



BOT*4380 Metabolism in the Whole Life of Plants

W22

Winter 2022

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - January 10, 2022

1 Course Details

1.1 Calendar Description

This course follows the developmental changes that take place in plants, and explores the molecular, biochemical and physiological mechanisms that are responsible for development. Emphasis will be placed on the importance of modern experimental methods and critical evaluation of data.

Pre-Requisites: BIOL*1090, BIOC*2580

1.2 Course Description

This course follows the developmental changes that take place in plants, and explores the molecular, biochemical, and physiological mechanisms that are responsible for development. Emphasis will be placed on the importance of modern experimental methods and critical evaluation of data. 0.5 U. Prerequisites: BIOL*1090 & BIOC*2580.

1.3 Timetable

LECTURE, Face-to-Face (as posted on Webadvisor), M, W, F, 10:30 am-11:20 am, CRSC 117.
See '**Course Delivery**' below for more details.

Course Delivery

Both Dr. Akhtar and Dr. Micallef will be presenting lectures using F2F or AD-S (AD-S if required by the U of G or if an instructor deems it necessary for the safety of students and instructors). Lecture sessions will not be recorded or posted; there will be no Hybrid delivery in the course. AD-S lectures will be delivered using Microsoft Teams. Instructors will provide information on covid-19 restrictions to students through email and on Courselink.

There will be some elements of a 'Blended' delivery, and specifically the 3 quizzes that test Micallef's portion of the course will be delivered using Respondus and LockDown Browser regardless of whether lecture delivery is F2F or AD-S. There will be 3 required Quizzes directed to Micallef's material in the 1st half of the course scheduled during the lecture period for 45 min starting at 10:30 am on Jan 21, Feb 4, and Feb 18 (each date is a Friday). Additional information on using Respondus & LockDown Browser will be provided in a separate document.

1.4 Final Exam

There is a final exam scheduled for Fri, April 22, 11:30 am-1:30 pm, that presently is scheduled in Webadvisor as F2F (room TBA). The final exam directly examines material presented by Dr. Akhtar in the 2nd half of the course; thus, it is not cumulative for the whole course.

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Dr. Tariq Akhtar
Email:	takhtar@uoguelph.ca
Telephone:	+1-519-824-4120 x54794
Office:	SC1 4461
Office Hours:	By appointment.

Feel free to contact us by email; we will do our best to respond quickly.

Instructor:	Dr. Barry Micallef
Email:	bmicalle@uoguelph.ca
Telephone:	+1-519-824-4120 x54384
Office:	CRSC 424
Office Hours:	1:00-2:30 pm on MWF and also by appointment.

Feel free to contact us by email; we will do our best to respond quickly.

2.2 Note

Feel free to contact Dr. Akhtar and Dr. Micallef by email at any time; we will do our best to respond quickly. B. Micallef will not have F2F office hours in Winter 2022, but students are free to set up Microsoft Teams meetings at a mutually agreed-upon time to consult with B. Micallef.

There are no GTAs in BOT 4380. All assignments, quizzes, and the final exam are marked by either Dr. Akhtar or Dr. Micallef.

3 Learning Resources

There is no text to purchase. There will be Lecture Presentations and other Required Reading posted on Courselink, and Supplemental Readings including references from the scientific literature will be also be posted on Courselink.

3.1 Additional Resources

Plant Biochemistry (Textbook)

Bowsher, Steer & Tobin (2008) Plant Biochemistry. Garland Science, Taylor & Francis Group, LLC, New York, New York. QK 861.B69 2008.
Available in the Library

Path of Carbon in Plants (Textbook)

- Bassham & Calvin (1957) Path of Carbon in Plants. Prentice-Hall Publishing. QK 882.B3.
- Available in the Library

Biochemistry and Molecular Biology of Plants (Textbook)

- Buchanan, Gruissem & Jones (2000) Biochemistry and Molecular Biology of Plants. American Society of Plant Physiologists. QK 861.B45.
- Available in the Library

The Path of Carbon in Photosynthesis (Textbook)

- Calvin (1962) The path of carbon in photosynthesis. *Science* 135: 879-889. QH 9 B6.B29.
- Available in the Library

Plant Secondary Metabolites: Occurrence, Structure, and Role in the Human Diet (Textbook)

- Crozier, Clifford, and Ashihara (2006) Plant Secondary Metabolites: Occurrence, Structure, and Role in the Human Diet. Blackwell Publishing. QK 881.P55 2006.
- Available in the Library

