ENGG*2180 Introduction to Manufacturing Processes

01

Winter 2020
Section(s): C01

School of Engineering
Credit Weight: 0.50
Version 1.00 - January 05, 2020

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1 Course Details

1.1 Calendar Description

This course is designed to provide students with an overview of a wide variety of manufacturing processes involved in industrial activities. While most of the manufacturing processes are to be introduced during the course, more emphasis will be given on those processes which are more common in industry, namely material removal processes, casting, and forming. In addition to introducing the various manufacturing process, mathematical models and several empirical data and equations describing the various manufacturing processes will be covered in order to provide the students with a better understanding of the relations between the parameters involved.

Pre-Requisites: ENGG*2160
Co-Requisites: ENGG*2120

1.2 Course Description

This course is designed to help the student**:**

- Understand the engineering aspects of manufacturing processes.
- Discuss the effects of different manufacturing processes on the performance of manufactured items.
- Foster an appreciation for the roles of manufacturing in modern society by discussing real-life applications.
- Develop basic understanding and as well as tools for selecting manufacturing processes for given applications and designs.

1.3 Timetable

Lectures: Richards 2520 Monday, Wednesday, Friday 12:30 – 1:20 pm

Laboratory: ***You are only allowed to attended the section you are registered in. Please check courselink for Lab sections and lab schedule.***

Laboratory Sections: Machine Shop THRN 1015 or advanced manufacturing laboratory THRN 1009

Section 1 Mon 8:30 AM-10:20 AM
Section 2 Thurs 9:30 AM-11:20 AM
Section 3 Wed 2:30 PM-4:20 PM
Section 4 Fri 9:30 AM-11:20 AM
Section 5 Tues 8:30 AM-10:20 AM
Section 6 Fri 2:30 PM-4:20 PM
Section 7 Tues 2:30 PM-4:20 PM
Section 8 Wed 8:30 AM-10:20 AM
Section 9 Thurs 2:30 PM-4:20 PM

1.4 Final Exam

Final EXAM (45%) on Wednesday Apr 15, 11:30 AM - 1:30 PM , Location TBA

Final exam date and time is set by registrar office, in case of discrepancy, the posted date and time posted on the registrar webpage supersedes this course outline.

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2 Instructional Support

2.1 Instructional Support Team

Instructor: Prof. Mary Wells Ph.D., FEC, FCAE, P.Eng.
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Lab Technician: David Wright
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2.2 Teaching Assistants

Stephanie Kotiadis, skotiadi@uoguelph.ca

Benjamin Maldonado, maldonab@uoguelph.ca

Ahmad Naser, anaser@uoguelph.ca

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3 Learning Resources

3.1 Required Resources

Course Website (Website)
https://courselink.uoguelph.ca/
Course material, news, announcements, and grades will be regularly posted to the ENGG*2180 Courselink site. You are responsible for checking the site regularly.

Fundamentals of Modern manufacturing (Textbook)
M Mikell P. Groover, Groover's Principles of Modern Manufacturing SI Version, Wiley.

Handouts (Other)
Check Courselink regularly.

3.2 Additional Resources

Lecture Information (Notes)
All the lecture notes will be posted on the web page.

Some examples and material will be distributed during the lectures only.

Please note that power point presentations are not always comprehensive of all materials

covered. you need always to consult your textbook or extra slides.

Lab Information (Other)
Handouts for all the lab sessions are posted under the the lab tab on courselink.

Assignments (Other)
Assignments handouts and due dates will be posted on Courselink.

Exams (Other)
The instructor reserves all the rights on setting exam rules, allowed materials and use of calculators, seating of students, allowing electronic devices, e.g. smart phones. It is the students responsibly to strictly follow instructor instructions.

1. Sharing of calculators, formula sheets, if applicable, or use of smart phones as calculators is not allowed.
2. Grading is based on the procedure, correctness of numerical calculations and final answer.

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4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. 1. Select an effective method and perform necessary calculations to solve the problem

    a. Select manufacturing processes.
    b. Select and calculate metal-casting processes parameters and describe equipment.
    c. Select and calculate metal forming processes parameters and describe related equipment.
    d. Select and analyze material-removal processes.
    e. Describe the joining processes.

2. Awareness of the impact of engineering solutions on safety and the environment

    a. Evaluate the basics of economics of metal cutting
    b. Identify the non-traditional machining processes.

