

**Faculty of Science Course Syllabus
Department of Biology
BIOL 3102 [10311 (10312-3)]
Microbial Eukaryotes: Biodiversity and Evolution
Fall 2021**

Instructor(s): Alastair Simpson alastair.simpson@dal.ca email to arrange in-person, or a virtual meeting via Zoom, Teams, Collaborate Ultra or Phone
Preferred times are Monday & Wednesday 12-4pm

Lectures: Mondays, Wednesdays: 10:35 - 11:25 am Common Area, Room C334
Fridays: 10:35 am - 12:25 pm James Dunn Building, Room 304
(unless superseded by a lab exercise or test)

NOTE: FRIDAY LECTURES ARE IN A DIFFERENT BUILDING & ROOM THAN MONDAY/WEDNESDAY LECTURES!

Laboratories: 5 lab exercises; certain Fridays (see calendar): 10:35 am - 12:25 pm OR 12:35 – 2:25 pm

Tutorials: None

Course delivery: In-person; Lectures will not normally be recorded.
(In the event that in-person instruction is suspended, lectures expected to be synchronous-virtual, with recordings)

Course Description

Microbial eukaryotes are of tremendous ecological, evolutionary and medical/veterinary importance. This course provides a comprehensive understanding of the biodiversity and evolution of both algal and protozoan eukaryotes, and examines important aspects of their organismal biology, including cell and genome organization, life histories, trophic strategies, locomotion and symbiosis.

Course Prerequisites

BIOL 2020.03 (or BIOA 2001.03) and BIOL 2004.03 (or MICI 2100.03)

Course Exclusions

None

Course Objectives/Learning Outcomes

- Describe the basic biology of the most important major groups of microbial eukaryotes.
- Describe the nature and role of the cytoskeleton in microbial eukaryotes (esp. flagellar apparatus, including replication)
- Explain the composition and synthesis of several important types of mineralised scales and tests of microbial eukaryotes
- Explain, and contrast the cellular basis and relevant hydrodynamic considerations for major forms of i) swimming, ii) gliding and iii) amoeboid locomotion by microbial eukaryotes.
- Describe and contrast major feeding modes for phagotrophic microbial eukaryotes.
- Understand the functions of major structures/life history stages often represented specifically in microbial eukaryotes (e.g. extrusomes, cysts)
- Describe the functions of major types of mitochondrion-related organelles in anaerobic eukaryotes.
- Contrast primary, secondary and tertiary plastid endosymbiosis, including the evolutionary pattern of occurrence, and protein targeting.
- Describe the basic evolutionary tree, and early evolutionary history, of eukaryotes; further, show understanding of major unresolved questions in eukaryote evolution.

Course Materials

The material for the course is that which is covered in the lectures and lab exercises. There is no single textbook or course pack for this course. The following resources will be made available instead:

- 1)** The lecture slides will be made available online **after** each lecture, **in edited form** (i.e. you should take notes during lectures themselves).
- 2)** There will be supplementary notes for most (but not all) of the lectures, especially in Parts 1 and 2 (see **course content**, below). These will be made available online in .pdf format before the relevant part or subsection of the course.
- 3)** There will be a small number of short readings (e.g. review papers) that you will be expected to read during the course. These will be provided in class or online prior to the relevant lecture.
- 4)** Handout/worksheets for each **lab exercise** (see above) will be provided as paper copies, free of charge. They will also be archived online.
- 5)** The “Handbook of the Protists” edited by Archibald, Simpson and Slamovits (2017) is available from the Dalhousie Libraries as an e-book. It is an *optional* resource, especially for Part 1 of the course.

The course Brightspace site (<https://dal.brightspace.com/d2l/home/185062>) will be the primary management tool for the course. All the course materials listed above, except (5), will be housed on the course Brightspace site.

Course Assessment

Component	Weight (% of final grade)	Date/Time
Tests/quizzes		
Test 1	18%	4 Oct 2021; 10:35 am - 11:25 pm (50 min)
Test 2	28%	19 Nov 2021; 10:35 am - 12:25 pm (110 min)
Test 3	14%	7 Dec 2021; 10:35 am - 11:25 pm (50 min) <i>(but see top of next page)</i>
Quizzes (best 6 of 9)	15% total	In class most Mondays 10:35 am (see Calendar) <i>(but see next page)</i>
Assignments		
Lab exercise reports (5)	25% total	With each Lab, due 1 week later (see Calendar)

Other course requirements

There are no other course requirements in addition to the assessment components above

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (<50)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies on Missed or Late Academic Requirements

Late Assignments: The due dates for lab assignments will normally be the Friday following lab, unless otherwise posted on the lab worksheet. Late assignments will be penalised 0.5 marks (typically out of 5) for every part or whole week late, *and* any commitments made by the instructor to return the marked assignment by a certain date (e.g. prior to a test) will not apply.

Missed Test (Tests 1 and 2): For Tests 1 and 2, the policy for rescheduling a missed test, or not, will be as follows:

A student requesting an alternative time shall be granted that request only in exceptional circumstances. Such circumstances include illness (with student declaration of absence – SDA, or medical certificate) or other mitigating circumstances outside the control of the student. Varsity sport is an example of a legitimate circumstance, providing reasonable prior warning (a week or more) is given to the instructor. Elective arrangements, such as travel plans, are not considered acceptable grounds for granting an alternative examination time. Using an SDA twice or more during the course will be referred to the Assistant Dean for Student Affairs to ensure your wellbeing.

Missed Test (Test 3): For Test 3, there will be a rescheduled test automatically available for anyone who does not take Test 3 at the scheduled time. SDAs or similar documentation will **not** be required. The time and date will be announced closer to the end of semester.

