ENGG*4030 Manufacturing System Design

Winter 2019
Section(s): C01

School of Engineering
Credit Weight: 0.75
Version 1.00 - January 05, 2019

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1 Course Details

1.1 Calendar Description

Students work in groups to design a manufacturing system to produce a specific product. Choices must be made about the materials to be used, the methods to manufacture each part of the product and the final assembly and/or packaging process. Attention is paid to economics and efficiency of the overall manufacturing system.

Pre-Requisite(s): ENGG*2180, ENGG*3070

1.2 Course Description

This course aims to introduce the students to manufacturing systems design. The main goals of the course are (1) to teach students the fundamental concepts in manufacturing systems, (3) teach the students the principles of material selection and basics of different manufacturing processes (2) illustrate the material and process selection (3) understand the economic and environmental implications of the selection decision.

1.3 Timetable

Lectures Tuesday, Thursday 11:30-12:50 THRN 1435

Lab: Wednesday 14:30-17:20 THRN 1009

1.4 Final Exam

This course has no final exam

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2 Instructional Support

2.1 Instructional Support Team

Instructor:	Dr. Ibrahim Deiab Ph.D., P.Eng.
Email:	ideiab@uoguelph.ca
Telephone:	+1-519-824-4120 x58391
Office:	Rich 2521
Office Hours:	Tuesday and Thursday 10:00 – 11:00, Wednesday 13:00 - 14:00, via email or by appointment
Lab Technician:	Barry Verspagen
Email:	baverspa@uoguelph.ca
Telephone:	+1-519-824-4120 x58821
Office:	THRN 1138

2.2 Teaching Assistant(s)

Teaching Assistant:	John Cloutier
Email:	jcloutie@uoguelph.ca
Office Hours:	Please check courselink for detials.

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3 Learning Resources

3.1 Required Resource(s)

Course Website (Website)

Course material, news, announcements, and grades will be regularly posted to the ENGG*4030 Courselink site. You are responsible for checking the site regularly. Also a Facebook page was created and will be used during the course (https://www.facebook.com/ENGG2180) please add yourself.

Fundamentals of Modern Manufacturing (Textbook)

M Mikell P. Groover, Groover's Principles of Modern Manufacturing SI Version, Wiley.

Handouts (Other)

Check Course link regularly.

3.2 Additional Resources

Lecture Information: Lecture notes will be posted on the course page.

Lab Information: The handouts for all the lab sessions are posted under the lab tab in courselink. All types of resources regarding tutorials, links to web pages can be found in this section.

Assignments: Assignments handouts, if applicable, and due dates will be posted on Courselink.

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4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Understand the basics of manufacturing systems design
2. Apply knowledge to select the proper material and manufacturing process for a given product
3. Design a manufacturing system for a given product.
4. Communicate effectively to present the solution to the given project problem
5. Function and be part of a team
6. Demonstrate knowledge of relevant contemporary issues
7. Understand of professional and ethical responsibility
8. Understand the impact of the proposed engineering solutions in a global, economic, environmental, and societal context

4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome(s)
1	Knowledge Base	1, 2, 4
1.1	Recall, describe and apply fundamental mathematical principles and concepts	4
1.2	Recall, describe and apply fundamental principles and concepts in natural science	4
1.3	Recall, describe and apply fundamental engineering principles and concepts	1, 2, 4
1.4	Recall, describe and apply program-specific engineering principles and concepts	2, 4
4	Design	1, 2, 3
4.1	Describe design process used to develop design solution	3
4.2	Construct design-specific problem statements including the definition of criteria and constraints	3
4.3	Create a variety of engineering design solutions	2, 3
4.4	Evaluate alternative design solutions based on problem definition	3

#	Outcome	Learning Outcome(s)
4.5	Develop and refine an engineering design solution, through techniques such as iteration, simulation and/or prototyping	1, 3
5	Use of Engineering Tools	2
5.1	Select appropriate engineering tools from various alternatives	2
5.2	Demonstrate proficiency in the application of selected engineering tools	2
5.3	Recognize limitations of selected engineering tools	2
7	Communication Skills	4
7.1	Identify key message(s) and intended audience in verbal or written communication as both sender and receiver	4
7.2	Interpret technical documentation such as device specification sheets, drawings, diagrams, flowcharts, and pseudocode	4
7.3	Construct the finished elements using accepted norms in English, graphical standards, and engineering conventions, as appropriate for the message and audience	4
7.4	Substantiate claims by building evidence-based arguments and integrating effective figures, tables, equations, and/or references	4
7.5	Demonstrate ability to process oral and written communication by following instructions, actively listening, incorporating feedback, and formulating meaningful questions	4
8	Professionalism	1
8.1	Demonstrate an understanding of what it means to be a professional engineer and distinguish between legislated and non-legislated professions	1
8.2	Effectively describe engineering law and its impact on professional engineering practice	1
8.3	Demonstrate professional behaviour	1
9	Impact of Engineering on Society and the Environment	1, 8
9.1	Analyze the safety, social, environmental, and legal aspects of engineering activity	1, 8

