

Course Outline (F2021-W2022)

BME70AB: Biomedical Engineering Capstone Design

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<p>Calendar Description</p>	<p>This two-term course provides a training platform for systematic open-ended design process and project management. Student groups apply their acquired knowledge and engineering skills to develop and build a design project from concept to working prototype. The lecture component provides advice and information on the design process, project management, reliability, system components, documentation, safety, and program specific aspects. In the laboratory component, once a project topic is assigned, student groups plan, design, source components, build, test/debug, and analyze, under the supervision of a faculty lab coordinator and submit a final design project report.</p>
<p>Prerequisites</p>	<p>BLG 601, BME 501, BME 516, BME 632, BME 639, BME 674, EES 612, BLG 701, BME 506, BME 423, BME 406, and MTH 410</p>
<p>Antirequisites</p>	<p>None</p>
<p>Corerequisites</p>	<p>None</p>
<p>Compulsory Text(s):</p>	<p>1. Teamwork and Project Management, Karl A. Smith, 3rd edition, McGraw Hill, 2004</p>
<p>Reference Text(s):</p>	<p>1. Design of Biomedical Devices and Systems, Paul H. King and Richard C. Fries, 2nd edition, CRC press, 2008. 2. Standard Handbook of Biomedical Engineering & Design, M. Kutz, 2002, McGrawHill</p>

3. The Biomedical Engineering Handbook, Joseph D. Bronzino, 2000, CRC Press(Available online at Ryerson Library)

At the end of this course, the successful student will be able to:

1. Develop creative thinking and capabilities of conducting research/interconnecting various engineering knowledge to formation of realistic designs. **(1c), (1d)**
2. Develop ability and technical skills to make decisions in engineering designs using judgement in solving problems with uncertainty and imprecise information. **(2a)**
3. Understanding foundational elements of the engineering design, and using principles of natural and engineering sciences, and mathematics in arriving at design solutions iteratively using feedback. **(3a)**
4. Experimental data collection by following appropriate principle of sensing and measurement, and using critical skills of data analysis by appropriate usage of statistical principles. **(3b)**
5. Develop skills of problem solving, systematic diagnose, trouble shooting, critical path analysis, logical decision, and engineering trade-off. **(4a), (4c), (4b)**
6. Develop students' ability of implementing prototype design, measurement and performance analysis. **(5a), (5b)**
7. Develop project management and teamwork skills, which includes leadership, organization, planning, motivation, conflict resolution, design process management, co-operation and contribution, decomposing project into key tasks, determining tasks inter-relationship, and managing project to meet budget and time line. **(6a), (6b)**
8. Demonstrates written communication skill through the ability of constructing effective arguments and drawing conclusions using evidence in discussing design choices, using technical vocabulary, and presenting information clearly and concisely. Develop reporting and technical writing skills through timely project progress reports and final report. Also, develop presentation skill through milestone demonstrations and public presentation in open-house. **(7a), (7b), (7c)**
9. Develop reporting and technical writing skills through timely project progress reports and final report. Also, develop presentation skill through milestone demonstrations and public presentation in open-house. **(8a), (8b)**
10. Considering sustainable design elements during phased-design stages, and taking into account regulatory and safety standards as applied to healthcare technology development and enablement **(9a), (10a)**
11. Develop project management and teamwork skills, which includes leadership, organization, planning, motivation, conflict resolution, design process management, co-operation and contribution, decomposing project into key tasks, determining tasks inter-relationship, and managing project to meet budget and time line. Understand systematic decomposition of project into key tasks, determine tasks inter-relationship, and manage project to meet budget and time line. **(11b)**
12. Develop resource management skills during project management phase, and in evaluating the functional aspects of the final design. **(11a)**
13. Exposure to state-of-the-art literature and summarizing as part of the written report, and communicating during oral exam and open house demos. Demonstrate ability to assimilate existing knowledge of the field, understand how literature is produced and maintain currency. **(12b), (12a)**

NOTE:Numbers in parentheses refer to the graduate attributes required by the Canadian Engineering Accreditation Board (CEAB).

