BOT*2100 Life Strategies of Plants

Winter 2021
Section(s): C01

Department of Molecular and Cellular Biology
Credit Weight: 0.50
Version 1.00 - January 19, 2021

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1 Course Details

1.1 Calendar Description

This course introduces the structures and processes used by plants in the greening of our planet, and how and why plants are basic to the functioning of the biosphere. This course includes hands-on experience in examining the cells, tissues and architectures of plants as well as selected processes of plant function.

Pre-Requisites: 2 of BIOL*1050, BIOL*1070, BIOL*1080, BIOL*1090

1.2 Course Description

This course introduces the structures and processes used by plants in the greening of our planet, and how and why plants are basic to the functioning of the biosphere. This course includes hands-on experience in examining the cells, tissues and architectures of plants as well as selected processes of plant function.

1.3 Timetable

Lectures: 10:00-11:20 Tuesday & Thursday, **To be conducted via Microsoft TEAMS or Zoom**

Look through the posted lectures **ahead** of time to get the most out of this course. You can print out the notes on Courselink and bring them to class. Any questions that you have pertaining to the lecture material can be answered during that time.

Labs: The laboratory component will be conducted through **Microsoft TEAMS** and alternatively via courselink virtual classroom. Contact Chris Meyer for more details (cmeyer02@uoguelph.ca).

Make sure that you read the pertinent lab exercises **ahead** of time. Consider any questions posed in each exercise; they can help you in completing the LAB REPORTS.

You are welcome to ask any questions during lectures, the laboratories or at any other times.

We welcome contact via email and are happy to set up office meetings.

1.4 Final Exam

Mid-Term Exam: February 23, during class time \10:00AM (via courselink respondus lockdown browser)

Final Exam: 24th April, 7.00 - 9.00 p.m. (via courselink respondus lockdown browser)

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

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2 Instructional Support

2.1 Instructional Support Team

Instructor:	Michael Emes
Email:	memes@uoguelph.ca
Telephone:	+1-519-824-4120 Ext 58905
Office:	SSC 4448
Office Hours:	Dr. Emes is a plant biochemist who earned his B.Sc. and Ph.D. from the University of Sheffield in the UK. His research focuses on starch biosynthesis and the relationship to yield and productivity in model plants and crops. He served as Dean of CBS from 2002-2015. Further information available at https://www.uoguelph.ca/mcb/people/dr-michael-j-emes.
Instructor:	Jaideep Mathur
Email:	jmathur@uoguelph.ca
Telephone:	+1-519-824-4120 x56636
Office:	SC1 4463
Office Hours:	Dr. Mathur is a plant biologist who has worked on plant conservation, on establishing a molecular-genetic basis for the role of Brassinosteroids in plant development and elucidating the role of the cytoskeleton in cell morphogenesis. His present research focuses on understanding plant development and interactions with the environment through the use of cell biological and molecular-genetic tools. More information on https://mathurlab.github.io/<
Lab Co-ordinator:	Chris Meyer
Email:	cmeyer02@uoguelph.ca
Telephone:	+1-519-824-4120 x53955
Office:	SC1 3507

Dr. Chris Meyer obtained B.Sc. and Ph.D. degrees in Plant Biology from the University of Waterloo. He has contributed to research and teaching in the plant sciences at the

Universities of Waterloo, Wilfrid Laurier and Brock. Dr. Meyer continues to explore new approaches in plant science education at Guelph. As the BOT*2100 Lab Coordinator, he manages all aspects of the teaching laboratory. See the Lab Manual for further details.

2.2 Teaching Assistants

Teaching Assistant: Mariel Burnside
Email: mburnsid@uoguelph.ca
Office Hours: -

Teaching Assistant: Mariann Lobbezoo
Email: mlobbezo@uoguelph.ca

Teaching Assistant: Owen Hebb
Email: ohebb@uoguelph.ca

Teaching Assistant: Nicholas Prudhomme
Email: nprudhom@uoguelph.ca

2.3 Teaching Assistants

The TAs are responsible for dealing with your questions and making sure that you understand the procedures. In addition, they will be able to give you help in getting all the exercises to work.

They will grade the LAB REPORTS that are handed in at the end of laboratories (see Grades).

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3 Learning Resources

3.1 Required Resources

Lab Manual (Lab Manual)

BOT*2100 Life Strategies of Plants, C.J. Meyer, Department of Molecular and Cellular Biology, College of Biological Science, University of Guelph, © Winter 2021.

