ENGG*3490 Introduction to Mechatronic Systems Design

01

Winter 2022
Section(s): C01

School of Engineering
Credit Weight: 0.75
Version 1.00 - January 17, 2022

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1 Course Details

1.1 Calendar Description

This course covers the design of mechatronic systems, which are synergistic, combinations of components and controls drawn from mechanical engineering, electronics, and computer engineering. The course covers the following areas: (1) modeling of mechatronic systems (mechanical, electrical/electronic systems) and understanding their behaviour, (2) sensing and measurement including a variety of mechatronics sensors (fundamentals and applications), (3) actuators specific to mechatronics including motors and drivers (fundamentals and applications), (4) basic microcontroller programming as well as sensor/actuator integrations, and (5) control and its applications in mechatronics.

Pre-Requisites: ENGG*2340, ENGG*2450
Co-Requisites: ENGG*3410

1.2 Course Description

This course covers an introduction to mechatronics systems. Mechatronics, in general, is involved with mechanical, electrical and computer systems. Recently, mechatronics have found a variety of applications in many fields especially in the automation and manufacturing industries. In this course, you will learn about mechatronics systems: how are they designed and controlled. We will cover programmable logic controller (PLC), review and modeling of mechatronic systems, sensing and measurement, sensors and applications, actuators and their applications, modeling and control of electric motors (dc and ac), as well as stepper and servo motors. You will learn important concepts such as analog/digital or digital/analog conversion. Microprocessors and microcontroller structures will be introduced and discussed. As well, some control techniques for mechatronic systems will be introduced, and finally mobile robotic systems and their recent advances will be reviewed. By the end of the

term, you should have a good understanding of design, modeling and control of mechatronic systems. This course contains theory and practical applications of those systems. More importantly, the course has hands-on labs which provide you with great skill sets required to succeed in your career. This course covers the following topics:

1. Introduction to mechatronic systems: basics
2. Sensors and instrumentation
3. Modeling of Mechatronics systems
4. Response
5. Actuators and Motors
6. Microprocessor and microcontroller
7. Programmable logic controller (PLC)
8. Control

1.3 Timetable

Lectures

Monday: 1:30 pm–2:20 pm, CRSC, Room 117

Wednesday: 1:30 pm-2:20 pm, CRSC, Room 117

Friday: 1:30 pm–2:20 pm, CRSC, Room 117

Laboratory:

Monday: 08:30 AM - 10:20 PM, THRN, Room 2307

Wednesday: 08:30 AM - 10:20 AM,THRN, Room 2307

* The TA will conduct all the labs. Once the grouping is done and you receive your equipment, you will perform the labs at home. The TA will provide all the necessary instructions and arrange with the students for grouping and equipment pick up the first week of classes. This information will be posted on the Courselink. For all the lab related materials, equipment, reports, etc. please contact the TA.

Note: Labs start the week of January 17

1.4 Final Exam

Final Exam: 30%

7:00 PM - 9:00 PM (2022/04/20), detailed instructions will be given in the semester before the exam. Please also check WebAdvisor for details.

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2 Instructional Support

2.1 Instructional Support Team

Instructor: Jhantu Kumar Saha Ph.D., EIT
Email: jsaha@uoguelph.ca
Telephone: 519-824-4120 Ext.53385
Office: THRN 2361
Office Hours: TBA on CourseLink or By Appointment

Lab Technician: Kevin Dong , P.Eng.
Email: kdong@uoguelph.ca
Telephone: 519-824-4120 x53729
Office: RICH 2506
Office Hours: By Appointment

2.2 Teaching Assistants

Teaching Assistant (GTA): Spencer Ploeger
Email: sploeger@uoguelph.ca
Office Hours: TBA on CourseLInk or By Appointment

Note: For the labs, please do not contact the professor. For all the labs related questions including the lab reports please contact the TA (Spencer Ploeger).

Teaching Assistant (GTA): Ruthvik Raja Munirrajappa Venkata
Email: rmunirra@uoguelph.ca
Office Hours: TBA on CourseLink or By Appointment

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3 Learning Resources

3.1 Required Resources

Course Website (Website)

News, homeworks, announcements, and grades will be regularly posted to the ENGG*3490 Courselink site. Students are responsible for checking the site very regularly.

Required Resources (Other)

Students are expected to attend all the lectures. Students are responsible for whatever material is taught in the class. Note that the textbook may not have all the material taught in the class.

There is no single textbook that can cover all the material taught in a Mechatronics course in general, simply because Mechatronics is multidisciplinary. The following book is a great

source:

“Mechatronics: A Multidisciplinary Approach”, W. Bolton, 6th edition, Prentice Hall, 2015.

3.2 Recommended Resources

Recommended Resources (Textbook)

“Applied Mechatronics”, A. Smaili, F Mrad, Oxford University Press, 2008.

“Programmable Logic Controllers”, Frank D. Petruzella, 3/E, McGrawHill, 2005.
“Mechatronics”, Dan S. Necsulescu, Prentice Hall, 2002.

“Principles of Robot Motion”, H. Choset, K. M. Lynch, S. Hutchinson, G. Kantor, W. Burgard, L. E. Kavraki and S. Thrun, MIT Press, Boston, 2005.

"Electric Machinary Fundamental”, by S. J. Chapman, McGraw-Hill, 5th edition, 2011.

“Principles and Applications of Electrical Engineering”, by G. Rizzoni, McGraw-Hill, 5th edition, 2007. “Electric Machinary Fundamental”, by S. J. Chapman, McGraw-Hill, 5th edition, 2011.

“Programmable Logic Controller”, J. R. Hackworth, F. D. Hackworth, Jr., 4th edition, Prentice Hall, 2004.

3.3 Additional Resources

Additional Resources (Other)

Lecture Information: Students should attend the online classes and make their own notes. The lecture notes will be posted on the Courselink after each class.

Lab Information: The handouts for all the lab sessions will be posted in the lab section in the Courselink. All types of resources and links to web pages can be found in this section.

Homework: Homeworks with solutions will be posted on the Courselink.

Miscellaneous Information: Other information related to Mechatronics are also posted on the web page.

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4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Learn how to work with sensors; learn how to acquire data; learn how to calibrate

sensors.
2. Learn how to work with actuators and micro-controllers; learn to connect sensors and actuators to micro-controllers; learn to program micro-controllers.
3. Learn how to integrate mechatronics components
4. Learn how to design, solve problems, and perform data analysis for mechatronics systems.
5. Learn reporting and engineering communication.

4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome
2	Problem Analysis	1, 2, 3, 4
2.2	Identify, organize and justify appropriate information, including assumptions	3
2.3	Construct a conceptual framework and select an appropriate solution approach	3
2.4	Execute an engineering solution	4
2.5	Critique and appraise solution approach and results	1, 2
4	Design	3
4.1	Describe design process used to develop design solution	3
7	Communication Skills	5
7.1	Identify key message(s) and intended audience in verbal or written communication as both sender and receiver	5

5 Teaching and Learning Activities

5.1 Lecture

Topics: Background and Review

Topics: Electrical/Electronic Systems & Modeling with Applications
References: Class lectures

Topics: Mechanical Systems Modeling
References: Class lectures

Topics:	System response
References:	Class lectures
Topics:	Principles of sensing
References:	Class lectures
Topics:	Sensors
References:	Class lectures
Topics:	Actuators and Motors
References:	Class lectures
Topics:	PLC
References:	Class lectures
Topics:	Control concepts
References:	Class lectures
Topics:	Control design: state space
References:	Class lectures
Topics:	Mobile Robots and Application (if time permits)
References:	Class lectures

5.2 Lab

Topics:	There is no labs the week of January 10
Topics:	Week of January 17: Overview of labs 1 and 2, and project, safety, group formation
Topics:	Week of January 24: Questions/answers regarding labs and Introduction to Lab #1
Topics:	Week of Jan 31: Lab 1 Sensor Measurements

Topics:	Week of Feb 7: Introduction to Lab #2 and Demonstration to Lab #1
Topics:	Week of February 15: Lab 2 DC Motors
Topics:	The week of February 21 is the reading week and there will be no lab that week
Topics:	Weeks of Feb 28, Lab 2 demonstration due, Project Introduction March 7,14,21,28, April 4 Questions and Answers about Project/Course, Project Work Period
Topics:	Project Milestone: Integration of Sensors with Arduino: March 14 for Monday labs, March 16 for Wednesday labs
Topics:	Project Milestone: All Machining Completed: March 21 for Monday labs, March 23 for Friday labs
Topics:	Project Milestone: Final Demonstrations- Week of April 4, in lab

Topics:	Final Project "Report" Due: April 4 by 5:00 PM (the entire class)

5.3 Other Important Dates

Monday, January 10, 2022: First day of classes

Monday, February 21, 2022: Winter study week, no classes, no labs

Friday, March 11, 2022: 40th class day

* labs start the week of January 17

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6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Lab	15
Midterm	10
Project	45
Final Exam	30
Total	100

6.2 Assessment Details

Lab 1 (7.5%)

- Demonstration to Lab 1 will be done and Introduction to Lab #2 on the week of Jan. 31
- Lab 1 report due: the week of Feb. 7 by 5 pm (which means the lab report due for Monday labs is Feb. 7 by 5 pm and for Wedneday labs is Feb. 9 by 5 pm)
- Lab reports submission: Dropbox (in Courselink)

Lab 2 (7.5%)

- Demonstration to Lab 2 will be done on the week of Feb. 28
- Lab 2 report due: the week of Feb. 28 by 5 pm (which means the lab report due for Monday labs is February 28 by 5 pm and for Wednesday labs is March 2 by 5 pm)
- Lab reports submission: Dropbox (in Courselink)

Midterm (10%)
Date: Mon, Mar 7
Learning Outcome: 4
Monday Mar 07, 2022, exam time: class time: detailed instructions will be given in the semester before the exam.