Learning Objectives (Indicators)

Course Organization

1.0 hours of lecture per week for 13 weeks
5.0 hours of lab per week for 12 weeks
0.0 hours of tutorial per week for 12 weeks

Teaching Assistants

NA

Course

Evaluation

Theory	
Design Process and Project Management Exam (A) I	6.25 %
Seminars and Quizzes (A) I	2.5 %
Report summarizing design activities (A) I/G	7.5 %
Final Engineering Design Report (B) G	22.5 %
Laboratory	
Milestones and Milestone Compliance Reports (A) I	3.75 %
Project Oral Exam (A) I	5 %
Project Management and Teamwork (B) I	11.25 %
Milestone Compliance Reports (B) I	11.25 %
Milestones and Final Demonstrations (B) I	11.25 %
Project Oral Exam (B) I	15 %
Open-House Participation (B) I	3.75 %
TOTAL:	100 %

Note: In order for a student to pass a course, a minimum overall course mark of 50% must be obtained. In addition, for courses that have both "**Theory and Laboratory**" components, the student must pass the Laboratory and Theory portions separately by achieving a minimum of 50% in the combined Laboratory components and 50% in the combined Theory components. Please refer to the "**Course Evaluation**" section above for details on the Theory and Laboratory components (if applicable).

Examinations

Course evaluation will be based on students' performance and design reports. Each project group consists of 4 students. Each student will be evaluated both individually and as a group.

BME 70A (Fall Term)
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Please refer to "Activity Schedule" table at the end of the course outline for the time line for exams, evaluation, and deadlines.

Examination on "Design Process and Project Management" is carried out in Week F6 (tentative).

Students must attend specified seminars (& quizzes) and submit project milestones and milestones compliance reports as per the "Activity Schedule" to their FLC for evaluation prior to meeting with their FLCs.

Project design oral exam will be conducted in weeks F12-F13 (tentative). Students "individually" should demonstrate a thorough knowledge of their EDP through the oral examination by their assigned FLC

The written report at the end of the Fall term (week F13) will be assessed not only on their technical merit, but also on the communication skills of their author as exhibited through the reports. The written report will be evaluated as follows:

- i) Introduction and Objective

-Statement of the problem, clarification of need and requirements

ii) Approach and Methods

-Relevant literature review, use of suitable engineering concepts and methods
-Alternative design approaches examined and analyzed

iii) Design Analysis and Synthesis

-Design specifications, challenges and methodology
-Use of modern concepts and methods for data gathering, analysis, and synthesis
-Charts on the design process

iv) Technical Writing and General Organization

-English, spelling, conciseness, clarity, cover page, index, sequence of chapters, references, appendices, overall adequacy, and integration of the report

BME 70B (Winter Term)

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Please refer to "Activity Schedule" table at the end of the course outline for the time line for exams, evaluation, and deadlines.

(a) Project Management & Teamwork: The FLC will mark each student in each phase in his/her role as a Manager/Team Leader (Leadership, Conductor of meetings, Organizer/planner/motivator, Conflict resolution) or as a Team Member (Co-operation, Contribution, Conflict resolution).

(b) Milestones Compliance Report, Milestones & Final Demonstration: Students are required to demonstrate milestone compliance (& submit milestone compliance report) during the 4 phases of the project, and build a working prototype. Failure to do so will automatically result in a FAIL grade. Students who do not keep their FLC advised of their progress on a weekly basis may be refused an oral examination because authorship and contribution to the project is questionable.

(c) Project design oral exam will be conducted in weeks W12-W13 (tentative). Students "individually" should demonstrate a thorough knowledge of their EDP through the oral examination by their assigned FLC

(c) Open House Presentation: Students are required to participate in an "Open House" exhibition that will be scheduled by the department. Please advise prospective employers of this requirement. At the Open House, students will demonstrate and discuss their project with visitors from the academic community, their peers, and visitors from industry. Participation in this exhibit may result in a grade revision for enhancements or improvements to the project. Students absent from the Open House will have their grade reflect this.

(d) Final Engineering Design Report (W13): The main body of the final report is limited to 40 pages, including text, analysis equations/algorithms diagrams, schematics, tables and references list. Additional material (e.g. source code, datasheets, etc.), not subjected to grading, can be inserted in the APPENDIX. Mark reduction will be applied for report exceeding the 40-page limit. One unbound copy of your group final Engineering Design report is required to submit to your FLC by the deadline set by dept/Course Coordinator. A report submitted without prior satisfactory demonstration of your group project will automatically be given a FAIL grade. The format of the report should conform to professional standards and adequately document the design activities. If the project includes software, the source code must be included/uploaded with the report. The final report will be returned to the students during the Open House together with corrections and suggestions for improvement. The students must make the necessary revisions and submit the final version by the deadline set by the department/CC. If the deadline set by the department/CC is not met for Engineering Design Report submission, the student will not be eligible to graduate. All written reports will be assessed not only on their technical merit, but also on the communication skills of the author as exhibited through these reports.

