Course Syllabus
EGCI 405 Mechatronics

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

2. Course Code EGCI 405
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 2014

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 1-2 thousand Baht minimum).

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 Monday and Wednesday 10-12 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	Introduction to mechatronic (9/15) Introduction to Arduino (9/17)	4	See line 16.
2	Electric circuits and components (9/22) Arduino's basic digital I/O (9/24)	4	
3	Analog signal conditioning with op-amp (9/29) Analog I/O and PWM (10/1)	4	
4	Semiconductor electronics (10/6) Power Supply and Circuit Design (10/8)	4	
5	PCB design and LCD interface (10/13) Midterm Exam (10/15)	4	
6	Industrial control components (10/20) H-Bridge and stepping motor (10/22)	4	
7	Sensors (10/27)	4	

	Serial communication (10/29)		
	Midterm Exam		
8	Actuators and motors (11/3) Network communication (11/5)	4	See line 16.
9	Basic vision algorithms (11/10) Image processing with OpenCV (11/12)	4	
10	PLC-based control, inverter (11/17) System integration (11/19)	4	
11	Project Presentation & Demo (11/24, 11/26)	4	
	Final Exam		

11. Teaching Method

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

12. Teaching Media

Lecture handouts, transparency notes, lab, etc.

13. Measurement and Evaluation of Student Achievement

Evaluate student's achievement from:

13.1 Ability to describe fundamental concepts of mechatronics

13.2 Ability to analyze and choose a suitable set of tools for developing mechatronic devices.

13.3 Ability to design a mechatronic system for industrial applications.

13.4 Ability to write software to control mechatronics devices.

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. Project performance (midterm and final)	20 %
3. Project report (midterm and final)	20 %
4. Peer evaluation (final)	20 %
5. Participation	10 %
Total	100 %

14. Course Evaluation

14.1 Evaluate as indicated in number 13 above.

14.2 Evaluate student's satisfaction towards teaching and learning of the course using a questionnaire.

15. 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.

16. Instructors

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17. Course Coordinator

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