* If you miss a test only due to grounds for granting academic consideration or religious accommodation, the weight of the missed test will be added to the final exam. There will be no makeup midterm tests.

Project Milestone #1: Build robot structure (5%)
Date: Mon, Mar 14
Learning Outcome: 1, 1, 1, 1, 1, 1, 3

Project Milestone #2: Integration and test (5%)
Date: Mon, Mar 21
Learning Outcome: 1, 1, 1, 4
• Please see next for details, milestones, and deadlines.

Final Project Demonstration (25%)
Date: Mon, Apr 4
Learning Outcome: 1, 1, 1, 4

Week of April 4, in lab
• Please see next for details, milestones, and deadlines.

Final Project Report (10%)
Date: Mon, Apr 4
Learning Outcome: 5
• Please see pages next for details and the deadline.

Final Exam (30%)
Date: Tue, Apr 20, 7:00 PM - 9:00 PM
Learning Outcome: 4
7:00PM - 9:00PM (2022/04/20): detailed instructions will be given in the semester before the exam. Please also check WebAdvisor.

6.3 6.2 Final Project

Final Project

The description of the project with all the necessary details will be posted on the Courselink.

For the course project, you are required to design and build an autonomous mobile robot that is capable of navigating a maze. The maze, which we call it also 'environment' is composed of several obstacles (both static and dynamic). Building includes mechanical design and fabrication of the robot as well as mounting microcontrollers and on-board sensors. Please visit the course webpage on the Courselink for information about the maze and all the dimensions.

The robot should be able to start from a known starting point, 'start', identify the environment and navigate through the maze until it reaches a 'goal'; the location of 'goal' is also known.

Note 1: Each group consists of 5~6 people (max. 6). Each group **must** contain **at least** one mechanical student due to shop policies. It is also **recommended** that your group include one ES&C or Computer student if possible.

Note 2: There is no late policy for the final demo. Late demonstration is not acceptable. Each group needs to demonstrate their project (whatever they have done by the deadline).

Report deliverables will be marked based on the requirements detailed in the Report Deliverables Section. All reports are to be submitted on-time. The design will be scored such

that the best design in each category will receive the highest mark for that respective category.

Table 1(a): Important dates

Item	Assigned / Start	Due / Finish	Mark
Demonstration	Jan 10	Week of April 4, in lab	25
Final Design Report	---	April 4, 5pm	10

Table 1(b): Project Completion Intermediate Milestones

Milestones	Due by / Finish	Mark
Robot Structure	Week of March 14, in lab	5
Integration and Test	Week of March 28, in lab	5

Project marking

The project demonstration will be marked out of **25**. The mark breakdown depends on the

following categories: (1) design (**8%**), (2) performance (**12%**), and (3) speed (5**%**).

Design (8%)

The first category is broken down into three subcategories as outlined in the table below.

Table 3: Design category Marks Weighting

Subcategory	**Weight**
Relevance to Mechatronics Design	4
Conformance to Dimensions specifications	2
Quality of Design – (machining, final look)	3
Circuitry Quality (neat, clean)	1

Relevance to Mechatronics Design: ENGG*3490 main emphasis is one mechatronics design and full mark will be given if all the relevant sensors and actuators are fully utilized. Justification for using the sensors needs to be reflected in the final report. For every sensor that is neither suitably used nor any acceptable justification provided one mark will be deducted.

Conformance to Dimensions specifications: groups should design their robot to conform to the dimensions of minimum of 12 cm to maximum of 25 cm (these dimensions include the entire exterior of the robot). Maximum tolerance of 5% is accepted. There is no restriction on the height.

Quality of Design – machining: Your final robot should be a product of systematic application of a well thought out design process that meets the project requirements. Your final design should reflect this fact and hence poorly machined parts or subsections of the mechanism that are products of "last minute" tweaking to ensure the objective is met will not be looked at favorably during the final evaluation. Your design should demonstrate that considerable time has been allocated to the implementation of the predefined design process. Also, your final product should reflect the fact that time was spent in the machine shop to ensure the integrated system is robust and was not put together in a rush to meet the competition deadline. Poorly-machined or integrated parts in your final design will result in mark deduction in this subcategory.