**Other
Evaluation
Information**

The EDP grade awarded to a student who has completed all the requirements, including a successful and timely project demonstration and oral examination, is based on an assessment made by their FLC. Though the wide variation in EDP topics, approach, and challenges encountered by the student does not allow a precise marking scheme to be uniformly applied, the factors described below will be weighted by the FLC in determining the student grade.

(a) Design and Laboratory Work

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All EDPs require that a concept, an idea, bounded by design specifications in the EDP topic description be researched to provide sufficient knowledge to enable a realistic design be fleshed out. This design is implemented in the laboratory. The foundations for the EDP grade rest on the design and implementation process. Unless the design is sound and based on solid engineering, the laboratory time will be inefficiently used and the effort frustrating to all involved including the FLC.

Even with a good design, the student will be challenged with implementation and bringing the design to life. The key aspect is the process by which the student tackles the challenges encountered. Is a problem analysed to thoroughly understand its root and a logical decision made as to what options are viable and a strategy devised to confirm the diagnosis and attempt a solution, or is a trial and error quick-fix method employed? How systematic and skilled are the troubleshooting procedures employed; for instance, are results studied carefully or program flow examined etc?

Other factors used in evaluating lab performance include time and project management skills. How well did the student meet milestones and GANTT chart schedules, and the consistency with which the project was tackled and ongoing technical documentation?

The variations in project topic and approach, student creativity, ingenuity, novelty and complexity of implementation or success in meeting practical implementation challenges are all factors in grading decisions. Although a project that has been demonstrated as meeting or exceeding the initial requirements is fundamental for a good grade, the FLC will consider all the aspects in establishing the final grade.

(b) Reports (70A & 70B)

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The report (70A & 70B) are essential and important course components. These are the documents on which anyone not intimately involved with the laboratory work assesses the project. The report should adequately describe the design activities undertaken in the project. Poor EDP reports will certainly demerit even excellent laboratory performance and will be reflected in the overall course grade.

Report (70A): The report summarizing design activities at the end of 70A will normally contain the following standard sections:

Title Page, Acknowledgements, Certification of Authorship, Table of Contents, Abstract, Introduction & Background, Objectives, Approach and Methods, Design Analysis and Synthesis, Conclusions, Appendices, and References.

Final EDP Report (70B): The Final EDP report (70B) will normally contain the following standard sections:

Title Page, Acknowledgements, Certification of Authorship, Table of Contents, Abstract, Introduction & Background, Objectives, Theory and Design, Documentation including Schematics and Parts Lists, Measurement Procedure, Performance Measurements, Analysis of Performance, Conclusions, Appendices, and References.

Additional Information: Particularly in engineering, it is essential that a project be properly designed. A designer must satisfy the examiner, the FLC, that the program or circuit will perform its tasks to specification under all or at least the usual, variations in the operating or manufacturing environment.

Such issues as component tolerance, voltage variations, maximum and minimum computer cycle times and data throughputs are examples of variables. In other words, the examiner must be convinced that the project is battle-proof and its operation at the demonstration is not an unusual event. Another guide used to assess whether the design is competent is to consider the mass production of this prototype. Could one anticipate a reasonable yield and customer satisfaction? The working prototype performance must be measured to quantify the extent to which it meets the design specifications. The procedure used to measure performance is to be described in sufficient detail that the reader can repeat it. The measured results must be documented in conjunction with appropriate schematics or flow charts. The results should be analysed to ensure that they fit the anticipated performance and if not an explanation is called for. The abstract must accurately précis the entire report contents in half a page or less. The conclusions should address the project's objectives; to what extent were they met? Where schematics and quotations are taken verbatim from other sources, these sources must be acknowledged to avoid the potentially serious charges of plagiarism.

(c) Project Management

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The project teams are required to demonstrate their project management skills by implementing the theory learnt into practice. The objectives of the evaluation process are as follows:

- i) Each team member receives fair amount of training in project management, and is required to demonstrate the skills of a project manager.
- ii) A project manager is evaluated for his/her capability of planning and achieving a tangible deliverable that can be demonstrated.
- iii) Each student is also required to demonstrate the behavior of a professional team member.