Missed Quizzes: 'Quizzes' cannot be taken after the original date due to absence. Please note, however, that only your 6 best quiz marks will count to your final grade, so up to 3 quizzes can be missed without reducing your maximum possible mark for the course. *Alternative quizzes will be made available on Brightspace on the same day for students who are absent from in-person class due to COVID exposure concerns or requirements; these will be different from the in-person quizzes, but have a similar time limit.*

Cancelled classes: If a lecture is cancelled due to weather etc. it will normally be given in the next available lecture slot. The remaining lecture schedule will be adjusted as needed.

In the event that a lab has to be cancelled, we will similarly attempt to shift the lab schedule (including adding an extra Friday to the lab schedule), which likely will involve also changing the lecture schedule. If it is impossible to reschedule a lab, the other lab assignments will be evenly reweighted such that the total lab mark remains as 25% of the total course mark.

Policy on Collaboration: This policy is relevant for the completion of the lab reports. Some of the actual laboratory work is inherently collaborative (examples; students working in small groups to prepare material; the entire class making similar measurements, then sharing them to generate larger datasets). However, unless explicitly stated otherwise in the worksheet, all components of all lab reports are to be done individually, and will be marked as the individual work of the student submitting the report.

Plagiarism software will not be used in this class.

Summary of COVID recommendations and contingency plans

All students are required to comply with health and safety requirements on campus, and should be considerate of others' health concerns. Non-compliance may be reported under the Code of Student Conduct.

Dalhousie University has made COVID vaccinations mandatory, unless you commit to twice per week rapid testing. Please, if you are able, get both doses of your vaccinations done as soon as possible.

Dalhousie University is asking everyone at Dalhousie to continue to wear masks in all indoor common spaces until at least September 30. A general recommendation for their use may persist after this.

Should we have to move away from in-person learning, either temporarily or for an extended period, I intend to continue with the course in a synchronous online format, with lectures given in Collaborate Ultra (via Brightspace). Outstanding labs will be replaced by synchronous virtual exercises (based on virtual labs we ran in 2020). If necessary, in-person tests and quizzes would be replaced by on-line tests administered through Brightspace.

Calendar

	Date	Day	Time	Activity	Quiz
Sept	8	Wed	10:35-11:25	Lecture 1: Orientation, Introduction	
	10	Fri	10:35-12:25	Lecture 2: Archaeplastida, 'Minor' algae	(practice)
	13	Mon	10:35-11:25	Lecture 3: Stramenopiles 1	***
	15	Wed	10:35-11:25	Lecture 4: Stramenopiles 2	
	17	Fri	10:35-12:25	Lecture 5: Alveolates 1	
	20	Mon	10:35-11:25	Lecture 6: Alveolates 2	***
	22	Wed	10:35-11:25	Lecture 7: Rhizaria	
	24	Fri	10:35-12:25	LAB EXERCISE 1	
	27	Mon	10:35-11:25	Lecture 8: Amoebozoa	***
	29	Wed	10:35-11:25	Lecture 9: Opisthokonts	
Oct	1	Fri	10:35-12:25	Lecture 10: 'Excavates', Misc. Groups	
	4	Mon	10:35-11:25	TEST 1	
	6	Wed	10:35-11:25	Lecture 11: Form 1	
	8	Fri	10:35-12:25	LAB EXERCISE 2	
	11	Mon	<i>Dal closed</i>	<i>None - Thanksgiving</i>	
	13	Wed	10:35-11:25	Lecture 12: Form 2	
	15	Fri	10:35-12:25	Lecture 13: Form 3	
	18	Mon	10:35-11:25	Lecture 14: Motility 1	***
	20	Wed	10:35-11:25	Lecture 15: Motility 2	
	22	Fri	10:35-12:25	LAB EXERCISE 3	
	25	Mon	10:35-11:25	Lecture 16: Motility 3	***
	27	Wed	10:35-11:25	Lecture 17: Motility 4	
	29	Fri	10:35-12:25	Lecture 18: TBA	
	Nov	1	Mon	10:35-11:25	Lecture 19: Cysts; Contractile Vacuoles
3		Wed	10:35-11:25	Lecture 20: Extrusomes	
5		Fri	10:35-12:25	LAB EXERCISE 4	
8..12		M-F	<i>Study break</i>	<i>None</i>	
15		Mon	10:35-11:25	Lecture 21: Feeding/Nutrition 1	***
17		Wed	10:35-11:25	Lecture 22: Feeding/Nutrition 2	
19		Fri	10:35-12:25	TEST 2	
22	Mon	10:35-11:25	Lecture 23: Intro. to protist evolution		
24	Wed	10:35-11:25	Lecture 24: Protist origins +fossils		
26	Fri	10:35-12:25	LAB EXERCISE 5		
Dec	29	Mon	10:35-11:25	Lecture 25: Mitochondrion 1	***
	1	Wed	10:35-11:25	Lecture 26: Mitochondrion 2	
	3	Fri	10:35-12:25	Lecture 27: Plastids	
	6	Mon	10:35-11:25	Lecture 28: Special topics 1	***
	7	Tues	10:35-11:25	TEST 3	

Fall 2021

BIOL 3102
Microbial Eukaryotes: Biodiversity and Evolution

University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

Statement: <http://www.dal.ca/cultureofrespect.html>

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: <https://dsu.ca/dsas>

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Safety

Biosafety: <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

Dalhousie COVID-19 information and updates: <https://www.dal.ca/covid-19-information-and-updates.html>