

# BIOLOGY 2D03 PLANT BIODIVERSITY & BIOTECHNOLOGY Winter 2020 Course Outline

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## Course Details

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**Instructors:** Dr. Robin Cameron, [rcamero@mcmaster.ca](mailto:rcamero@mcmaster.ca)

Office: LSB 529. Ext: 26345

**Dr. Susan Dudley,** [sdudley@mcmaster.ca](mailto:sdudley@mcmaster.ca)

Office: LSB 225. Ext: 24004

**Office hours:** TBA

**Course Coordinator:** Alastair Tracey, [bioyr2@mcmaster.ca](mailto:bioyr2@mcmaster.ca)

Office: LSB 119

**Lab/TA's:** TBA

**Lectures:** Tuesday, Thursday, Fridays at 11:30 am – 12:20 pm, Location to be Determined

**Lab:** Tue, Wed, Thu, Fri 8:30 – 11:30 am and 2:30 – 5:30 pm in LSB 105

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## Course Description

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Key concepts in plant biology and biodiversity will be explored, including the origin of plants, plant structure and development, plant genomes, plant responses to the environment and other organisms, agriculture and plant biotechnology.

Three lectures, one lab (three hours); one term

**Prerequisite(s):** [BIOLOGY 1A03](#), [1M03](#); or [ISCI 1A24 A/B](#). If not already completed, [BIOSAFE 1BS0](#) (or HTHSCI 1BS0) must be done prior to the first lab.

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## Course Learning Objectives

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By the end of the course students will:

- Obtain an introductory understanding of many aspects of plant biology, including genomics, anatomy, cell structure/function, development, reproduction and physiology.
- Use this fundamental knowledge to explore how plants live their lives by:
  - obtaining energy and information from light for growth and reproduction
  - responding to the abiotic environment (drought, floods, cold, etc)
  - interacting with beneficial organisms (pollinators, symbiotic microbes)
  - defending themselves from pests (pathogens, insects, etc).
- Obtain introductory knowledge of traditional and modern agriculture.
- Examine how scientists apply fundamental knowledge of plant biology to improve agriculture
- Learn about the pros and cons of genetically modified crops and be able to form an opinion: Do the benefits outweigh the risks or the risks outweigh the benefits?
- Obtain plant biology-associated lab skills including microscopy and serial dilutions.

**OVERARCHING GOALS:** To demonstrate: i) the importance of plants for people and the planet, ii) that plants are fascinating and iii) plant research, both fundamental and applied, is key to solving numerous problems facing our planet.

## Course Schedule

LECTURE SCHEDULE		LAB SCHEDULE	
Week of	Topic	Lab Topic	Lab Exercises
<b>Lecture 1</b>	Introduction to course Origin of Plants - evolution of photosynthesis, eukaryotic cells, land & seed plants, angiosperms	<b>No labs</b>	
<b>Lecture 2</b>	Plant Genomes	<b>Lab 1: Origin of Plants</b>	Meet in lab, accompany TA to greenhouse, Scavenger Hunt I.
<b>Lecture 3</b>	Plant Cells (importance of cell wall, vacuole, cuticle, plasmodesmata)	<b>Lab 2: Seedlings</b>	Fern spore germination (to be observed all term). Cauliflower tissue culture.
<b>Lecture 4</b>	Development in Angiosperms (embryogenesis to plant sex)	<b>Lab 3: Plant organs I</b> -roots and shoots	Sectioning and staining of different plant organs.
<b>Lecture 5</b>	Plant plumbing & nutrition <b>Online Midterm, early February,</b> covers Lectures 1 to 4 (20%)	<b>Lab 4: Plant organs II</b> -leaves and flowers	Protoplast Isolation.
<b>Lecture 6</b>	Plant responses I <u>Perception of Light</u> -seed germination, shade avoidance <u>Perception of Hormones</u> – Ethylene, ABA & GA signal transduction	<b>Lab 5: Reproduction, Seeds, fruits</b> <b>Life cycles</b>	<b>Lab Test 1 covers labs 1 to 4 (10%)</b>
<b>Feb 15-19</b>	<b>Mid-term Recess</b>	<b>No labs</b>	
<b>Lecture 7</b>	Plant Responses II - Environmental Stress	<b>Lab 6: Light &amp; hormone responses</b>	Photosynthesis exercise. Seed germination response to hormones. Effect of hormones on tissue regeneration in tissue culture.
<b>Lecture 8</b>	Plant Responses III – Biotic Interactions, plant immunity & disease, symbiotic interactions	<b>Lab 7: Environmental Responses</b>	Hrp exercise- inoculate bacteria into leaves.