Following management attributes and skills are used in the evaluation process:

- Project Management Attributes
- Leadership
- Manager of design process
- Motivator
- Organizer/planner

iv) Skills used to exhibit project management attributes

- Understanding and managing scope of work/deliverables
- Design review meeting, recording of minutes and design discussion
- Timely follow-up
- Learn to identify strengths/weaknesses
- Conflict resolution
- GANTT chart, Critical Path analysis

The 70B semester is divided into four phases of three weeks each:

- Phase 1: Week W1, W2 and W3
- Phase 2: Week W4, W5 and W6
- Phase 3: Week W7, W8 and W9
- Phase 4: Week W10, W11, and W12

v) One student will act as a manager/team leader within a phase, thus each student will get a chance to play the role of manager/team leader

vi) The team will select their manager/team leader for each phase at the beginning of the respective phases and

provide the names to the FLC

vi) Each student is marked in each phase in his/her role according to the following metric:

- Manager/Team Leader
- Leadership
- Conductor of meetings
- Organizer/planner/motivator
- Conflict resolution
- Team Member
- Co-operation
- Contribution
- Conflict resolution

Project management evaluation:

-FLC may attend one group meeting in each phase as an observer

-Each project manager is required to submit a tangible deliverable that can be demonstrated in the lab at the end of his/her term, and a plan to achieve that deliverable.

-Student's role is evaluated during the weekly progress meeting, through milestone submissions, milestones compliance reports, and exhibits.

-The group may be requested to provide necessary information/documents that help FLC in evaluating their project management role.

IMPORTANT NOTE: BME70A/B is a two-term course. If the course is dropped in either of the terms or receive a "F" grade in the course, the entire course has to be repeated.

Teaching Methods

The lectures/seminars, quizzes, exams, and meetings with the FLCs will all be virtual (Zoom or Google Meet) unless otherwise specified. In the event University is not open for in-class/in-lab activities during the Winter term (70B), your EDP topic specifications, requirements, implementations, and assessment methods will be adjusted by your FLCs at their discretion that is suitable for online methods and assessments.

Other Information

Course Organization Details (BME 70A) [2 hrs Lec/Lab]

The engineering design projects are selected from a published list of project topics on the course D2L web site. The description of each topic contain a preamble that gives an overview of the project and explains why it is of interest. Partial specifications, objectives, and suggested approach are included. All topics are 4-student projects. Note: BME students can only choose project topics from BME 70A/B approved list of projects.

Once the EDP topics are posted in the D2L, students can contact the professors teaching this course termed the Faculty Lab Coordinators (FLCs) to discuss their project topics available for student selection and the design challenges for those projects. If a student(s) wishes to propose (or) modify a topic, the student should first choose the topic(s) closest to their likes from the approved list of BME EDP topics and go through the BME EDP topic selection process. Once they are assigned a topic by the computer selection process, they can then discuss with their assigned FLC to modify their topics subjected to the approval of their respective FLCs.

In Week F3 (tentative) lecture hour, a seminar on "Design Process and Project Management" is scheduled. During Week F2, students must select their project topics online using our Department's computers. The actual dates of the computer topic selection and the procedure will be announced. If more than one group of students selects a particular project topic, the approval of the selection is

based on a random process; those who do not get the approval will re-select another topic.

Once topics are assigned to the groups, the students will start the design activities and meet with their FLCs regularly the following weeks of the course. Students must attend specified seminars (& quizzes) and submit project milestones and milestones compliance reports as per the "Activity Schedule" to their FLC for evaluation prior to meeting with their FLCs. During the weeks when seminars/quizzes/exams are scheduled, it is student responsibility to discuss with their FLCs ahead of time and identify alternate meeting times.

In Week F6 (tentative) lecture hours, students must do an examination on the subject of Design Process and Project Management. During Weeks F7 to F11, students attend seminars* (that will be announced on the course D2L web site) and/or carry out design work and report to their designated FLC. Seminars may be team taught by the guest speakers or FLCs. These seminars will be scheduled and announced on the course D2L website.

*Note: Weeks F7-F11 are tentatively planned for seminars/quizzes, the actual weeks will be announced subjected to the availability of the guest speakers.

During Weeks F12/F13, students must do their Oral Exam with their designated FLCs and submit their report in Week F13.

Course Organization Details (BME 70B) [5 hrs Lab]

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The winter semester is divided into four Phases (I, II, III, and IV). Each phase consists of three weeks. One student will act as a project manager/team leader within a phase, thus each student will have a chance to play the role of manager/team leader. The team will select their manager/team leader for each phase at the beginning of each of the phases and provide the names to the FLC.

