SEMESTER	***DEPARTMENT***	***COURSE TITLE***
Seventh	*Control Engineering*	*Mechatronics*
COURSE CODE	***HOURS*** 3	***COURSE SPECIFICATIONS***
EC701	***UNITS 3***	*Theoretical Content*

Mechatronics is well known as a multidisciplinary field of engineering since it integrates different engineering branches such as Mechanical, electrical, control, electronics, and computer engineering.

Course Objective:

The objective of Mechatronics course is to teach students Mechatronic components and their integration to form a practical system. Student should learn how to deal with as well as how to develop and design entry-level Mechatronic systems.

1. *Introduction to Mechatronic Systems:*

- Definition of Mechatronic, block diagrams, and some real practical examples.
- Revision for related material (closed loop control, PLC, etc.)

2. Mechanical and Electrical components of Mechatronics*:*

- Mechanical components in mechatronics (e.g., valves, hydraulics, etc.) with smart options (i.e., under supervision of microcontrollers)
- Electrical components in mechatronics (e.g., motors, electrical switches, …) with smart options (i.e., under the supervision of microcontrollers/microprocessor)
- Electrical/Mechanical integrated components.

3. General overview for Sensors and Actuators

- Review to sensors: (analog, digital, and optical): Potentiometers, proximity sensors, eddy current sensors, capacitive sensors, piezoelectric sensors, Doppler-based sensors, ultrasonic sensors, LVDT, etc.
- Actuators (electrical stepper motors, servo, hydraulics, pneumatics) and their definition in Mechatronics

4. *Interfacing Circuits:*

- Interfacing electronics (electronic boards connecting microcontrollers or PLC to real mechanical/electrical components)

5. SMART DEVICES

- Embedded systems in mechatronics
- Finite state machines: design and implementation

6. Mechatronic Systems

- Study or real systems and subsystems: Robotics, anti-Lock Braking System (ABS), CDM (Computer Drive Machines), Medical Mechatronics,..etc.
- Mechatronic system design.

7. Mechatronics Engineering Design Project

References:

Sabri Cetinkunt, *Mechatronics*, Wiley 2007