<b>Lecture 9</b>	Domestication & Agriculture	<b>Lab 8: Biotic Interactions</b>	Hrp exercise – collect leaves & bacteria, plate serial dilutions. PCR of GMO food products.
<b>Lecture 10</b>	Biotechnology I – current GM crops in Canada, ethical issues, organic vs conventional farming	<b>Lab 9: Discussions</b>	Hrp Exercise - review Hrp images, produce a class chart; discuss Hrp and PCR results.
<b>Lecture 11</b>	Biotechnology II –GM crops in developing world, plants as factories, future GM crops	<b>Lab 10: Agriculture Greenhouse Scavenger Hunt II</b>	Agriculture and wood exercise, then accompany TA to greenhouse for Scavenger Hunt II
<b>Lecture 12</b>	Plant Ecology – Dr. Susan Dudley	<b>Lab Test 2 covers labs 5 to 10 (10%)</b>	
<b>Lecture 13</b>	<b>Finish and Review</b>		

### Laboratories for Biology 2D03

**Labs are every week! Students must attend the lab section they have been assigned to.**

In the event of university closure due to a storm, make-up labs will be attempted as soon as possible.

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course A2L webpage weekly during the term and to note any changes.

### Lab Expectations

Students work in pairs but complete the weekly lab assignments individually.

Students are **expected to clean up their work area** at the end of each lab by:

- Unplugging microscopes, wrapping the cords around them and putting the dust cover on.
- Returning all prepared slides to the appropriate slide boxes on the center and back benches.
- Disposing of their waste in the appropriate containers.

### LAB SUPPLIES – Students should bring to each lab (no loaners available)

- ✓ Lab coat (available at the bookstore)
- ✓ Lab manual (printed from Avenue)
- ✓ Pens, pencils, coloured pencils or markers
- ✓ Digital imaging device. Students are permitted to use digital cameras or other digital imaging devices in the Biology 2D03 labs. **These devices are not required laboratory supplies.** Students can obtain equally good lab notes (and marks) by making their own hand drawn diagrams during the labs. If you elect to use a digital imaging device, read the policy regarding their use (outlined in the lab manual) carefully. **The use of such devices is a privilege and may be withdrawn if the policy is not followed.**

### IMPORTANT NOTE

*The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If any modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the*

term and to note any changes. Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.

## Course Materials

**Recommended Textbook:** *Plant Biology*, Smith A.M., G. Coupland, L. Dolan, N. Harberd, J. Jones, C. Martin, R. Sablowski & A. Amey. Garland Science, NY, NY.

Available at McMaster University Campus Store, the McMaster University bookstore (used and new copies) 13:978-0-8153-4025-6

An e-book version is available directly from the publisher 9781136977459 or Amazon.ca ASIN B008ZJKUZ8  
A copy of the text is available on reserve at the Thode Library

**May be of interest:** When is a flower not a flower? and other intriguing questions about plants, Larry and & Carol Peterson. Available online at [www.petersonbook.com](http://www.petersonbook.com) for \$25.

**Lab Manual:** Chapters will be posted weekly to Avenue to Learn

## Course Evaluation

Grading Schemes	1	2	3	4	5	6	7	8
Laboratory Practical Test 1	10	10	0	0	0	0	10	10
Laboratory Practical Test 2	10	10	10	10	0	0	0	0
Laboratory Practical Test Make-up	0	0	10	10	20	20	10	10
Midterm (in class)	20	0	20	0	20	0	20	0
Lab Assignments	15	15	15	15	15	15	15	15
Final Exam (cumulative)	45	65	45	65	45	65	45	65
TOTAL	100	100	100	100	100	100	100	100

