



Faculty of Engineering
Department of Mechanical Engineering
COURSE OUTLINE

MECH 458 – Mechatronics

Term – Spring 2017 (201701)

Instructor	Office Hours
Dr. Yang Shi	Days: Monday and Thursday
Phone: 250-853-3178	Time: 3PM-4PM
E-mail: yshi@uvic.ca	Location: EOW-519

List all prerequisites and co-requisites:

- CSC 110 or 111.
- ELEC 216 or PHYS 216.

LECTURE DATE(S)

Section:	Days:	Time:	Location:
A01/CRN 22183 A02/CRN 22184	Monday and Thursday	10:00 am-11:20 am	Cornett Building A221

TUTORIAL SECTIONS

Section: T	Days:	Time:	Location:
N/A			

LAB SECTIONS

Section: B (Multiple)	Days:	Time:	Location:
B01	Monday	04:00 pm-06:50 pm	ELW B232
B02	Tuesday	01:00 pm-03:50 pm	ELW B232
B03	Wednesday	01:00 pm-03:50 pm	ELW B232
B04	Friday	08:30 am-11:20 am	ELW B232

Lab times and locations are also available from the [timetable](#) through Sign in to UVic, My Page.

TA Name	E-mail	Office
Jicheng Chen	jichengc@uvic.ca	EOW 148
Kunwu Zhang	kunwu@uvic.ca	EOW 148
Chao Shen	shenchao@uvic.ca	ELW 240
Qi Sun	sunqi@uvic.ca	EOW 148
Zhiying Zhang	zhiyingz@uvic.ca	

Required Text: No required	Optional Text: No required
Reference Materials:	

- David G. Alciatore and Michael B. Hstand, *Introduction to Mechatronics and Measurement Systems*, 2nd Ed., McGraw Hill, 2003.
- Robert H. Bishop, *Mechatronics: An Introduction*, CRC Press, 2006.
- Irene J. Busch-Vishniac, *Electromechanical Sensors and Actuators*, Springer, 1998.
- Clarence W. de Silva, *Mechatronics: An Integrated Approach*, CRC Press, 2005.
- Dan Neculescu, *Mechatronics*, Prentice Hall, 2001.
- Andrzej. M. Pawlak, *Sensors and Actuators in Mechatronics*, CRC Press, 2007.
- Online materials from various manufactures of sensors and actuators (some of these will be posted on the course website as supplementary materials).

COURSE OBJECTIVES:

The main objective of this course is to introduce the rapidly developing, multidisciplinary field of Mechatronic Engineering, which deals with the development of “smart” electromechanical products, through an integrated design approach and a multidisciplinary point-of-view. This course particularly focuses on providing an overview of embedded controllers (microprocessors/microcontrollers) and sensor and actuator technologies that are key components of mechatronic systems.

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

Students are expected to achieve the following learning outcomes:

- Explain the basic physical components of mechatronic systems.
- Explain the process of modeling of mixed mechatronic systems.
- Perform microcontroller programming.
- Explain the interfacing of the circuit.
- Describe and explain the impact of the differences between data acquisition systems on the system performance.
- Explain basic principles of sensors and actuators.
- Explain control architectures for mechatronic system.
- Design a mechatronic system to achieve specified requirements in the course project.
- Perform cost analysis and project scheduling in the course project.

Weight & Date(s) of Assessments:	Weight	Date
Assignments:	5%	
Labs	45%	
Mid-term	25%	Date: To be decided soon
Final Exam	25%	April 4, 2017

ASSIGNMENTS (Include Assignment Schedule) (Description & Method of Delivery)

Assignment sets will be distributed over the course of the term via the MECH 458 Course Space site. The assignment problems will be predominantly hand. **Assignments are to be completed individually.**

Assignment hardcopy submissions are to be made to the MECH 458 Dropbox located opposite ELW A136. Hardcopy submissions must be completed on Engineering computation paper or prepared

Assignment #	Modules	Start	Due (5 pm)
1	To understand the representation of numbers under different bases. To understand the representation of numbers in computer, the concept of overflow. To practice the K-map method.		
2	To apply the K-map method to simplify the logic expression. To further understand the basics of C programming for embedded systems.		
3	To understand the working principle of ADC.		
4	To understand the working principles of sensors, actuators, and interface circuits.		

