WOLLO UNIVERSITY
KOMBOLCHA INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

MEng 4193 - Intro. To Mechatronics Systems

Year/ Sem. : IV / I **ECTS: 5**
Instructors: Ms. Melat Desta

COURSE OUTLINE

I. Overview to Mechatronics
- **Physical Systems Modelling**
  - Electromechanical systems; Fluid power systems; Electrical systems; Thermal systems;
- **Systems and Control**
  - Dynamic system properties (in time domain and frequency domain); Control systems (Open loop, Feedback, Digital control)

II. Electronics
- Diodes; Transistors; Operational amplifier; LED; SCR, TRIAC

III. Sensors
- Linear/Rotational sensors; Acceleration sensors; Force sensors; Torque and power sensors; Flow sensors; Temperature sensors

IV. Actuators
- Electromechanical actuators; Electrical machines; Piezoelectric actuators; Hydraulic and Pneumatic Actuators

V. Logic Systems
- Combinational logic; Sequential logic; Flip-flops; counters/timers;PLC (components, programming, memory organization, setup, communications); System Interfaces.

VI. Data Acquisition
- Analog to digital converter; Digital to analog converter; Filters

Pre-Requisites: Instrumentation and Measurement, Introduction to Computer Programming , Mechanism of Machinery

- Introduction to computers (and file handling using common operating systems)

Textbook:

References:

1. Bishop, R.H.: *The Mechatronics Handbook*
2. Bolton, W.: *Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering*
3. Holman, J.P.: *Experimental Methods for Engineers*
4. Horwitz, P. and Hill, W.: *The Art of Electronics*
5. Morries, S.B.: *Programmable Logic Controllers*
6. Nakra, B.C. and Chaudhry,K.K.: *Instrumentation Measurement and Analysis*

Evaluation:

Continuous Evaluation systems 50%

Final exam 50%