In each of the phases, students will decide on the project manager/team leader for that Phase. After discussing with the team members the project manager will submit the milestones & deliverables for that Phase to the FLC (please refer to the GANTT chart that will be posted for due dates). The team will work towards completing the milestones, submit a milestone compliance report, and demonstrate the deliverables for that Phase by the end of the Phase. This cycle repeats until all four phases are completed and the deliverables are demonstrated to the FLC.

The project manager responsible for Phase II will also submit the theory and design sections of the EDP report. During each of the phases (i.e., the 3 weeks period) the respective project managers are responsible for submitting 3 weekly minutes of the meeting and 1 milestone compliance report to the FLC. During the FLC evaluations of deliverables, it will be the project manager's responsibility to explain and discuss with FLC on what was accomplished towards the stated milestone deliverables; what each member accomplished; and to conduct and manage the demo session. The FLC may ask any member of the team for further verification of his/her aspects of the contributions.

In Week W12, individual project contribution summary will be submitted to the FLCs. Individual oral exam are scheduled during the Week W12 and/or W13. The team will submit their final EDP report during Week W13. Following Week W13, the team will present their project during the open house scheduled by the department and will submit the final EDP report to the department and FLC

Project Cost, Equipment, and Laboratories

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Project costs for components and other supplies will be borne by the students. Some specialized components may be provided by the Department. This will be noted in the project description. Students should carefully assess the cost implications of a particular project before making a commitment. Requests for equipment or laboratory usage outside of your scheduled lab hours should be directed to your FLC.

Course Content

Week	Hours	Chapters / Section	Topic, description
F1-13 & W1-13 (26 weeks)			Biomedical Engineering Capstone Design (BME 70 A/B)

Laboratory(L)/Tutorials(T)/Activity(A) Schedule

Week	L/T/A	Description
F1	-	Presenters/Evaluators: EDP Coordinator, FLCs, Staff Activities: Course Management, EDP Topics
F2	-	Presenters/Evaluators: EDP Coordinator, FLCs, Staff Activities: Computer Selection of EDP Topics, Lab Safety, Begin Meetings with FLCs
F3	-	Presenters/Evaluators: EDP Coordinator, FLCs, PM Faculty Activities: Design Process and Project Management Seminar/ FLCs Meetings and Design Activities/ Project Milestone Submission (BME70A)
F4	-	Presenters/Evaluators: FLCs Activities: FLCs Meetings and Design Activities
F5	-	Presenters/Evaluators: FLCs Activities: FLCs Meetings and Design Activities/ Milestone Compliance Report (MCR) submission (St1)
F6	-	Presenters/Evaluators: EDP Coordinator, FLCs Activities: Design Process and Project Management Exam/ FLCs Meetings and Design Activities
F7	-	Presenters/Evaluators: Guest Speakers, EDP Coordinator, FLCs Activities: Seminar*/ FLCs Meetings and Design Activities/ MCR submission (St2).

		*Note: Weeks F7-F11 are tentatively planned for seminars/quizzes, the actual weeks will be announced subjected to the availability of the guest speakers.
F8	-	Presenters/Evaluators: Guest Speakers, EDP Coordinator,FLCs Activities: Seminar/ FLCs Meetings and Design Activities
F9	-	Presenters/Evaluators: Guest Speakers, EDP Coordinator,FLCs Activities: Seminar/ FLCs Meetings and Design Activities/ MCR submission (St3)
F10	-	Presenters/Evaluators: Guest Speakers, EDP Coordinator,FLCs Activities: Seminar/ FLCs Meetings and Design Activities
F11	-	Presenters/Evaluators: Guest Speakers, EDP Coordinator,FLCs Activities: Seminar/ FLCs Meetings and Design Activities/ MCR submission (St4)
F12	-	Presenters/Evaluators: FLCs Activities: Project Design Oral Exam
F13	-	Presenters/Evaluators: FLCs Activities: Project Design Oral Exam/ Final Report Submission/ Submission of BME 70B plan for all 4 phases
W1	-	Presenters/Evaluators: Course Coordinator (CC) Activities: Course Introduction, FLC meetings, Submission of Phase I milestones and deliverables by project manager of Phase I to FLCs.
W2	-	Presenters/Evaluators: FLCs Activities: FLCs Meetings and Design/Implementation Activities
W3	-	Presenters/Evaluators: FLCs Activities: Phase I MCR submission, deliverables demo., and evaluation, Selection of project manager for Phase II
W4	-	Presenters/Evaluators: FLCs Activities: Submission of Phase II milestones and deliverables by project manager of Phase II to FLCs.
W5	-	Presenters/Evaluators: FLCs Activities: FLCs Meetings and Design/Implementation Activities, Theory and design sections of report submission
W6	-	Presenters/Evaluators: FLCs Activities: Phase II MCR submission, deliverables demo., and evaluation, Selection of project

