



BOT*3410 Plant Anatomy

Fall 2023

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - August 31, 2023

1 Course Details

1.1 Calendar Description

The intricate internal structure of plants is explored in this course. The development, pattern and significance of cells, tissues and organs will be emphasized as well as the histological and microscopical methods used to study them. The lab emphasizes interpretation of plant structure as it relates to function.

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

1.2 Course Description

The intricate internal structure of plants is explored in this course. The development, pattern and significance of cells, tissues and organs will be emphasized along with the histological and microscopical techniques used to study them. The labs emphasize interpretation of plant structure in relation to function and adaptations to the environment.

1.3 Timetable

LECTURES

Unless mandated otherwise by the University, all lectures will be delivered in a F2F setting only. Unless mandated by the University lecture recordings will not be made / provided by the instructor.

The Lectures are scheduled on Tuesdays and Thursdays from 11:30 am – 12:50 pm in MCKN 232.

The first Introductory lecture is scheduled for 11:30 AM, Thursday September 7.

The lecture and/or lab slots from Nov 20 to Dec 1 might be used for student presentations.

LABORATORIES

Laboratories will be held in SSC 3304, in person every **Monday from 2:30-5:20 PM, starting September 11** with F2F instructions and discussions. There is a possibility for 'Arboretum walks' (weather permitting), to be included in the laboratory schedule.

1.4 Final Exam

There is no Final exam for this course. Two mid-term tests will be held during the scheduled class time 11.30 AM to 12.50 PM, tentative dates Oct 5 (Test 1) and Nov 9 (Test 2).

2 Instructional Support

2.1 Instructional Support Team

Instructor: Dr. Jaideep Mathur
Email: jmathur@uoguelph.ca
Telephone: +1-519-824-4120 x56636
Office: SC1 4463
Office Hours: Please feel free to contact Dr. Mathur by e mail whenever you have course related questions or problems.

Dr. Jaideep Mathur obtained his B.Sc., M.Sc. and Ph.D. in Botany and spent the period between 1992 and 2004 as a scientist in various International institutions. His early research work resulted in providing a molecular-genetic basis for the presence and developmental role of Brassinosteroids, a group of plant hormones and was followed by his discovery of an actin related protein (ARP) 2/3 complex as a major regulator of plant cell shape development. Dr. Mathur's present research focuses on understanding plant development and interactions with the environment through the use of numerous cell biological and molecular-genetic tools. His lab is renowned Internationally for its expertise with fluorescent protein aided live-imaging of sub-cellular interactions. For more information visit <<https://mathurlab.github.io/>> .

Lab Co-ordinator: Chris Meyer
Email: cmeyer02@uoguelph.ca
Telephone: +1-519-824-4120 x53955
Office: SC1 3507

Dr. Chris J. 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*3410 Lab Coordinator, he manages all aspects of the teaching laboratory. See the Lab Manual for further details.

2.2 Teaching Assistants

Teaching Assistant (GTA): Victoria Butler
Email: vbutler@uoguelph.ca

Teaching Assistant (GTA): Alyssa Clews
Email: clewsa@uoguelph.ca

3 Learning Resources

3.1 Required Resources

Laboratory Manual (Lab Manual)

The Laboratory Manual will be available online through the Plant Anatomy CourseLink website. This manual includes all the necessary information for conducting lab exercises.

3.2 Recommended Resources

Teaching Plant Anatomy (Textbook)

Teaching Plant Anatomy by Peterson, L. et al. 2008.

A copy of the textbooks will be available in the Library on a two-hour course reserve. Copies are also available for consultation in the lab.

On the Plant Anatomy CourseLink site, there will also be links to a number of useful websites.

Esau's Plant Anatomy (Textbook)

Esau's Plant Anatomy, 3rd Ed. Ray Evert. 2006.

A copy of the textbooks will be available in the Library on a two-hour course reserve. Copies are also available for consultation in the lab.

On the Plant Anatomy CourseLink site, there will also be links to a number of useful websites.

3.3 Campus Resources

The Academic Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program.
<http://www.bsc.uoguelph.ca/index.shtml> or
<https://www.uoguelph.ca/uaic/programcounsellors>

If you are struggling to succeed academically:

- 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/>

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.
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/counselling/>
- 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/>

If you have a documented disability or think you may have a disability:

- The Centre for Students with Disabilities (CSD) can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see: <https://www.uoguelph.ca/csd/>

4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Proper identification of plant anatomical and morphological traits.
2. Learning how to link plant structure with function and habitat.
3. Enhanced observational skills.
4. Advanced microscopy, and digital imaging skills.
5. Maintaining comprehensive, research-oriented notes and observations.
6. Effectively search for primary scientific literature.
7. Communication skills from preparing written lab reports and a scientific research presentation.