Plant Physiology, Biochemistry, and Molecular Biology (Textbook)

- Dennis (1997) Plant Physiology, Biochemistry, and Molecular Biology. Longman Publishing. QK 881.P54 1997.
- Available in the Library

Plant Biochemistry and Molecular Biology (Textbook)

- Heldt (1997) Plant Biochemistry and Molecular Biology. Oxford University Press. QK 861 H4513 1997.
- Available in the Library

Plant Physiology (Textbook)

- Taiz & Zeiger (2015) Plant Physiology. Sinauer Associates. QK 711.2 T35 2014.
- Available in the Library

3.2 Additional Useful Sources

- There are several journals that provide original scientific articles dedicated to plant biology such as Plant Physiology, The Plant Cell, The Plant Journal, Plant Molecular Biology, Plant and Cell Physiology, Journal of Experimental Botany, Plant, Cell and Environment, etc.
 - Wider-audience journals such as Science, Nature, Proceedings of the National Academy of Sciences, Cell, etc. also include many original scientific articles in plant biology and related studies.
 - There are also several journals that publish review articles such as Annual Reviews of Plant Physiology and Plant Molecular Biology, Annual Plant Reviews, Trends in Plant Science, Current Opinion in Plant Science, Annual Reviews of Biochemistry, etc.
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4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Grasp both the historical development and the current state of knowledge in plant biology, and particularly in plant metabolism, including an appreciation of emerging technologies and experimental methods.
 2. Integrate the physiological, biochemical, and molecular mechanisms whereby autotrophic organisms, and particularly seed plants, sustain themselves in the context of the whole life cycle of the plant.
 3. Interpret the scientific literature and data relevant to plant biology and to plant metabolism in particular.
 4. Communicate effectively using scientific writing.
 5. Apply forms of inquiry including hypothesis development through critical analysis of relevant scientific literature and essay writing.
 6. Apply knowledge of plant metabolism to specific questions associated with relevant biological processes, agriculture, forestry, energy production, and medicine.
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5 Teaching and Learning Activities

This course will consist of interactive on-line lectures with opportunity for questions and

discussion, including some discussion of scientific papers. In addition, required and supplemental readings will be posted on Courselink throughout the course. Supplemental readings from the textbook, required and supplemental readings, and scientific paper citations directed to each topic below will be indicated in the Powerpoint lectures posted on Courselink.

Comprehensive treatments are given for all the topics listed below; the list below is a general outline divided between the two lecturers in the course. It does not necessarily provide all specific topics covered.

5.1 Lectures

(A) Lectures by Micallef (1st half of the course)

Module 1-Significance, Structure and Function of Autotrophic Organisms

Introduction to autotrophy and autotrophic organisms; chemoautotrophy versus photoautotrophy.

Photoautotrophy in terrestrial (land) plants at different levels of organization: (1) the whole plant to organ levels, including how the body plan of land plants reflects their autotrophic nature, sources & sinks in plants, anatomy of autotrophic organs in land plants, parasitic angiosperms; (2) the cellular to organellar levels, including microscopy, plant versus animal cells, plastid types and their characteristics, chloroplast structure and function; and (3) the sub-organellar to biochemical levels, including primary and secondary metabolism, sub-organellar structure and function of chloroplasts, major protein complexes in the chloroplast, chloroplasts as a solar hydrogen fuel cell, artificial photosynthesis. There will be some emphasis on structure-function relationships.

Chemoautotrophic prokaryotes & bacterial anoxygenic photoautotrophs. Oxygenic photoautotrophy, including cyanobacteria & eukaryotic photoautotrophs. Definition of a plastid and the evolutionary origin of eukaryotic photoautotrophs; biodiversity and ecological & economic significance of photoautotrophy in marine and terrestrial environments.

Module 2-The Light Reactions in the Chloroplast

Properties of light and light-absorbing pigments: basic properties of the light reactions; four crucial characteristics of chlorophyll; absorption spectrometry; specific chromophores in photoautotrophic organisms; chlorophyll species and their structure-function relationships; a pigment = a chromophore-protein complex; metabolites derived from 5-aminolevulinate; methods used to study biochemical pathways; chlorophyll synthesis and degradation, including regulatory mechanisms; phycobilin pigments and their significance.

Photosystems and fates of absorbed light energy: characteristics of the light-harvesting apparatus; definition of a photosystem; X-ray crystallography of membrane-bound proteins; structure and function of light-harvesting complexes, including the phycobilisome antenna network in cyanobacteria; fates for excitation energy; funnelling of excitation energy to the reaction center; efficiency of a plant photosystem in utilising sunlight energy.

Electron transport and ATP synthesis: photochemistry and quantum yield; reaction center complex in purple-sulfur bacteria; function of mobile electron carriers; structure-function relationships for the major thylakoid complexes; requirement for one or two photosystems; electron transport and generation of a proton gradient; coupling of the proton gradient to ATP synthesis.

Regulation of the light reactions: cyclic & non-cyclic electron transport; phosphorylation of LHC's; functional significance of the spatial arrangement of thylakoid complexes; processes to dissipate excess light energy; dealing with reactive oxygen species (ROS); coping with varying irradiance and light quality.

Improving the light reactions, impact of stress.

Module 3-Primary Carbon Metabolism in Source and Sink Tissues

Introduction to photosynthetic C metabolism and the Calvin-Benson cycle: why organisms on earth are C-based; elemental composition of terrestrial plants; defining photosynthetic C, N & S metabolism; elucidating the 1st product of C fixation in C3 plants; elucidating the reactions of the Calvin-Benson cycle; phases and reactions of the Calvin-Benson cycle; interactions with respiratory metabolism; end products of photosynthesis.

Regulation of the Calvin-Benson cycle: modulation of enzyme activity by the ionic & solute environment in the stroma; thioredoxin-ferredoxin system; properties of ribulose biphosphate carboxylase/oxygenase (Rubisco); Rubisco activase.

Photorespiration and altered photosynthetic types: definition of photorespiration; Rubisco oxygenase reaction; evolutionary kinetics of Rubisco; C2 oxidative photosynthetic cycle and photorespiratory N cycle; elucidation of the photorespiratory cycle; effects of photorespiration on net C assimilation and the quantum requirement for C fixation; atmospheric CO₂, temperature and photorespiration; C4 photosynthesis; chloroplast ultrastructure in C4 plants; CAM metabolism; carboxysomes in bacteria.

End product synthesis and transport: properties of sucrose and starch; pathways of sucrose and starch synthesis, including regulation; chloroplast phosphate translocator and phosphate cycling; chloroplastic starch degradation; phloem loading and unloading.

Sucrose utilization in sink tissues: sucrose hydrolytic enzymes and relationship to respiratory metabolism.

Improving photosynthetic C metabolism, impact of stress.

Module 4-N & S Uptake, Assimilation and Utilization

Overview of N metabolism and N uptake: major inorganic forms of N & S; nitrogen cycle, including biochemical aspects of N₂ fixation; roles of N and S in the plant; phases and

enzymes of N uptake and assimilation; N uptake and transport, including cellular transport processes, N remobilization during senescence.

Assimilation of nitrate and ammonium to organic N: nitrate and nitrite reductase, including regulation; assimilation of ammonium by GS-GOGAT; sources of ammonium in plant cells; nitrate assimilation in roots and shoots; organic N transport compounds; interactions between C and N metabolism;

S uptake and assimilation: sulfate uptake and transport; activation and reduction of sulfate; formation of cysteine and glutathione; functions for glutathione in the plant; amino acid synthesis; N & S utilization in plants.

Improving N uptake and assimilation, N-use efficiency in plants.

Module 5-Reproductive Biology of Plants and Germination

Reproductive biology of plants: the 'switch' from a vegetative to floral meristem in angiosperms; role of the florigen protein in the flowering response in angiosperms; development of the male and female gametophyte.

Germination and early seedling establishment in plants: the 'switch' from seed development to seed germination; the mobilization of seed reserves, including protein, starch and fatty acid degradation; early seedling establishment, including photomorphogenesis mediated by photoreceptors.

(B) Lectures by Akhtar (2nd half of the course)**Module 6-Introduction to Secondary Metabolism**

Understanding the interface between primary and secondary metabolism: Classification of the three main clades of 'specialized metabolites'; focus will be on alkaloid, glucosinolate, and polyamine biosynthesis and their physiological importance. Medicinal plants will be discussed.

Module 7-Isoprenoid Metabolism

Isoprenoids: the largest class of secondary metabolites. Focus will be on isoprenoid synthesis from primary precursors to the physiological and ecological roles that these compounds serve. Focus will be on terpenes, sterols, carotenoids, polyprenols and isoprenoid-derived vitamins and plant hormones. Industrial applications of isoprenoids will be discussed.