		manager for Phase III
W7	-	Presenters/Evaluators: FLCs Activities: Submission of Phase III milestones and deliverables by project manager of Phase III to FLCs.
W8	-	Presenters/Evaluators: FLCs Activities: FLCs Meetings and Design/Implementation Activities
W9	-	Presenters/Evaluators: FLCs Activities: Phase III MCR submission, deliverables demo., and evaluation, Selection of project manager for Phase IV
W10	-	Presenters/Evaluators: FLCs Activities: Submission of Phase IV milestones and deliverables by project manager of Phase IV to FLCs.
W11	-	Presenters/Evaluators: FLCs Activities: FLCs Meetings and Design/Implementation Activities
W12	-	Presenters/Evaluators: FLCs Activities: Phase IV MCR submission, deliverables demo., final project demo, and evaluation. Submission of Individual project contribution summary prior to oral exam. (Your FLC may choose to conduct oral exams in week W12 and/or W13)
W13	-	Presenters/Evaluators: FLCs Activities: Project oral exams and Final report submission
TBD	-	Open House Exhibition/Participation
-	-	<p>Additional IMPORTANT Information: =====</p> <ul style="list-style-type: none"> - Seminars will be arranged and the details will be posted on D2L. During the weeks with in-class activities, please arrange alternate meeting times with your FLCs. - Please refer to the GANTT chart (for 70B) that will be posted on D2L for specific due dates and deadlines for Winter term. - The above activity schedule is tentative and if there are any changes, announcements will be made on D2L.

Policies & Important Information:

Students must be reminded that they are required to adhere to all relevant university policies found in their online course shell in D2L and/or on the following URL: <http://ryerson.ca/senate/course-outline-policies>

1. Students are required to obtain and maintain a Ryerson e-mail account for timely communications between the instructor and the students;
2. Any changes in the course outline, test dates, marking or evaluation will be discussed in class prior to being implemented;
3. Assignments, projects, reports and other deadline-bound course assessment components handed in past the due date will receive a mark of ZERO, unless otherwise stated. Marking information will be made available at the time when such course assessment components are announced.
4. Ryerson senate policy 157 requires that any electronic communication by students to Ryerson faculty or staff be sent from their official Ryerson email account.
5. Familiarize yourself with the tools you will need to use for remote learning. The [Continuity of Learning Guide](#) for students includes guides to completing quizzes or exams in D2L or Respondus, using D2L Brightspace, joining online meetings or lectures, and collaborating with the Google Suite.
6. The University has issued a minimum technology requirement for remote learning. Details can be found at: <https://www.ryerson.ca/covid-19/students/minimum-technology-requirements-remote-learning>. Please ensure you meet the minimum technology requirements as specified in the above link.
7. Ryerson COVID-19 Information and Updates (available <https://www.ryerson.ca/covid-19/students>) for Students summarizes the variety of resources available to students during the pandemic.
8. Refer to our **Departmental FAQ** page for information on common questions and issues at the following link: <https://www.ee.ryerson.ca/guides/Student.Academic.FAQ.html>.

Missed Classes and/or Evaluations

When possible, students are required to inform their instructors of any situation which arises during the semester which may have an adverse effect upon their academic performance, and must request any consideration and accommodation according to the relevant policies as far in advance as possible. Failure to do so may jeopardize any academic appeals.

