungal Diversity Part 1: Chytridiomycota & zygomycetes</i>	<i>Individual lab assignments due at end of lab.</i>
Unit 2. Evolution & Diversity Part 2: Evolutionary trends in mycelial fungi and evolution of the Dikarya	W Sept. 26	Unit 2 RAT	
	F Sept. 28	Clarification lecture & team activities—septa, fruiting bodies and sexual reproduction in Ascomycota	
	M Oct. 1	Team activities—septa, fruiting bodies and sexual reproduction in Basidiomycota	<i>Project Proposal due at 3 pm</i>
	W Oct 3	Team activities—asexual reproduction in Dikarya	
	F Oct 5	Clarification lecture & team activities—rusts	
	T/R Oct 2/4	<i>Lab 4. Fungal Diversity Part 2: Dikarya</i>	<i>Individual lab assignments due at end of lab</i>
	M Oct 8	Thanksgiving—no class	
	W Oct 10	Team activities—evolutionary trends	
	F Oct 12	Team activities—summary of Unit 2	Mid-semester peer evaluation survey opens
	T/R Oct 9/11	<i>Lab 5. Fungal Diversity Part 3: Dikarya continued</i>	<i>Core Concept Explanation #2 due on D2L by 9 am on Oct. 9. Individual lab assignments due at end of lab.</i>

Unit	Date	Topic	Assignments due*
Unit 3. Fungal growth, nutrition & metabolism	M Oct 15	Unit 3 RAT	
	W Oct 17	Clarification lecture & team activities—hyphal structure and growth	
	F Oct 19	Team activities—nutrient uptake & enzymes	Mid-semester peer evaluation survey closes
	T/R Oct 16/18	<i>Review lab. Teams complete review activity</i>	<i>Team Review lab activity due at end of lab</i>
	M Oct 22	In-class review for lab & lecture test	
	W Oct 24	Team activities—secondary metabolism	
	F Oct 26	Clarification lecture & team activities—wood decay	
	T/R Oct 23/25	Lab & Lecture Test (on Introduction to Fungi, Units 1 & 2, including Labs 2-5)	Lab Handbook #1 due at start of lab
	M Oct 29	Team activities—wood decay	
	W Oct. 31	Team activities—summary of Unit 3	
Unit 4. Fungi as symbionts with phototrophs: lichens	F Nov 2	Unit 4 RAT Clarification lecture & team activities—lichen structure/function	
	T/R Oct 30/Nov 1	<i>No labs—time to work on Project drafts and Course Reflection #2</i>	
	M Nov 5	Team activities—lichen nutrition	Draft Final Project due at 11:59 pm on D2L
	W Nov 7	Team activities—lichen secondary metabolites	Course Goals Reflection #2 due at 11:59 pm on D2L
	F Nov 9	Team activities—lichen secondary metabolites	
	T/R Nov. 7/9	<i>Lab 6. Fungal Nutrition Part 1: keratin-degrading fungi and wood-decay fungi. Set up wood decay investigation</i>	<i>Individual lab assignments due at end of lab.</i>
	Nov 12-16	Reading Days—no classes	
	M Nov 19	Team activities—lichen symbiosis	Core Concept Explanation #3 due at 11:59 pm on D2L
	W Nov 21	Team activities—summary of Unit 4	
	T/R Nov 20/22	<i>Lab 7. Fungal Nutrition Part 2: Lichens and continuation of wood decay investigation</i>	<i>Individual lab assignments due at end of lab.</i>
Unit 5. Fungi as symbionts with heterotrophs: fungal pathogens and medical mycology	F Nov 23	Unit 5 RAT	
	M Nov 26	Clarification lecture & team activities—dermatophytes	
	W Nov 28	Team activities—primary pathogens	
	F Nov 30	Team activities—opportunistic pathogens	Project due at 11:59 pm on D2L
	T/R Nov 27/29	<i>Lab 8. Fungal Nutrition Part 3: Fungi in food production; complete wood decay investigation. Review material</i>	<i>Individual lab assignments due at end of lab.</i> <i>Team Review lab activity due at end of lab</i>
	M Dec 3	Threat of fungal pathogens	
	W Dec 5	Capstone Team Assignment	
	F Dec 7	Gallery walk for Capstone Team Assignments; course summary	Course Goals Reflection #3 due at 11:59 pm on D2L. Final peer evaluation survey opens (closes Dec. 17)