3. Awareness of government regulations and professional standards

a. Demonstrate familiarity with statistical quality control

4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome
1	Knowledge Base	1, 2
1.3	Recall, describe and apply fundamental engineering principles and concepts	1, 2
1.4	Recall, describe and apply program-specific engineering principles and concepts	1
2	Problem Analysis	1
2.4	Execute an engineering solution	1
5	Use of Engineering Tools	1, 3
5.1	Select appropriate engineering tools from various alternatives	1, 3
5.2	Demonstrate proficiency in the application of selected engineering tools	1, 3
5.3	Recognize limitations of selected engineering tools	1, 3

5 Teaching and Learning Activities

5.1 Lecture

Topics: Introduction to Manufacturing
References: Chapter 1

Topics: Metal-casting processes

References: Chapter 7-8

Topics: Theory of metal cutting

References: Chapter 17

Topics: Machining operations and machine tools

References: Chapter 18-19

Topics:	Economics of metal cutting
References:	Chapter 20
Topics:	Metal forming
References:	Chapter 14-16
Topics:	Joining processes
References:	Chapter 25-26
Topics:	Non-conventional processes
References:	Chapter 22
Topics:	Quality control
References:	Chapter 37
Topics:	Review and Evaluation

5.2 Tentative

Please note that the number of lectures allocated to each topic and the order of topics coverage is tentative. The instructor at his discretion may modify the topic delivery sequence.

5.3 Other Important Dates

Monday, January 6: Classes commence

Monday, February 17 – Friday, February 21: WINTER BREAK

Friday, April 3: Last day of classes.

Important dates can be found here:
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c03/c03-wintersem.shtml

6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Quizzes	5
Homework	0
Labs and project	20
Midterm Exam(s)	30
Final EXAM	45
Total	100

6.2 Assessment Details

Quizzes (5%)
Date: Monday Jan. 20 and Monday Mar. 23
Learning Outcome: 1, 1, 2

Homework (0%)
Homework problems will be posted on Course link and key solution will be posted a week later. Homework weight is 0%, however it is highly recommended that you go through and solve them.

Tentative Out-of-class Homework sets

HW # 1 Casting
HW # 2 Metal forming
HW # 3-5 Metal cutting
HW # 6 Non-conventional machining and Welding
HW # 7 Statistical quality control
Project Due and presented in the last lab session, detials will be posted on Courselink

Labs and project (20%)
Learning Outcome: 1, 2, 3
Lab sessions are designed to cover topics needed for the students' project. It may include tutorials on software and use of different pieces of equipment related to the course. Experiments will be presented as mini projects where students work on designing and conducting the experiments. Labs are used for group meetings and meeting with instructor and GTA.

Please note: the instructors will form project and lab groups, as much as possible students' preferences will be entertained.

Midterm Exam(s) (30%)
Date: Monday Feb. 3 2019 and Monday Mar. 9 2019
Learning Outcome: 1, 2

Final EXAM (45%)
Learning Outcome: 1, 1, 2
Monday Apr 8, 8:30 - 10:30 AM

As set by Registrar, Room TBA.

6.3 Assessment Dates

The instructor, at his discretion, may entertain requests by the class to adjust assessment dates, except final exam, with the unanimous consent of the class.

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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 instructors. 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

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructors within the first two weeks 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 and have the labs, project and quizzes count towards your grade, students must obtain a grade of 50% or higher on the exam portion (final exam and midterms).

Missed midterm tests: If you miss a test due to grounds for granting academic consideration or religious accommodation, the weight of the missed test will be added to the final exam and/or other exams at the discretion of the instructor. There will be no makeup midterm tests or exams.

Remarking of midterms: Consideration for remarking of midterms will only be made if the request is made within two weeks from when the midterms are returned to students.

Lab Work: You must attend and complete all laboratories no make up for missed labs. If you are to miss a laboratory due to grounds for granting academic consideration, or if you are to miss a lab for religious accommodation, arrangements must be made with the teaching assistant a priori.

Late Lab Reports: Late submissions of lab reports will be deducted 5% for each business day that they are late.

7.2 Communication & Email Policy

Please use lectures and office hourses as your main opportunity to ask questions about the course. Major announcements will be posted to the course website. **It is your responsibility to check the course website regularly.**

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 book their exams at least 7 days in advance and not later than the 40th Class Day.

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