1. **Academic Consideration Requests for missed work** (e.g. missing tests, labs, etc) - According to [Ryerson Senate Policy 134](#), sections 1.2.3, if you miss any exams, quizzes, tests, labs, and/or assignments for health or compassionate reasons you need to inform your instructor(s) (via email whenever possible) in advance when you will be missing an exam, test or assignment deadline. When circumstances do not permit this, you must inform the instructor(s) as soon as reasonably possible "*In the case of illness, a [Ryerson Student Health Certificate](#), or a letter on letterhead from an appropriate regulated health professional with the student declaration portion of the Student Health Certificate attached. For reasons other than illness, proper documentation is also required (e.g. death certificate, police report, TTC report).* **ALL supporting documentation for illness or compassionate grounds MUST be submitted within three (3) working days of the missed work.** **NOTE: You are required to submit all of your pertinent documentation through Ryerson's online Academic Consideration Request system at the following link: <http://prod.apps.ccs.ryerson.ca/senateapps/acadconsform>.**
2. **Religious, Aboriginal and Spiritual observance** - If a student needs accommodation because of religious, Aboriginal or spiritual observance, they must submit a Request for Accommodation of Student Religious, Aboriginal and Spiritual Observance AND an Academic Consideration Request form within the first 2 weeks of the class or, for a final examination, within 2 weeks of the posting of the examination schedule. If the requested absence occurs within the first 2 weeks of classes, or the dates are not known well in advance as they are linked to other conditions, these forms should be submitted with as much lead time as possible in advance of the absence. Both documents are available at www.ryerson.ca/senate/forms/reobservforminstr.pdf. **If you are a full-time or part-time degree student, then you submit the forms to your own program department or school;**
3. **Academic Accommodation Support** - Before the first graded work is due, students registered with the [Academic Accommodation Support office](#) (AAS - www.ryerson.ca/studentlearningsupport/academic-accommodation-support) should provide their instructors with an Academic Accommodation letter that describes their academic accommodation plan.

Virtual Proctoring Information (if used in this course)

Online exam(s) within this course may use a virtual proctoring system. Please note that your completion of any such virtually proctored exam may be recorded via the virtual platform and subsequently reviewed by your instructor. The virtual proctoring system provides recording of flags where possible indications of suspicious behaviour are identified only. Recordings will be held for a limited period of time in order to ensure academic integrity is maintained and then will be deleted.

Access to a computer that can support remote recording is your responsibility as a student. The computer should have the latest operating system, at a minimum Windows (10, 8, 7) or Mac (OS X 10.10 or higher) and web browser Google Chrome or Mozilla Firefox. You will need to ensure that you can complete the exam using a reliable computer with a webcam and microphone available, as well as a typical high-speed internet connection. Please note that you will be required to show your Ryerson OneCard prior to beginning to write the exam. In cases where you do not have a Ryerson OneCard, government issued ID is permitted.

Information will be provided prior to the exam date by your instructor who may provide an opportunity to test your set-up or provide additional information about online proctoring. Since videos of you and your environment will be recorded while writing the exam, please consider preparing the background (room / walls) so that personal details are not visible, or move to a room that you are comfortable showing on camera.

Turnitin (if used in this course)

Turnitin.com is a plagiarism prevention and detection service to which Ryerson subscribes. It is a tool to assist instructors in determining the similarity between students' work and the work of other students who have submitted papers to the site (at any university), internet sources, and a wide range of books, journals and other publications. While it does not contain all possible sources, it gives instructors some assurance that students' work is their own. No decisions are made by the service; it generates an "originality report," which instructors must evaluate to judge if something is plagiarized.

Students agree by taking this course that their written work will be subject to submission for textual similarity review to Turnitin.com. Instructors can opt to have student's papers included in the Turnitin.com database or not. Use of the Turnitin.com service is subject to the terms-of-use agreement posted on the Turnitin.com website. Students who do not want their work submitted to this plagiarism detection service must, by the end of the second week of class, consult with their instructor to make alternate arrangements.

Even when an instructor has not indicated that a plagiarism detection service will be used, or when a student has opted out of the plagiarism detection service, if the instructor has reason to suspect that an individual piece of work has been plagiarized, the instructor is permitted to submit that work in a non-identifying way to any plagiarism detection service.

Academic Integrity

Ryerson's [Policy 60 \(the Academic Integrity policy\)](#) applies to all students at the University. Forms of academic misconduct include plagiarism, cheating, supplying false information to the University, and other acts. The most common form of academic misconduct is plagiarism - a serious academic offence, with potentially severe penalties and other consequences. It is expected, therefore, that all examinations and work submitted for evaluation and course credit will be the product of each student's individual effort (or an authorized group of students). Submitting the same work for credit to more than one course, without instructor approval, can also be considered a form of plagiarism.