### EXPLANATION OF GRADING PROCEDURES USED IN BIOLOGY 2D03

- A. Final Exam (45% or 65%)** A copy of a past final exam will be posted to A2L under Content.
- B. Laboratory Practical Tests (20%)** - The practical tests will be held in lab. Lab Test 1 will take place the second week of February, Lab Test 2, the last week of March. Lab Practical Tests provide you the opportunity to review and check your understanding of laboratory and related lecture material. Practice questions will be provided before each Lab Practical Test. If you miss Lab Test 1 or Lab Test 2, you will write a Lab Test Make-up for the Lab Test you missed during early April. If you miss both Lab Test 1 & 2, you will write a Lab Test Make-up that will cover both Lab Test 1 & 2 during early April.
- C. Midterm (20%),** will cover LECTURE material. The Midterm will be held in class in early February. Practice Midterm questions and answers will be posted to A2L under Content. If you don't write the Midterm, your exam will be worth 65%. We strongly encourage you to write the Midterm to practice for the exam. If you do poorly on the Midterm you will not be penalized and instead will receive Grading Scheme 2, 4, 6 or 8 in which the 20% Midterm will be transferred to the Final Exam.
- D. Lab Assignments (15%)** A small assignment will be completed by each student and submitted to your TA by the end of each lab.

Students who fail to clean up their work area at the end of each lab will have marks deducted from the lab assignment component of their grade.

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## Academic Integrity

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You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/), located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

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## Authenticity/Plagiarism Detection

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**Some courses may** use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. Avenue to Learn, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster’s use of Turnitin.com please go to [www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

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## Courses with an On-line Element

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**Some courses may** use on-line elements (e.g. e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, Echo360, Microsoft Teams, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

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## Online Proctoring

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**Some courses may** use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or

lock/restrict their browser or other applications/software during tests or exams.  
This software may be required to be installed before the test/exam begins.

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## Conduct Expectations

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As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx, Echo360, Microsoft Teams or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

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## Academic Accommodation of Students with Disabilities

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Students with disabilities who require academic accommodation must contact [Student Accessibility Services](#) (SAS) at 905-525-9140 ext. 28652 or [sas@mcmaster.ca](mailto:sas@mcmaster.ca) to make arrangements with a Program Coordinator. For further information, consult McMaster University’s [Academic Accommodation of Students with Disabilities](#) policy.

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## Requests for Relief for Missed Academic Term Work

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McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

View the [McMaster Student Absence Form \(MSAF\)](#) for more information.

For Biology 2D03 you should list **Mihaela Georgescu** ([mgeorg@mcmaster.ca](mailto:mgeorg@mcmaster.ca)) as the course contact. **Immediately after using the online tool, students MUST contact Mihaela Georgescu regarding the nature of the relief. Failure to do so may negate the opportunity for relief.**

### Additional Information on Missed Work in Biology 2D03:

NOTE: To receive credit for completing Biology 2D03, students must complete a majority of the labs and course tests. An MSAF does NOT exempt students from completing the course lab or test requirements. If a student misses more than 75%<sup>1</sup> of the labs and/or test components, credit in Biology 2D03 may NOT be given. This applies even if the absences from the labs or tests are validated by AN MSAF AND the student has a passing grade for the portion of the course the student has completed.

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<sup>1</sup> Note: 75% refers to **completion** of 75% of the term work, NOT achieving a grade of 75% on the term material!

**Missed Midterm:** If you miss the Midterm, contact Mihaela Georgescu as soon as possible after submitting the MSAF. The weight of the Midterm (20%) will be added to that of your final exam (Grading Scheme 2, 4 or 6).

**Missed Labs or Lab Practical Test:** Please contact Mihaela Georgescu (mgeorg@mcmaster.ca) as soon as possible after submitting the MSAF. If you miss a lab every effort will be made to put you into a later lab slot in the same week. If you MSAF one of the Lab Tests the 10% will be reweighted to the other Lab Test. If you do not hand in a lab assignment but submit an MSAF or can provide a valid reason that is approved by the Associate Dean of Science Office, your accommodation will be a 48 hour extension from the lab assignment due date, regardless of when the MSAF was submitted.

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## Academic Accommodation for Religious, Indigenous or Spiritual Observances (RISO)

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Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

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## Copyright and Recording

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Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

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## Extreme Circumstances

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The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.