You are responsible for bringing this manual to every laboratory. The charge also covers the cost of your project handout and other additional handouts that you will receive later in the semester.

Courselink (Website)

https://courselink.uoguelph.ca

This course will make use of the University of Guelph's course website (*via* Courselink). Consequently, you are responsible for all information posted on the Courselink page for BOT*2100. Please check it regularly.

3.2 Recommended Resources

Undergraduate Calendar (Website)
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/
The source of information about the University of Guelph's procedures, policies and regulations, which apply to undergraduate programs.

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4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Critically evaluate ideas and arguments by gathering and integrating relevant qualitative and quantitative information, assessing its credibility, and synthesizing evidence to formulate a position.
2. Accurately and effectively communicate ideas, arguments and analyses in graphic, oral and written form.
3. Collaborate effectively as part of a team by demonstrating mutual respect, and an ability to set goals and manage tasks and time lines.
4. Apply scientific methods and processes to generate and interpret scientific data using quantitative, qualitative and analytical methodologies and techniques.
5. Demonstrate knowledge in the molecular and chemical composition of plants and their relationships to structure and function.
6. Demonstrate knowledge in the fundamental vegetative and reproductive attributes of plants.
7. Demonstrate knowledge in the interaction of plants with biotic and abiotic factors.
8. Demonstrate knowledge in plant diversity and genetic variability and their relationship to evolution, speciation and adaptation.
9. Demonstrate the use of modern techniques in plant research.
10. Demonstrate skills to study plants in field or laboratory settings.
11. Interpret the evolutionary history of plants through an examination of phylogenetic trees.

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5 Teaching and Learning Activities

5.1 Course Content

Lectures

Lecture notes will be posted on courselink and then reviewed during the scheduled lecture time via Microsoft TEAMS or Zoom

Lectures are on:

Tuesdays at 10:00 - 11:20 AM

Thursdays at 10:00 - 11:20 AM

The first lecture is on VVVV -January 2021**.** You are most welcome to ask any questions during lectures, the laboratories, or at any other times.

Laboratories

Laboratories will take place via live discussion on Microsoft TEAMS.

Laboratories are on:

Wednesdays at 2:30 – 5:20 PM

Thursdays at 2:30 – 5:20 PM

Live discussions of lab content will be held primarily on Microsoft Teams. (CourseLink Virtual Classroom is available as a secondary/backup video platform.) These discussions are held weekly on **Wednesdays and Thursdays from 2:30-5:20 pm, starting on January 20 and 21.** Plan to attend the live discussions once per week during your regularly scheduled lab section.

Make sure that you read the pertinent lab exercises **ahead** of time. Consider any questions posed in each exercise; they can help you in completing the LAB REPORTS. **Remember that you will be examined on laboratory-based material in the mid-term and final examinations.**

5.2 Important Dates

Jan 12, 2021: First lecture

Feb,23, 2021 : Midterm examination (during scheduled class time)

April 24, 2021: Final examination at 19.00 hrs

5.3 Note

You will require a minimum of 6 hours of **independent study** per week (reading, checking your notes, preparing for the lab) to really get the most out of this course. You will be asked to complete a **Course/Instruction and Teaching Assistant Evaluations** using **Courselink.** The evaluation surveys and comments will be given to the instructors after final grades have been submitted.

5.4 Lectures

Dr. J. Mathur (lectures 1-11 and mid-term)

Dr. M. Emes (lectures 12-22 and final exam)

Week	Date	Topic	Lecture
1	Jan12	Introduction to the course; Evolution of Plants	1
1	Jan 14	Evolution of Plants continued; Life Cycles (seedless plants)	2
2	Jan 19	Classification, Reproductive strategies	3
2	Jan 21	Angiosperm flowers, Flowering genes	4
3	Jan 26	Pollination, Embryogenesis - fruits	5
3	Jan 28	Seeds - Germination & early growth	6
4	Feb 2	Meristems, cells differentiating into tissues	7
4	Feb 4	Cell types and tissues	8
5	Feb 9	Organ types - roots and shoots	9
5	Feb11-	Secondary growth - how plants get bigger. Leaves - structure and function	10

