MSCI 402 Management Engineering Design Project 2

Course Outline | Winter 2020

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Course Description

MSCI 402 is a continuation of MSCI 401 and is intended to provide students the opportunity to successfully deliver a verified management engineering design solution to the problem that was conceived of and formulated in MSCI 401. The objective of this course is for students to apply the knowledge, skills and behaviors acquired in previous courses and work in the form of a significant design experience, in teams.

Students are expected to be self-directed in their approach and to meet regularly with the teaching team (including the course instructors and respective faculty advisors) and design project sponsors for advice, assistance and to report design project progress as appropriate.

Intended Learning Outcomes

At the end of this course students will be able to:

1. Re- formulate and re-communicate a management engineering problem or opportunity (as appropriate) identifying the needs, benchmarks objectives, requirements, and specifications. (PA)
2. Revise and re-evaluate solutions that address the formulated problem (as appropriate) (Design)
3. Implement and verify design solutions by analysis and/or test methodologies. (Design, Inv)
4. Verify and interpret results from investigation methods by recognizing assumptions and limitations. (Inv)
5. Address safety, regulatory, sustainability and professional ethics requirements, as appropriate (Impact)
6. Effectively manage and communicate design project plans, and technical and non-technical risks, using project management tools and techniques (PM)
7. Communicate accurately and effectively including by oral presentation, written reports and with professors, peers, clients, and the public at large (as appropriate) (Comm)
8. Work effectively as a team member and/or team leader (Team)
9. Give and receive feedback (Prof)

Course Administration

Learn will be used for posting of all course materials, including but not limited to slides, deliverables, and rubrics. The **Slack** platform will be used to facilitate communication in the course.

Course activities, deliverables, and assessment

The course structure contains a variety of activities. Scheduled course components include:

Component	Evaluation Weight
Class-Wide Workshops Topics include introduction/review of engineering design methodologies, verification & validation, symposium orientation, and course retrospective 1. Friday, January 10, 9:30 – 11:20, CPH 3681: Intro to MSCI 402 2. Friday, January 17, 9:30 – 11:20, CPH 3681: Design Verification 3. Friday, March 13, 9:30 – 11:20, CPH 3681: Symposium Orientation 4. Friday, April 3, 9:30 – 11:20, CPH 3681: Course and Team Retrospective	N/A
Kick-Off Deliverable And Meeting (KODAM) (Dates and Place TBD) • Abstract + figures to appear in symposium brochure. • 2-page summary of progress to date and plan for MSCI 402, to be submitted and approved by instructor and faculty advisor. Due in the first week of classes, but no later than **Friday, January 10** **In some cases**, at the request of the team, instructor, and/or faculty advisor, a 30 minute meeting may be scheduled to review progress/changes and determine a plan for the term. To be scheduled by the team at a time convenient for all parties, in the **January 13 – 17** window).	3%
Progress Update Meetings (PUMs) (3) (Dates and Place TBD) Tentative dates are noted in the schedule; may be rescheduled if necessary Pre-PUM materials are due **2 business days before** the meeting Post-PUM materials are due **2 business days after** the meeting	3*7% = 21%
Symposium Demonstration (March 20, 9am-5pm) A public demonstration of the design project. Formally evaluated by faculty members, alumni, and industry guests.	20%
Final Design Review (Dates and Place TBD) A 45-60 minute formal review of the final deliverables of the design project. To be attended by the industry client (if applicable), the faculty advisor, and the course instructor	46%
Project Management Log Students should maintain an up-to-date log on all project management efforts. This may include but is not limited to meetings (with minutes); completed, WIP, and future tasks list (and planned start/end dates); risk register; and lessons learned (a.k.a. retrospective). Ideally, this should be housed in an application like Trello or Asana. The instructional team will have access in order to observe and evaluate project management efforts, as well as to support communication between stakeholders.	5 %
Teamwork This component includes teamwork peer evaluations.	5 %

Important Notes

- Late submissions of deliverables will be penalized at 20% per day.
- Late attendance for any progress update meetings or design reviews that is weakly justified will be penalized at 50% immediately for the individuals who are late.

- If a student does not attend a progress update meeting or design review and does not present a valid excuse, he/she will receive a mark of 0% on that activity. If the absence is due to illness, he/she must submit a Verification of Illness Form within 48 hours.

Important Notes

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the Office of Academic Integrity for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4. When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check the Office of Academic Integrity for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline. For typical penalties, check Guidelines for the Assessment of Penalties.

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals.

Note for students with disabilities: AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.

Appendix

All engineering programs are reviewed by the Canadian Engineering Accreditation Board (CEAB). One of the required accreditation criteria is that institutions ensure students have sufficient knowledge and proficiency with respect to the 12 Graduate Attributes (GAs) listed below. These attributes are mapped to the learning objectives in each course for assessment, as shown in the brackets. This allows the program to both comply with CEAB requirements and continuously improve.

#	Acronym	Attribute Name	Attribute Definition
1	KB	Knowledge Base	Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.
2	PA	Problem analysis	An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions.
3	Inv	Investigation	An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data, and synthesis of information in order to reach valid conclusions.
4	Des	Design	An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.
5	Tools	Use of Engineering Tools	An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.
6	Team	Individual and team work	An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.
7	Comm	Communication skills	An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.
8	Prof	Professionalism	An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.
9	Impact	Impact of engineering	An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.
10	Ethics	Ethics and equity	An ability to apply professional ethics, accountability, and equity.
11	Econ	Economics and project management	An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations.
12	LL	Life-long learning	An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge.