

**University of Guelph  
College of Biological Science**

**Department of Molecular and Cellular Biology**

**COURSE OUTLINE**

**BOT\*3410 – Plant Anatomy**

**Fall 2015**

**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 using histological preparations and microscopy methods. The lab emphasizes interpretation of plant structure as it relates to function.

Credit value: 0.50

Prerequisite(s): BIOL\*1040 or (2 of BIOL\*1070, BIOL\*1080, BIOL\*1090); BOT\*2100 strongly recommended.

**Teaching team**

**Dr. Jaideep Mathur (Instructor): Office: SSC 4463 – Phone Ext. 56636**

**E-mail: [jmathur@uoguelph.ca](mailto:jmathur@uoguelph.ca)**

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 the discovery of an actin related protein (ARP) 2/3 complex as a regulator of plant cell shape development. Dr. Mathur's present research focus is 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 subcellular interactions. He maintains a freely accessible web-educational resource called "The Illuminated Plant Cell". For more information visit <http://www.uoguelph.ca/~jmathur/> .

Dr. Mathur maintains an open door policy. Please feel free to contact him whenever course related questions or problems arise. An e-mail announcing your arrival will ensure that he is present in his office (Rm. 4463 Science Complex).

**Dr. Chris J. Meyer (Lab Coordinator): Office SSC 3507 – Phone Ext. 53955**

**E-mail: [cmeyer02@uoguelph.ca](mailto:cmeyer02@uoguelph.ca)**

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.

### **Teaching Assistants**

The Graduate Teaching Assistants for this course are Cole Anderson [cander07@uoguelph.ca] and Mark Minow [mminow@uoguelph.ca].

## **Course schedule**

### **LECTURES**

Lectures will be held in SSC 3315.

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

The first lecture is scheduled for Thursday September 10. The last three lectures and/or lab slots will be used for project preparation and presentations. The last day of class is Thursday Dec. 3.

### **LABORATORIES**

Laboratories are held in SSC 3315.

Laboratories are scheduled on Tuesdays from 2:30 pm – 5:20 pm.

First Lab: Laboratories will commence on Tuesday September 22.

## **Learning goals and 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 anatomists to investigate plant structure. 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 investigating plant structure as it relates to adaptation to the environment and importance to humans.

Lectures and presentations will be given to clarify topics pertinent to successfully completing the course. For the major "independent" project, an economically important plant provided to each student pair would be studied using the methods taught in class and laboratories. 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.

You will be conducting weekly lab exercises and your independent projects along with one partner. You will make one oral (PowerPoint aided) presentation as a pair on your assigned project plant on a specific date towards the end of the semester, followed by questions and discussion.

You will submit, as a pair, the two lab assignments on the "independent" project, based entirely on your own evaluation of the anatomy of your plant. If necessary, and through mutual consent, a statement of contribution might be included in the project report and presentation. The lab notebooks, two quizzes and midterm exam will be considered as 'individual effort' and marked as such.

## **Learning outcomes**

- #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 a comprehensive, research-oriented lab notebook.
- #6. Effectively search for primary scientific literature.
- #7. Communication skills from preparing a scientific research presentation and written report.

## **Course Resources**

### **Recommended textbooks**

- \* Teaching Plant Anatomy by Peterson, L. et al. 2008.
- \* Esau's Plant Anatomy, 3<sup>rd</sup> Ed. Ray Evert. 2006.

A copy of the textbooks will be available in the Library on a two-hour course reserve. A copy might also be made available for consultation in class.

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

### **REQUIRED 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.

## Course Content (Tentative schedule)

Week #	Dates	Topics	Lab #	Lab date
1	Sept 10	Introduction to Plant Anatomy	No lab	
2	Sept 15 & 17	Tools, Techniques	No lab	
3	Sept 22 & 24	Techniques; Basic Cell types; Simple tissue; Epidermis	1	Sept 22
4	Sept 29 & Oct 1	Primary Vascular tissue; Xylem & Phloem <b>[QUIZ #1 – OCT 1<sup>th</sup>]</b>	2	Sept 29
5	Oct 6 & Oct 8	Primary growth of Stems; Roots <b>[Lab book due – OCT 9<sup>th</sup>]</b>	3	Oct 6
6	Oct 13 & 15	Secondary growth; Wood formation	4	Oct 20
7	Oct 20 & 22	Leaves and modifications	5	Oct 27
8	Oct 27 & 29	Flowers & Fruits <b>[Midterm Exam on – OCT 27<sup>rd</sup>]</b>	6	Nov 3
9	Nov 3 & 5	Ecology; Adaptation and specialized anatomy	7	Nov 10
10	Nov 10 & 12	Economic & Applied Plant Anatomy <b>[QUIZ #2 – NOV 19<sup>th</sup>]</b>	8	Nov 17
11	Nov 24 & 26	Project work <b>[Lab book due – NOV 24<sup>th</sup>]</b>	Project	Nov 24
12	Dec 1	Project work	Project	Dec 1
13	Dec 3	Project presentations & Report	Project	Dec 3

## Methods of Assessment

Form of Assessment	Weight of Assessment	Due Dates of Assessment	Course Content	Learning Outcomes Addressed
<b>Quizzes</b>	10% each = 20% of total	Oct 1 <sup>st</sup> Nov 19 <sup>th</sup>	Lecture	#1 to #2
<b>Midterm</b>	20% of total	Oct 27 <sup>th</sup>	Lecture	#1 to #2
<b>Lab notebook grading</b>	5% 15% 20% of total	Oct 9 <sup>th</sup> Nov 24 <sup>th</sup>	Laboratory	#1 to #5
<b>Project presentation</b>	20% of total	Dec 3 <sup>rd</sup>	Laboratory	#1 to #7
<b>Project report</b>	20% of total	Dec 3 <sup>rd</sup>	Laboratory	#1 to #7

**Important:** Since 60% of your total grade is derived from lab-related work your attendance and participation in all laboratory periods is necessary for completing this course. This includes submission of the lab notebook on two occasions, submission of a written report for the independent project, delivering an oral presentation for the independent project, plus being in attendance for all the student presentations. Failure to submit or participate in any of these lab modules by the advertised due date will result in a mark of zero for that specific component. Hence, your final mark will be a reflection of your enthusiasm and dedication to the lab work for the entire semester.

## Important Dates

- Quizzes: Oct 1 and Nov 19
- Midterm test: Oct 27
- Lab notebook grading: Oct 9 and Nov 24
- Presentation for the independent project: Dec 3
- Written report for the independent project: Dec 3

The last date to drop this course, without academic penalty, is Friday November 6<sup>th</sup> (the 40<sup>th</sup> class day).

## Course and University Policies

### ***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, and be prepared to provide supporting documentation. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:

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

### ***Accessibility***

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca) or see the website: <http://www.csd.uoguelph.ca/csd/>

### ***Academic Misconduct***

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as

possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

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

The Academic Misconduct Policy is detailed in the Undergraduate Calendar: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

### ***E-mail Communication***

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

### ***Drop Date***

The last date to drop one-semester courses, without academic penalty, is the 40<sup>th</sup> class day. To confirm the actual date please see the schedule of dates in the Undergraduate Calendar. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

### ***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.

### ***Recording of Materials***

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

### ***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 notebook grading, project presentations, project report), 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.

## **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> o r  
<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.  
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.uoguelph.ca/~ksomers/>

### ***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/>