MSE 312 Mechatronics Design II

Lecture:

Tutorial:

Pre-recorded tutorials will be available in advance of these times.

For further details, see Canvas.

Electronic Communication: Canvas: https://canvas.sfu.ca/

Objectives

By the end of this course students should be able to
- Effectively design, plan and manage a group project.
- Design a mechanical system
- Design and construct a basic power drive, interface electronics, and electrical system for a mechatronics application
- Understand and build a feedback control system and apply it to control a one degree of freedom system
- Integrate mechanical, electrical, and controls knowledge to solve a design problem.

Optional Textbooks

Robert L. Mott, *Machine Elements in Mechanical Design*, 4th Edition, Pearson Prentice Hall, 2004.
E. Carryer, M. Ohline, T. Kenny, *Introduction to Mechatronic Design*, Pearson, 2010.
Farid Golnaraghi, Automatic Control Systems, 9th Edition, John Wiley & Sons Inc, 2010.
Clarence de Silva, Mechatronics An Integrated Approach, CRC Press, 2005.

Evaluation

Evaluation Component	Proportion of overall mark
Mechanical Design and Analysis Report and code	20%
Electrical/Electronics	20%
Controls	20%
Final Project	40%

Projects

The students will be required to complete all projects on time. Specific due dates for each project are given in Canvas. Late submissions will not be accepted. Contact the professor responsible for the section if there are extenuating circumstances.

Teamwork

Developing teamwork skills in an important part of training to become an engineer and will be assessed in this Course. However, in the climate of Covid-19, these teamwork skills will be practiced remotely and will be required to follow all physical distancing rules established by the province of British Columbia and/or Simon Fraser University. Students have access to a Zoom account through SFU or can use BB Collaborate through canvas for remote communication.

If a person is deemed to be not contributing a reasonable amount to their team project they will be removed from their team and expected to work alone or with others who are in a similar situation. This may result in no ability to demonstrate your teamworking skills therefore you will potentially receive a very low mark for the teamworking part of the Course, in addition to the extra challenges of completing a complicated project as an individual. Please review the documentation on teamworking available on Canvas.

Exams

There is no final exam. Some sections of the course may have a quiz. Each professor will indicate the distribution of grades for their section.

Laboratory Sessions

There will be various Lab sessions during the semester that you will be expected to attend (remotely). If your Lab session is on a statutory holiday, you will be expected to attend one of the other Lab sessions during that week or the lab session will be moved to a different date (that falls within your lab timetable).
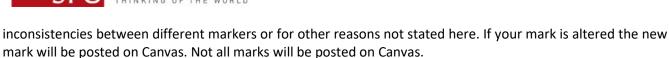
Class Rules

Participation

1) It is your responsibility to stay up to date with this course and be aware of any deadlines and other requirements. All information will be available on Canvas. It is your responsibility to check Canvas regularly for information.
2) Class attendance is important. A lot of information conveyed, or sometimes implied, by the instructor cannot be learned from the textbook. Students are expected to prepare for class, participate in class discussion, and ask questions. Discussions with the instructor, TAs and classmates will provide information necessary to complete the course projects. The class may be "live" or pre-recorded, with opportunities to ask discussions available. Please note that "live" classes may recorded or not recorded at the discretion of the instructor.
3) Inform the section professor of your absences beforehand
4) If you miss a class you are responsible for the material. If your absence is unavoidable (documented illness, family emergency, etc.), email the section professor before your absence to make alternate arrangements for project deadlines.

Keeping informed of your grade

Your marks will be posted on the Canvas before the end of the term. This ensures that your calculations of grades can be checked with our records. Do note however the total column in Canvas may be incorrect as Canvas may not take the weightage into account. Your mark can be altered after it is initially posted due to marking errors,

inconsistencies between different markers or for other reasons not stated here. If your mark is altered the new mark will be posted on Canvas. Not all marks will be posted on Canvas.

Professional Conduct

Students are expected to conduct themselves professionally at all times including interactions with professors, teaching assistants, laboratory assistants and fellow students outside of class. Students are responsible for their own contributions to each project and are expected to actively contribute to *all aspects* of the projects. Interactions in the remote teaching environment are still guided by SFU's core values of civility and mutual respect. Disruptive or concerning behaviour can have a harmful impact on our entire learning community and are not acceptable. Refer to the SFU Calendar for course withdrawal, academic dishonesty, and for other related regulations.

Technology requirements for successfully completing this course

To complete this course you will need access to a laptop or desktop computer with a stable internet connection. You will be able to remotely log in to the MSE computer lab to access the software and associated computing processing capabilities of these computers. You can also access software from SFU (https://www.sfu.ca/itservices/technical/software.html). You will require a stable internet connection to complete this course. This will enable you to listen and attend lectures and tutorials as well as communicate as a team and with the instructors and TA's.

Synchronous Course Components

Some lectures, tutorials and Labs will be held synchronously. Please see individual information on Canvas in advance of the lecture or tutorial. Synchronous events will only occur during the scheduled lecture/tutorial/Lab times.

Collection Notice

Lectures and tutorials delivered on Zoom or Bb Collaborate may be recorded by your instructor. As a result, Simon Fraser University may collect your image, voice, name, personal views and opinions, and course work under the legal authority of the University Act and the Freedom of Information and Protection of Privacy. This information is related directly to and needed by the University to support student learning only (i.e., posting in the Learning Management System for students to review). If you have any questions about the collection and use of this information, please contact your instructor promptly.

SFU's Intellectual Property Policy (R30.03) restates the fact that students own the copyright in their work made as part of their course of studies at SFU. A recorded lecture that includes student responses, student presentations, or elements of student work will engage with the student's copyright since their copyrighted work or performance is being copied (recorded). Therefore, you are being informed the lectures and / or tutorials may be recorded and that their contributions are being copied and made available to all those in the class.

Changes and clarifications

The instructors may make changes to this Course Syllabus at their discretion. If anything in this syllabus is unclear or missing, please contact the Instructors.

MSE 312 Course schedule (tentative)

Weeks	Date	Content
Week 1	12-May	Project Introduction and Teamwork Tools. Remote working and team strategies
Week 2	19-May	Design Process
Week 3	26-May	Kinematics and Kinetics of mechanisms
Week 4	02-Jun	Kinematics and Kinetics of mechanisms
Week 5	09-Jun	Analysis of mechanical systems
Week 6	16-Jun	Electrical/Electronic Interface Circuit Design
Week 7	23-Jun	Electrical/Electronic Interface Circuit Design
Week 8	30-Jun	Protection and start/stop circuitry
Week 9	07-Jul	Control Design and Implementation
Week 10	14-Jul	Implementation of a position control system using Arduino board and DC motor
Week 11	21-Jul	Integration of Mechatronic Systems
Week 12	28-Jul	Integration of Mechatronic Systems II
Week 13	04-Aug	Demonstration of Integrated Project