Course Syllabus
EGCI 406 Mechatronics

1. Program of Study Bachelor of Engineering Program in Computer Engineering (International Program)
Faculty Faculty of Engineering, Mahidol University

2. Course Code EGCI 406
Course Title Mechatronics

3. Number of Credits 4 (4-0-8) Credit (Lecture-Lab-Research)

4. Prerequisites Consent of instructor

5. Type of Course Major Course (Elective Major)

6. Session / Academic year 2018

7. Course Conditions

Class size will be in the range of 5-16 students. The students must bring their own laptop and purchase microcontroller board and electronic parts on their own (approx 2 thousand Baht).

8. Course Description

Mechatronic system is an integration of mechanical, electrical, computer and control system engineering. Mechatronic devices such as hard drive or others. Laboratories or projects will be the core of the course. The course covers electronic feedback, power amplifier, digital logic, encoder interfacing, motor control, sensor, and real time control.

The course meets twice a week on Tuesday 12-14 and Wednesday 12-15 at room ME314.

9. Course Objectives

After successful completion of this course, students will be able to

9.1 Gain an in-depth understanding of fundamental concepts of Mechatronics.
9.2 Design mechatronic devices for industrial applications.
9.3 Implement software applications to control mechatronic devices.

10. Course Outline

Week	Topics		Instructor
	Lecture/Seminar	Hour	
1 (9/11,9/12)	* Orientation (LT0) * Introduction to mechatronic (LT1) and Electrical circuits (LT2)	5	See line 16.
2 (~~9/18~~,9/19)	* Introduction to Arduino (LB1)	5	
3 (9/25,9/26)	* Arduino's basic digital I/O - LED (LB2) * Arduino's basic digital I/O - Switch (LB3)	5	
4 (10/2,10/3)	* Analog output and PWM (LB4) * Driver – ULN2003 (LB5)	5	
5 (10/9,10/10)	* DC motors – H-Bridge (LB6) * Robot construction (LB7)	5	
6 (10/16,10/17)	* Serial bluetooth communication (LB8) – Bluetooth serial control robot * Processing and GUI (LB9)	5	
7 (~~10/23~~,10/24)	* Power supply (LB10)	5	

8 (10/30,10/31)	* Midterm Exam (10/30) * Workshop	5	
(Fri 11/2)	Demo Day 1 (MU Openhouse)	-	
9 (11/6,11/7)	* PCB design using Eagle (LB11) – Make the OpAmp module * Ultrasonic Sensor (LB12)	5	
10 (11/13,11/14)	* Control (LB13) * Multipurpose PCB – Optical Sensor (LB14)	5	See line 16.
11 (11/20,11/21)	* Peer Evaluation + Workshop	5	
12 (11/27,11/28)	* Final Exam + Workshop * Demo Day 2	5	

10. Teaching Method

Lecture, hand-on projects, group discussion, and oral presentation

11. Teaching Media

Lecture/lab handouts, computer programs, online quiz

12. Measurement and Evaluation of Student Achievement

Evaluate student's achievement from:

1. Ability to describe fundamental concepts of mechatronics,
2. Ability to analyze and choose a suitable set of tools for developing mechatronic devices,
3. Ability to design a mechatronic system for industrial applications,
4. Ability to write software to control mechatronics devices, and
5. Ability to work with a team.

Student's achievement will be evaluated according to the faculty and university standard, using the symbols: A, B, B+, C, C+, C, D+, D and F.

Weight:

1. Exams (midterm and final)	30 %
2. Participation (attendance, quiz, assignment)	20 %
3. Project report (midterm 15% and final 5%)	20 %
4. Project performance (midterm and final)	15 %
5. Peer evaluation (midterm and final)	15 %
Total	100 %

13. References

1. David G. Alciatore and Michael B. Histand, Introduction to Mechatronics and Measurement Systems, McGraw-Hill.
2. W. Bolton, Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, Pearson.

14. Instructors

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15. Important Notes

1. Bring your own computer every class.
2. Buy parts. You will need "individual supplies" on week 2, and "robot parts" on week 4
3. Create a FaceBook group with keyword "2018" in the name, put me (ittichote@gmail.com) into the group. We will use this group for communications
4. Join the course page in "Canvas". You will get email invitation. We will use this page for handouts, quiz, and assignment.