Suspensions of academic misconduct may be referred to the Academic Integrity Office (AIO). Students who are found to have committed academic misconduct will have a Disciplinary Notation (DN) placed on their academic record (not on their transcript) and will normally be assigned one or more of the following penalties:

1. A grade reduction for the work, ranging up to and including a zero on the work (minimum penalty for graduate work is a zero on the work);
2. A grade reduction in the course greater than a zero on the work. (Note that this penalty can only be applied to course components worth 10% or less, and any additional penalty cannot exceed 10% of the final course grade. Students must be given prior notice that such a penalty will be assigned (e.g. in the course outline or on the assignment handout);
3. An F in the course;
4. More serious penalties up to and including expulsion from the University.

The unauthorized use of intellectual property of others, including your professor, for distribution, sale, or profit is expressly prohibited, in accordance with Policy 60 (Sections 2.8 and 2.10). Intellectual property includes, but is not limited to:

1. Slides
2. Lecture notes
3. Presentation materials used in and outside of class
4. Lab manuals
5. Course packs
6. Exams

For more detailed information on these issues, please refer to the [Academic Integrity policy](https://www.ryerson.ca/senate/policies/pol60.pdf) (<https://www.ryerson.ca/senate/policies/pol60.pdf>) and to the Academic Integrity Office website (<https://www.ryerson.ca/academicintegrity/>).

Academic Accommodation Support

Ryerson University acknowledges that students have diverse learning styles and a variety of academic needs. If you have a diagnosed disability that impacts your academic experience, connect with Academic Accommodation Support (AAS). Visit the [AAS website](#) or contact aaadmin@ryerson.ca for more information.

Note: All communication with AAS is voluntary and confidential, and will not appear on your transcript.

Important Resources Available at Ryerson

1. The Library (<https://library.ryerson.ca/>) provides research workshops and individual assistance. If the University is open, there is a Research Help desk on the second floor of the library, or go to <https://library.ryerson.ca/workshops>
2. Student Learning Support (<https://www.ryerson.ca/student-life-and-learning/learning-support/>) offers group-based and individual help with writing, math, study skills and transition support, as well as resources and checklists to support students as online learners (<https://www.ryerson.ca/student-life-and-learning/learning-support/>).
3. You can submit an Academic Consideration Request (<https://prod.apps.ccs.ryerson.ca/senateapps/acadconsform>) when an extenuating circumstance has occurred that has significantly impacted your ability to fulfill an academic requirement. You may always visit the Senate website (<https://www.ryerson.ca/senate/>) and select the blue radial button on the top right hand side entitled: Academic Consideration Request (ACR) to submit the request.

Policy 167: Academic Consideration due to COVID-19: Students that miss an assessment due to cold or flu-like symptoms, or due to self isolation, are currently not required to provide a health certificate. Other absences must follow [Policy 167: Academic Consideration](#).

Also NOTE: Outside of COVID-19 symptoms, the new Policy 167: Academic Consideration does allow for a once per term academic consideration request without supporting documentation if the absence is less than 3 days in duration and is not for a final exam/final assessment. In the absence is more than 3 days in duration and/or is for a final exam/final assessment, documentation is required. For more information please see Senate [Policy 167: Academic Consideration](#).

4. Ryerson COVID-19 Information and Updates for Students (<https://www.ryerson.ca/covid-19/students/>) summarizes the variety of resources available to students during the pandemic.
5. Familiarize yourself with the tools you will need to use for remote learning. The Continuity of Learning Guide (<https://www.ryerson.ca/centre-for-excellence-in-learning-and-teaching/learning-guide/>) for students includes guides to completing quizzes or exams in D2L Brightspace, with or without [Respondus LockDown Browser and Monitor](#), using [D2L Brightspace](#), joining online meetings or lectures, and collaborating with the Google Suite.
6. Information on Copyright for Faculty (<https://library.ryerson.ca/copyright/faculty/copyright-faqs/my-teaching-materials-have-been-posted-online/>) and students (<https://library.ryerson.ca/copyright/home/copyright-for-students-2/students-course-sharing-websites-and-file-sharing/>).
7. At Ryerson, we recognize that things can come up throughout the term that may interfere with a student's ability to succeed in their coursework. These circumstances are outside of one's control and can have a serious impact on physical and mental well-

being. Seeking help can be a challenge, especially in those times of crisis. Below are resources we encourage all Ryerson community members to access to ensure support is reachable. <https://www.ryerson.ca/mental-health-wellbeing>.

If support is needed immediately, you can access these outside resources at anytime:

- **Distress Line** - 24/7 line for if you are in crisis, feeling suicidal or in need of emotional support (phone: 416-408-4357)
- **Good2Talk** - 24/7 hour line for postsecondary students (phone: 1-866-925-5454)