Week	Date	Topic	Lecture
	Feb 15-Feb 19	WINTER BREAK	No Classes
6	**Feb 23**	**Mid-term Examination in class**	11
7	March 2	Photosynthesis - evolution	12
7	March 4	Photosynthesis - mechanism	13
8	March 9	Photosynthesis - Carbon acquisition, C3, C4, CAM metabolism	14
8	March 11	Respiration	15
9	March 16	Inorganic nutrients in soils - N symbiosis	16
9	March 18	The Fungi (including mycorrhizae)	17
10	March 23	Water - potential and uptake	18
10	March 25	Water loss	19
11	March 30	Moving water and sugars around the plant	20

Week	Date	Topic	Lecture
11	April 1	Moving water and sugars around the plant	21
12	April 6	Review	

Final examination April 24, 2021: at 19.00 hrs

Note: Reduced versions of the lecture slides will be available on Courselink – it is suggested that you print them out and bring them with you to the lecture so you can take additional notes.

5.5 Laboratories

Week	Date	Module	Lab Title
1	Jan 20-21	0	Introduction
2-3	Jan 27-28 Feb 3-4	1	Plant evolution 1. Plant phylogeny & life cycles 2. Floral structures & double fertilization

Week	Date	Module	Lab Title
4-7	Feb 10-11 *Feb 17-18* *Study Break* Feb 24-25 Mar 3-4	2	Plant organs: structure and function 1. Seed structure & germination 2. Seedling growth & morphology 3. Meristems 4. Identifying different cell types 5. Root & stem anatomy
8-10	Mar 10-11 Mar 17-18 Mar 24-25	3	Photosynthesis 1. Leaf anatomy 2. Epidermis & stomatal complexes 3. Photosynthesis in C3 & C4 plants 4. Starch detection in leaves 5. Hill Reaction
11-12	Mar 31 – Apr 1 Apr 7-8	4	Water transport 1. Long distance water transport 2. Osmosis, cell turgor & plasmolysis

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6 Assessments

Your grade for the course will be determined from the total results of one midterm examination, laboratory work and a final examination.

6.1 Midterm Examination

The **MIDTERM EXAMINATION** will be held in class via courselink at **10:00 – 11:20 a.m. on February 23, 2021** It will contribute **30%** towards your final grade. Since the midterm examination occurs during a lecture period no alternative time will be scheduled. If you miss the midterm examination due to illness please notify us immediately or bring documentation as soon as possible.

6.2 Final Examination

The **FINAL EXAMINATION** - April 24, 2021: at 19.00 hrs - on line via courselink. This

examination will contribute **35%** towards your final grade. The final examination will cover primarily materials not covered in the midterm examination but will include related topics dealt with in the labs.

6.3 The Examinations

The examinations will cover the lecture AND laboratory materials. The examinations will consist of an array of multiple choice questions, some questions that require concise written answers, and analysis of visual materials. The answers to the midterm examination will be posted in the laboratory. The midterm examination will be returned to you. Any problems with examinations or questions arising from them must be resolved immediately.

6.4 Labs

LABORATORY WORK contributes **35%** towards your final grade. The grades come from:

There are 4 modules which include 10 scheduled laboratories. A lab report will be assigned for each module. There is a lab report associated with each of the four lab modules. It is strongly recommended that you work on the report questions over the duration of the module and not leave it to the lastminute. Similar to the lab modules, each lab report covers a great deal of content that cannot be properly completed in one brief sitting. Lab report templates with questions will be available to download from CourseLink. Due dates for each report are listed above and on CourseLink. You must prepare and submit your own report; all the text, graphs and original content must be your own otherwise it will be treated as plagiarism. Reports must be submitted for grading as a PDF file to the CourseLink dropbox, where they will be scanned through the Turnitin plagiarism-detection software. The TAs will grade your reports and provide feedback. If you are unable to submit a report by the advertised due date, please contact Dr. Meyer at the earliest. Inability to inform within two days of the due date will result in a mark of zero for that specific report. Following academic consideration and consultation with Dr. Meyer, alternative arrangements may be granted on a case-by-case basis.

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7 Course Statements

7.1 Illness & other authorized absences

If you are absent during laboratory periods, the midterm or final examination, for legitimate medical or other authorized reasons, please make sure you contact us. Provide supporting documentation as soon as you are able.

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)

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 book their exams at least 7 days in advance and not later than the 40th Class Day.

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 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.

9.10 Illness

The University will not normally require verification of illness (doctor's notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.
