EP486 Microcontroller Applications

Topic 0
THE COURSE

Department of Engineering Physics
University of Gaziantep

Sep 2013
Introduction

- Microcontroller is a small computer on a single integrated circuit containing
  - processor core,
  - memory
  - programmable input/output peripherals.

2 ATmegaxx micro controllers
Introduction

- The purpose of this course is to review of electronics and C programming quickly and to give you an introduction to the Arduino.

- Wikipedia says: Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible.

- Arduino Says: Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists and anyone interested in creating interactive objects or environments.
The Course

- Course web page
  http://www1.gantep.edu.tr/~bingul/ep486

- Arduino Home Page
  http://arduino.cc

- Arduino Türkiye
  http://arduinoeturkiye.com
Course Content

PART I (Electronics & Programming)
- Review of C Programming Language
- Introduction to Processing
- GUI Programming
- Basics of Analog Electronics (resistors, diodes, transistors, …)
- Basics of Digital Electronics (binary logic, gates, ADC, …)

PART II (Arduino Projects)
- LED, 7 Segment, LCD projects
- Sensor Projects (temperature, humidity, pressure, light, sound, piezo, peltier, magnetic…)
- Driving DC, Stepper, Servo motor projects
- RF and BlueTooth projects
- High-Power Control
- Data analysis and monitoring
Lectures, Labs, Exams

- **Mondays**
  
  3-3 hour lecture
  
  13:30-16:30 Engineering of Physics Seminar Room
  
  16:30-18:50 Engineering of Physics Seminar Room

- **Exams**
  
  - 1st midterm 30%  Oct 2013 (written)
  
  - 2nd midterm 30%  Nov 2013 (project)
  
  - Final 40%  Jan 2013 (project)
Grading

Independent from the arithmetic mean of the class, the following rules will be applied:

- 00 – 19  >> FF
- 20 – 29  >> FD
- 30 – 39  >> DD
- 40 – 49  >> DC
- 50 – 59  >> CC
- 60 – 66  >> CB
- 67 – 74  >> BB
- 75 – 84  >> BA
- 85 – 99  >> AA
Arduino Products

http://arduino.cc/en/Main/Products

Arduino Uno

Arduino Mega

Arduino Micro

Arduino Nano
Arduino Kit

robotistan.com

aliexpress.com

ebay.com

dx.com
Arduino Kit

must contain:

- Leds
- 7 segment display, LCD (16x2 or more)
- Bread-board
- Cables
- Stepper, servo and DC motor
- Relay
- Resistors
- Sensors (temperature, humidity, pressure, tilt, LDR, …)
- RFid
Example Kit

ArduSat

- ArduSat is Arduino based Nanosatellite (Aug. 9, 2013).
- ArduSat is the first open source satellite which will provide such open access to the general public to space.
ArduinoHand

http://www.youtube.com/watch?v=ZYKoNi48m9o
http://www.youtube.com/watch?v=A4knNBvnSfE