Circuitry Quality: you should also do a great job with circuity layout and make sure all the connections and wirings are done neatly and nicely. It is important not to just have a functional electronic system, but also a product that looks professional.

Performance (12%)

This category relates to efficiency of the autonomous system. At the end of completion, robot should get to the final goal position while not having any collisions with the walls or obstacles.

For a robot that gets from start to goal without any collisions, a full mark of 12/12 is guaranteed in this category. Every time the robot hits a wall 3 marks, collides with an obstacle 2 marks (for each obstacle) will be deducted. Partial marks will be given if a robot could not

finish the task completely, i.e., if the robot finishes roughly x% of the course, then (x/100)*12 marks will be given.

Speed (5%)

The third category depends on speed of the robot for navigating the environment from start to goal.

- For groups that scored 12/12 in performance, a full mark of 5/5 in speed will be awarded to the group that completes the maze perfectly (no collision etc.) in the fastest time. The group that requires the longest time to navigate the entire maze will receive a mark of 2.5/5 in this category. The mark for all other groups (that successfully completed category 2) will be spanned linearly between 5/5 and 2.5/5.
- All groups that fail to score 12/12 in performance will be placed in a separate poll for evaluation for speed. They will be ranked based on the speed of robot and their mark in this category will be calculated as (mark in performance/12)*(5)*(speed of fastest group in the pool)/recorded speed of the group.

6.4 Important Note

While you are encouraged to discuss with other classmates about the labs, there is zero tolerance for plagiarism or copying. Cases of academic misconduct will be reported.

While the university's current plan is to return to previously scheduled F2F activities on Jan 24, it is difficult to predict the potential impacts of Covid/Omicron, remote learning, Instructor will accommodate various situations if they arise, including pivot to online assessments, changing the course project/labs, if necessary.

6.5 Final Project

Final Design Report

The purpose of this report is to communicate the progress leading up to your group's resulting design. It will detail your design specifications, explaining calculations and analyses that ensure that your final design meets specifications. It should also include all microcontroller program code and a description of the logic you used to navigate your robot. Any further testing, simulation, and results should be detailed and discussed. In addition, this report will also include changes to budgetary and scheduling plans. While the report should be comprehensive and include all the necessary information, it should not exceed **10 pages**. Appendices and codes are not counted toward the 10 page limit. Both hard and soft copies are required for submission. Reports should be submitted to the TA and are due by 5:30 pm on April 4th. Reports that are not submitted by 5:30 pm on April 4th will not receive any marks.

6.6 Important Note regarding exams

- Both midterm and final exams are closed-book, closed-notes. Both midterm and final exams have problems. For both exams you are allowed to bring your own **only one-page** aid sheet (double-side) A4 size and can **only** have formulas (**No** solved problems, no derivations, no description, no explanation, no figures, no diagrams, no graphs, no curves, no tables, etc.) **Any deviations from this** will result in **40%** deduction of your exam mark.

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7 Course Statements

7.1 Course Grading Policies

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. 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

As for the midterm: there is no make up for missed midterm. Students who miss the midterm due to valid reasons (e.g. illness, etc.), must email the instructor first. If the instructor approves, the weight of the midterm exam will be transfered to the final exam.

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor at the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Passing grade: In order to pass the course, you must obtain a grade of 50% or higher in total.

Lab Work: You must attend and complete all laboratories. If you miss a laboratory due to grounds for granting academic consideration or religious accommodation, arrangements must be made with the teaching assistant to complete a makeup lab.

Late Lab Reports: Late submissions of lab reports will **not** be accepted.

Lab Equipment Return Policy: the equipment that will be lent to the students belong to the lab and must be returned toward the end of the semester. All the groups must return the equipment in the same condition that was lent to them at the beginning of the semester. Toward the end of the semester, the TA will arrange a date for equipment return. If any group fails to return the equipment by the allocated time, they will not receive a mark for this course. Students should work with all the components very carefully and delicately to make sure they are not damaged.

7.2 Relationships with other Courses & Labs

Previous Courses:

ENGG*2340: Systems, first-order, 2nd order systems, signals
ENGG*3450: Fundamentals of DC and AC circuits, KVL, KCL

Courses:

ENGG*3410: Control systems, feedback, etc.

Follow-on Courses:

ENGG*4480: Advanced Mechatronics
ENGG*4030: Manufacturing System Design
ENGG*4480: Advanced Mechatronic Systems Design

8 School of Engineering Statements

8.1 Instructor's Role and Responsibility to Students

The instructor’s role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink but these are not intended to be stand-alone course notes. Some written lecture notes will be presented only in class. During lectures, the instructor will expand and explain

the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and labs.

8.2 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and lab sessions. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

8.3 Lab Safety

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

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

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