#	Outcome	Learning Outcome(s)
9.2	Evaluate the uncertainties and risks associated with engineering activities	1
9.3	Anticipate the positive and negative impacts of introducing innovative technologies to solve engineering problems	1
10	Ethics & Equity	7
10.1	Summarize ethical theories and equity, diversity, and inclusivity principles	7
10.3	Demonstrate values consistent with good ethical practice, including equity, diversity, and inclusivity	7
11	Economics and Project Management	3
11.1	Apply project management techniques and manage resources within identified constraints	3
11.2	Identify risk and change management techniques, in the context of effective project management	3
11.3	Estimate economic impact and feasibility of an engineering project or design using techniques such as cost benefit analysis over the life of the project or design	3
12	Life Long Learning	6
12.2	Self-assess skills relative to career goals and SOE defined learning outcomes	6

5 Teaching and Learning Activities

5.1 Lecture

Topic(s): Introduction to Manufacturing
Reference(s): Chapter 1

Topic(s): Overview of Engineering Materials
Reference(s): Chapter 5

Topic(s): Review Manufacturing processes
Reference(s): Chapters 7, 8, 15, 17, 18, 20

Topic(s): Welding
Reference(s): Chapter 20

Topic(s): Automated technologies for manufacturing systems
Reference(s): Chapter 34

Topic(s): Integrated manufacturing systems
Reference(s): Chapter 35

Topic(s): Process planning and production control
Reference(s): Chapter 36

Topic(s): Quality control and inspection
Reference(s): Chapter 37

5.2 Lab

Topic(s): Introduction to Lab Equipment and Safety Training

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. Lab experiments and project may be integrated together.

A detailed schedule with deliverables and due dates will be posted on courselink.

5.3 Lecture Schedule

Length of coverage, topics, and order of topics may be changed, check course link for covered sections of each chapter. At his discretion the instructor will add or delete topics as seen relevant to the course project.

5.4 Other Important Dates

Monday, January 7: Classes commence

Monday, February 18 – Friday, February 22: WINTER BREAK

Friday, March 8: 40th Class Day. Last day to drop winter semester courses.

Friday, April 5: Last day of classes.

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

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6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Homework	0
Quizzes	10
Midterm Exam	20
Labs and projects	70
Total	100

6.2 Assessment Details

Quizzes (10%)
Date: Thursday Jan 31 & March 7

Midterm Exam (20%)
Date: Tuesday March 19
Learning Outcome(s): 1

Labs and projects (70%)
Learning Outcome(s): 2,3,4,5,6,7,8
(40%+30%) please check course link for dates and break down

1) 40% is dedicated to the project and labs reports, presentation, literature survey, peer evaluation and other tasks.

2) 30% is project evaluation by instructor: This may include oral and/or written exams related to the project and may also included individual and/ or group evaluation. Date and time will be set with each individual or group**.**

Group meeting with instructor every other week or when called by instructor. Submissions and requirements are posted on course link. Log book: record of meetings and progress to be submitted as appendix to final report. Final Report and project poster Due date is posted on course link.

Final presentation and/or oral exam, will be tentatively scheduled in the last week
Note: Both paper and electronic copies are to be submitted.

A detailed schedule of activities, milestones and due dates will be posted on courselink.

6.3 Note

Sharing of calculators, formula sheets, if applicable, or use of smart phones as calculators is not allowed.
Grading is based on the procedure, correctness of numerical calculations and final answer.
The instructor, at his discretion, may entertain requests by the class to adjust assessment dates with the unanimous consent of the class.

Please note: project and lab groups will be formed by the instructor, as much as possible students' preferences will be entertained.

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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

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

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 other course activities or a make up exam will be given at the discretion of the instructor.

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 not be accepted.

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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.

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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

9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate 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

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.

More information can be found on the SAS website
https://www.uoguelph.ca/sas

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
