Adnan Menderes University
Electrical and Electronics Engineering Department
EE 471-SENSORS AND TRANSDUCERS (2017-2018 Fall)

Instructor: Dr. Coşkun DENİZ

Schedule: Thursdays, 09:30—12:15 (classroom number will be posted on my door notice!)

Office Hours: Wednesdays, 12:00—14:00 (Block C, 2nd floor)

Textbook: Lecture notes and internet sources

Reference Books:
1. Sensors and Transducers, Ian Sinclair, Butterworth-Heinemann, Great Bretain, 2001
2. Handbook of Modern Sensors: Physics, Designs, and Applications, Jacob Fraden, Springer, 2010

Grading: MT: 30% and projects: 70% (there will be 7 projects)

Course Outline

I. Basic Concepts (3 weeks)
1. Physical quantities
2. Measurement and instrumentation
3. Sensitivity, error, reliability, and precision concepts
4. Sensor types and classification
5. Wheatstone bridge
6. Review of op-amps
7. Introduction to Arduino
8. Data loggers

II. Displacement measurements (2 weeks)
1. resistive methods
2. project #1: potentiometer application (10pts)

III. Temperature measurement (4 weeks)
1. project #2: thermistor application (10pts)
2. project #3: thermocouple application (10pts)

IV. Force and pressure measurement (2 weeks)
1. project #4: strain gauge application (10pts)

V. Light intensity measurement (2 weeks)
1. project #5: LDR application (10pts)
2. project #6: photodiode and phototransistor application (10pts)

VI. Other sensor-transducer applications (2 weeks)
1. project #7: DC motor drives and AC generators (10pts)
2. 3D Accelerometers and sensing displacement and velocity
3. Ultrasound and piezoelectric effect
4. Hall sensors, semiconducting sensors, superconducting sensors, SQUIDS, etc.
5. Sensing nuclear Radiation
6. others (on students interest)

VII. Midterm exam (30pts)

Expectations

Attendance is not mandatory. A Student has to submit her/his project in time. There will be totally 7 projects as stated above and your midterm exam will be given at the end of the semester (last week) from these projects and subjects given in the contents section above. Each student should learn their project subjects by following the announcements posted on my door and submit their short lab reports by presenting her/his projects during the lecture hours or during my office hours to me. Midterm exam questions will be theoretical in paper exam involving the projects you did. You are expected to explain your projects and the theory behind them.

Good luck!