Module 8-Lipid Metabolism

Fatty acid biosynthesis and nomenclature: Assembly of phospholipids, galactolipids, triacylglycerols, and cutin/epicuticular waxes. Biophysical properties of plant lipids and the regulation of their synthesis will be explored.

Module 9-Phenolics

Biosynthesis and function of plant phenolics: Flavonoids, aromatic amino acid metabolism, plant volatiles, and cell wall assembly.

Module 10-Vitamins, Cofactors, and Polyketides

Co-factor biosynthesis: Emphasis will be on B-vitamins and their functional roles. Branched chain amino acid metabolism, prenylated polyketides and their industrial significance.

5.2 Important Dates

Important Dates

Quizzes in Micallef's section of the course are scheduled using Respondus & LockDown Browser in Courselink. There will be 3 required Quizzes directed to Micallef's material in the 1st half of the course during the scheduled lecture period for 40 min starting at 10:30 am Jan 21, Feb 4, and Feb 18.(each date is a Friday). Additional information on using Respondus & LockDown Browser will be provided in a separate document.

Course Assessment

Form of Assessment	Weight of Assessment	Quiz/Exam Dates Due Dates for Assignments	Additional Comments	Learning Outcomes Addressed
3 required In-class quizzes delivered using Respondus & LockDown Browser (Micallef lectures)	35% of final grade, Quiz 1 = 10% Quiz 2 = 12.5% Quiz 3 = 12.5%	Scheduled during the lecture period using Respondus for 40 min each on the following Fridays: Jan 21, Feb 4 & 18 starting at 10:30 am.	Includes all material covered starting after the previous quiz for quiz 2 and quiz 3.	1-3, 6
Pre-submission for the 1 st 3-page	2.25% of final grade	Topic selected & approved by B. Micallef	Pre-submission will be marked &	1-6

Form of Assessment	Weight of Assessment	Quiz/Exam Dates Due Dates for Assignments	Additional Comments	Learning Outcomes Addressed
essay: complete Intro. paragraph; remaining Intro. sentences; 10 references (5 must be <u>original</u> scientific articles).		by Mon, Jan 17 at 11:59 pm. Pre-submission due on Mon, Jan 31 at 11:59 pm as an electronic copy emailed to B. Micallef.	returned by Mon, Feb 7.	
Completed 1 st 3-page essay	12.75% of final grade	Due by Mon, Feb 28 th at 10:30 am as an electronic copy using DropBox in Courselink.	Essay marks & evaluations returned by Mon, March 11 .	1-6
2 nd 3-page essay	15% of final grade		Topic provided on Mon, Feb 28. Essay marks returned by the final	1-6

Form of Assessment	Weight of Assessment	Quiz/Exam Dates Due Dates for Assignments	Additional Comments	Learning Outcomes Addressed
			exam period.	
Final Exam (Akhtar lectures)	35% of final grade		Includes lecture material covered by T. Akhtar.	1-3, 5-6

6 Assessments

6.1 Assessment Details

Course Assessment (0%)

Learning Outcome: 1, 2, 3, 4, 5, 6

Course Assessment

Form of Assessment	Weight of Assessment	Quiz/Exam Dates Due Dates for Assignments	Additional Comments	Learning Outcomes Addressed
3 required In-class quizzes delivered using Respondus & LockDown	35% of final grade, Quiz 1 = 10% Quiz 2 = 12.5%	Scheduled during the lecture period using Respondus for 40 min each on the following	Includes all material covered starting after the previous quiz for quiz 2 and	1-3, 6

Form of Assessment	Weight of Assessment	Quiz/Exam Dates Due Dates for Assignments	Additional Comments	Learning Outcomes Addressed
Browser (Micallef lectures)	Quiz 3 = 12.5%	Fridays: Jan 21, Feb 4 & 18 starting at 10:30 am.	quiz 3.	
Pre-submission for the 1 st 3-page essay: complete Intro. paragraph; remaining Intro. sentences; 10 references (5 must be <u>original</u> scientific articles).	2.25% of final grade	Topic selected & approved by B. Micallef by Mon, Jan 17 at 11:59 pm. Pre-submission due on Mon, Jan 31 at 11:59 pm as an electronic copy emailed to B. Micallef.	Pre-submission will be marked & returned by Mon, Feb 7.	1-6
Completed 1 st 3-page essay	12.75% of final grade	Due by Mon, Feb 28 th at 10:30 am as an electronic copy using	Essay marks & evaluations returned by	1-6