5 Teaching and Learning Activities

5.1 Learning Goals & Rationale

This course is designed to give students a working knowledge of the structure of vascular plants and introduce some of the methods used by plant scientists to investigate plant structure and function. It is primarily a 'hands-on' laboratory course with cooperative, self-directed learning components. Students will have the opportunity to learn various microscopy techniques and apply these to a major project where they study plant structure as it relates to adaptation to the environment and its importance to humans.

Lectures and presentations will be given only to clarify topics pertinent to successfully completing the course. Attending Labs is compulsory. Completed assignments should include relevant images and diagrams with a written description of the findings. Further details on the assignments will be provided in class. For the major "independent" project, each student pair will choose a plant species to be studied using the methods taught in lectures and laboratories.

Students will be conducting weekly lab exercises and an independent project along with one partner. The student-pair will make one, final, oral (PowerPoint aided) presentation on the assigned project plant on a specific date towards the end of the semester. This will be followed by questions and discussion. The results of this project are based entirely on you and your partner's own evaluation of the anatomy of the plant allocated to you. The several lab reports and midterm exams will be considered and marked as 'individual effort'.

5.2 Course Content

| Week # | Dates | Lecture topics | Lab # | Lab date |
|---------------|--------------|-------------------------------|--------------|-----------------|
| 1 | Sept 7 | Introduction to Plant Anatomy | | |
| 2 | Sept 12 & 14 | Tools, Techniques | 1 | Sept 11 |
| 3 | Sept 19 & | Techniques; Basic Cell types; | 2 | Sept 18 |

| Week # | Dates | Lecture topics | Lab # | Lab date |
|---------------|----------------|---|--------------|-----------------|
| | 21 | Simple tissue; Epidermis | | |
| 4 | Sept 26 & 28 | Primary Vascular tissue; Xylem & Phloem | 3 | Sept 25 |
| 5 | Oct 3 & 5 | Primary growth of Stems; Roots [Test #1 – OCT 5th] | 4 | Oct 2 |
| 6 | Oct 12 | Secondary growth; Wood formation | | No lab |
| 7 | Oct 17 & 19 | Leaves and modifications | 5 | Oct 16 |
| 8 | Oct 24 & 26 | Flowers & Fruits | 6 | Oct 23 |
| 9 | Oct 31 & Nov 2 | Ecology; Adaptation and specialized anatomy | 7 | Oct 30 |
| 10 | Nov 7 & 9 | Economic & Applied Plant Anatomy [Test #2 – NOV 9th] | 8 | Nov 6 |

| Week # | Dates | Lecture topics | Lab # | Lab date |
|---------------|--------------|-------------------------------|---------------|-----------------|
| 11 | Nov 14 & 16 | Work on Project presentations | Project | Nov 13 |
| 12 | Nov 21 & 23 | Student presentations | Presentations | Nov 20 |
| 13 | Nov 28 & 30 | | Presentations | Nov 27 & Dec 1 |

5.3 Important Dates

- Tests: Oct 5 and Nov 9
 - Lab report grading: see lab manual
 - Presentation for the independent project: TBA
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6 Assessments

6.1 Methods of Assessment

| Form of Assessment | Weight of Assessment | Due Dates of Assessment | Course Content | Learning Outcomes Addressed |
|---------------------------|-----------------------------|--------------------------------|-----------------------|------------------------------------|
| Test #1 | 20% of total | Oct 5 th | Lectures | #1 to #8 |
| Test #2 | 25% of total | Nov 9 th | Lectures | #9 to #16 |

| Form of Assessment | Weight of Assessment | Due Dates of Assessment | Course Content | Learning Outcomes Addressed |
|-----------------------------|-----------------------------|--------------------------------|-----------------------|------------------------------------|
| Lab report grading | 30% of total | See lab manual | Laboratory | #1 to #9 |
| Student presentation | 25% of total | Nov 20 to Dec 1 | Student research | |

6.2 Note

Attendance and participation in both, lectures and labs is necessary for getting the maximum benefit of this course. Be aware that 55% of your total grade is derived from the labs and self motivated research on the plant selected by you for your presentation.

Completion of Labs is essential. Grades allocated to lab reports and project work will not be distributed to any other activities. Thus failure to attend and complete labs will severely compromise your ability to do well in this course.

7 Course Statements

7.1 Grading

If you are absent, do not participate, or do not submit by the due date one or more of the course assessments (quizzes, midterm, lab reports, project presentations), for legitimate medical or other authorized reasons, please make sure that you contact the instructor or lab coordinator at the earliest. Provide supporting documentation as soon as you are able to. Inability to inform within three days, or not providing valid documentation will result in a mark of zero for that specific assignment.

8 Department of Molecular and Cellular Biology Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations.
<http://www.selfregulationskills.ca/>

8.4 Personal information

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

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

8.5 Course Offering Information Disclaimer

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

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

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

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

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

9.9 Illness

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