LABORATORIES (Description & Method of Delivery)

These time slots will be used for hands-on labs, which will be a significant portion of the course. The labs will start in the third week of classes in January (TBD), and will run each week. The exact dates/times will be announced soon as they become available. Attending the labs is compulsory.

Students *are required to* purchase the low cost Mechatronics Student Kit to keep. The cost of the student kits have been subsidized by the Department of Mechanical Engineering and allow each student unlimited access to the microcontrollers. Further information will be given in class.

Lab #	Modules	Start	Due (5 pm)
1	Introduction to the microcontroller		
2	C programming and basic micro-controller functions		
3	Sensors and actuators		
4	Inspection system design and documentation		
5	Inspection system implementation		

PROJECTS: (Description & Method of Delivery) (remove sample text)

The goal of this project is to sort items of varying materials and colors into the appropriate bucket with the greatest possible accuracy and in the shortest possible amount of time. The preliminary system design documentation and the final documentation are required. The final documentation format is similar to ENGR466 report.

NOTE:

1. If a student is unable to attend a lab session due to illness (or any other acceptable reasons as specified in the UVic 2016/2017 Calendar), its contribution to the final grading will be transferred to the module exam component.
2. If a student misses an exam or a lab, without an acceptable reason, he/she will lose the percentage for that component.
3. If a student is late to a lab by more than 30 minutes, he/she will lose the percentage for that

component.

4. No late lab reports will be accepted. Typically, lab reports are to be submitted at the beginning of next lab, except the last report which is to be submitted in class on a scheduled due date.

Additional Notes:

- The instructor has the right to change the grading scheme, and any changes will be announced in a lecture hour in advance.
- All examinations are closed-book, unless stated otherwise by the instructor.
- Self-contained calculators are allowed in all exams.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

COURSE LECTURE NOTES

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar.



Faculty of Engineering

Department of Mechanical Engineering

COURSE OUTLINE

GENERAL INFORMATION

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Attendance

Students are expected to attend all classes in which they are enrolled. An academic unit may require a student to withdraw from a course if the student is registered in another course that occurs at the same time....

An instructor may refuse a student admission to a lecture, laboratory, online course discussion or learning activity, tutorial or other learning activity set out in the course outline because of lateness, misconduct, inattention or failure to meet the responsibilities of the course set out in the course outline. Students who neglect their academic work may be assigned a final grade of N or debarred from final examinations.

Students who do not attend classes must not assume that they have been dropped from a course by an academic unit or an instructor. Courses that are not formally dropped will be given a failing grade, students may be required to withdraw and will be required to pay the tuition fee for the course." UVic Calendar, (2017) <http://web.uvic.ca/calendar2017-01/undergrad/info/regulations/attendance.html#>

Faculty of Engineering, University of Victoria Standards for Professional Behaviour

"It is the responsibility of all members of the Faculty of Engineering, students, staff and faculty, to adhere to and promote standards of professional behaviour that support an effective learning environment that prepares graduates for careers as professionals...."

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour which contains important information regarding conduct in courses, labs, and in the general use of facilities.

<http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf>

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the Undergraduate Calendar for the UVic policy on academic integrity.

Policy on Academic Integrity

<http://web.uvic.ca/calendar2017-01/undergrad/info/regulations/academic-integrity.html#>

Equality

This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements.

Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.

The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.

Resource Centre for Students with Disabilities

<http://www.uvic.ca/services/rcsd/>

Accommodation of Religious Observance (AC1210)

<http://web.uvic.ca/calendar2017-01/general/policies.html>

Discrimination and Harassment Policy (GV0205)

<http://web.uvic.ca/calendar2017-01/general/policies.html>



Faculty of Engineering
Department of Mechanical Engineering
COURSE OUTLINE

Course Schedule (to be added later)

Module	Topics	Date/Week
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