Form of Assessment	Weight of Assessment	Quiz/Exam Dates Due Dates for Assignments	Additional Comments	Learning Outcomes Addressed
		DropBox in Courselink.	Mon, March 11 .	
2 nd 3-page essay	15% of final grade		Topic provided on Mon, Feb 28. Essay marks returned by the final exam period.	1-6
Final Exam (Akhtar lectures)	35% of final grade		Includes lecture material covered by T. Akhtar.	1-3, 5-6

Quizzes (35%)**Learning Outcome:** 1, 2, 3, 4, 5, 6**Additional Information on the Quizzes**

The quizzes for B. Micallef's lectures will consist of multiple-choice, true or false, fill-in-the-

blanks, & short answer questions. **Important:** The quizzes will test: (1) all information provided in the Powerpoint presentations posted on Courselink; (2) additional information discussed in lecture; and (3) any Required Readings posted on Courselink. Quiz 1 covers material posted on Courselink to Wed, Jan 20, Quiz 2 covers material posted from Fri, Jan 22 to Wed, Feb 3, and Quiz 3 covers material from Fri, Feb 5 to Wed, Feb 24 (note that Feb 15-19 is Winter Break). Quizzes will start at 10:30 am and last 40 min.

Completed First 3-Page Essay (15%)

Learning Outcome: 1, 2, 3, 4, 5, 6

Additional Information on the 3-Page Essays

Complete instructions on writing the 3-page essays, including the evaluation scheme, are provided in a separate document posted in the News Item section of Courselink. The 1st Essay and 2nd Essay will be marked by B. Micallef and T. Akhtar, respectively. The topic for the 1st 3-page essay is open, and it must be selected and approved by B. Micallef by Mon, Jan 18 at 11:59 pm. A list of potential general topics (for guidance only, other topics can be chosen if approved by the instructor) for the 1st 3-page essay are provided in the instructions posted on Courselink, and approval will occur by the instructor through email. To provide writing assistance for the 1st 3-page essay, a Pre-submission, including the complete introductory paragraph, the introductory sentence for each remaining paragraph, and a minimum of 10 references (5 must be original scientific articles), will be submitted to B. Micallef for marking on Mon, Feb 1st by 11:59 pm as an electronic copy. The grade provided for this Pre-submission will include: (1) the entire grade for the Introductory paragraph (i.e. 10% of the total essay value out of 100%); and (2) a portion of the total grade for Research worth 5% of the total essay value out of 100%. Thus, the Pre-submission is worth 2.25% of the final grade in the course. When handing in each essay and the Pre-submission for the 1st 3-page essay, both a Word and pdf file must be submitted to the appropriate instructor by the deadline. The electronic copy is used to assess when the assignment was submitted, and a confirmatory email will be sent by the instructor.

Completed Second 3-Page Essay (15%)

Date: Due by Friday, April 12th at 4 pm

Learning Outcome: 1, 2, 3, 4, 5, 6

- Must be submitted as an electronic copy to T. Akhtar
- Marked essays will be returned during the final exam period

Final Examination (35%)

Date: Wednesday, April 22 2021, 8:30-10:30AM, Courselink Respondus

Learning Outcome: 1, 2, 3, 5, 6

Includes material from T. Akhtar's lectures starting on Monday, March 1st 2021

B. Micallef's lecture material will not be directly tested on the Final Exam, although many principles discussed by B. Micallef are applicable to the 2nd half of the term

Three In-Class Quizzes (20%)

Date: At the beginning of the Friday lectures on Jan 17th, Jan 31st and Feb 14th

Learning Outcome: 1, 2, 3, 5, 6

The in-class quizzes for B. Micallef's lectures will consist of multiple-choice, true or false, fill-in-the-blanks, & short answer questions. The best two-out-of-three will be used to calculate the final grade, so each quiz is potentially worth 10% of the final grade.

Important: The quizzes will test: (1) all information provided in the Powerpoint presentations posted on Courselink (regardless of whether it was directly covered in class or not); (2) additional information discussed in lecture; and (3) any Required Readings posted on Courselink.

Quiz 1 covers material from Mon, Jan 6th to Wed, Jan 15th, Quiz 2 covers material from Fri, Jan 17 to Wed, Jan 29, and Quiz 3 covers material from Fri, Jan 31 to Wed, Feb 12.

Quizzes must be written in class, and they cannot be rescheduled due to an absence, which is why the best 2 out of 3 marks will be used to calculate the final grade. If a quiz is missed due to a snow day, the quiz will occur in the next class.

7 Course Statements

7.1 Academic Consideration

Quizzes cannot be made up outside of class, which is why the best 2 out of 3 will be used for the final grade.

Arrangements for a deferred Final Exam can potentially be made through either a course instructor or the Registrar's Office.

For the Essay Assignments and Take-Home Assignment, any alternative submission dates for compassionate reasons must be established by the instructor marking the Assignment (B. Micallef for the 1st Essay and Take-Home Assignment, and T. Akhtar for the 2nd Essay).

7.2 Course Evaluation Information

- End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.
- While many course evaluations are conducted in class others are now conducted online. Please refer to the Course and Instructor Evaluation Website for more information.
- Your responses will not affect your grade. Course evaluation data are distributed to individual instructors after final grades have been submitted to the Registrar, following the completion of each academic semester.
 - https://courseeval.uoguelph.ca/CEVAL_LOGIN.php
- Please be honest, respectful, constructive and thorough. Instructors and review committees place great value on student course ratings and read all comments provided in course evaluations. It is helpful to provide comments on the strengths of the course, in addition to the areas for improvement. Please refrain from personal comments unless they relate to teaching and learning.
- The timing and type of course evaluation for each instructor will be indicated in lecture. Since T. Akhtar and B. Micallef are in different Colleges, their course evaluations will be conducted separately.

7.3 Grading

For the Essays and Take-Home Assignment, a deduction will be assessed worth 10% of the assignment value per working day late = a deduction of 1.5% of your final grade per working day late, where a working day does not include Saturday and Sunday for both students and the instructors

- . For the Essays and Take-Home Assignment, if a reconsideration of grade is requested the

entire marked Essay or Take-Home Assignment will be provided to the instructor, and the entire essay or assignment will be re-marked.

7.4 Additional Statement

Email from the University of Guelph on Jan 7, 2022 Regarding COVID-19 and the Winter 2022 Semester

The email below was sent to students, staff, and faculty from the Office of the President on January 7, 2022 regarding the Covid-19 pandemic.

Dear Students, Staff and Faculty,

We want to wish you each the very best for 2022 and for the new semester.

As we prepare for the start of winter classes next week, we recognize the uncertainty and disruption being caused by the Omicron variant and the rise in COVID-19 case counts across the country. In response, the University is continuing to assess our plans as we balance our commitment to health, safety and well-being with our commitment to providing the best possible learning, teaching, research and work experiences for all community members this winter.

Before the winter break, in response to public health guidance at that time, U of G decided to postpone the start of most in-person learning until Jan. 24. Since then, uncertainty and case counts have continued to increase.

Given the complexity and dynamic nature of the situation, we are undertaking considerable engagement with internal and external stakeholders to ensure that we have considered all perspectives. This includes working with local and provincial public health units to better understand the modelling projections and evolving context of COVID-19.

The University is carefully considering the guidance, perspectives and needs that have been shared. Please be assured that we will announce any changes to our winter 2022 course delivery plans for the Guelph and Ridgeway campuses by Jan. 14.

Throughout the semester, U of G will keep you updated about any changes and will prioritize your health and well-being. As we continue to hear from public health officials, we can protect ourselves by wearing well-fitting masks, physically distancing when possible, practising regular hand hygiene and, most importantly, getting booster doses. The University is now hosting a public vaccination clinic on campus in the Guelph Gryphons Athletics Centre, where you can receive first, second or third vaccination doses.

The pandemic continues to challenge us collectively and individually. Some of you - or those close to you - may have tested positive for COVID-19 over the winter break, or you may currently be experiencing symptoms. We know parents and guardians are balancing additional child-care responsibilities because of the shift to virtual learning for K-12 schools. Many are also struggling with additional mental health stressors. Reach out to your instructors, managers and counsellors when you need help, and please know there are resources and services available to you.

Thank you all for your continued dedication, patience and, above all, compassion. Kindness and empathy have gotten our community through challenges in ways that we would have thought impossible in March 2020. We have confidence we can – and will – do the same this semester.

Sincerely,

Charlotte Yates
President and Vice-Chancellor

Gwen Chapman
Provost and Vice-President (Academic)

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 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of

course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. 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

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).

9.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
