

Ministry of Higher Education and Scientific research



Department of Electrical Engineering

College of Engineering

Salahaddin University – Hawler

Subject: Microprocessors and Microcontrollers

Course Book – 3rd Year Computer and Control Eng.

Lecturer's name: Assist Prof. Dr. Fadhil Toufick Aula

Miss. Lina Namiq Tofiq

Academic Year: 2018 -2019

Course Book

1. Course name	Microprocessors and Microcontrollers
2. Lecturers	Assist Prof. Dr. Fadhil Toufick Aula Miss. Lina Namiq Tofiq
3. Department/ College	Electrical Engineering / Engineering
4. Contact	e-mail: Fadhil.aula@su.edu.krd lina.tofiq@su.edu.krd
5. Time (hr. / week)	2 hrs/week
6. Office hours	2
<p>7. Course overview: Introduction to microcontrollers and their architecture; assembly language; timing analysis of assembly language programs; digital input/output (I/O); in-depth discussion on the use of built-in peripheral devices such as timers, analog-to-digital converters, EEPROM storage devices, capture/compare/PWM, and parallel and serial communication devices; serial communication includes both synchronous communication (SPI, I2C) and asynchronous (USART) communication; introduction to systems of networked microcontrollers; advanced fixed-point arithmetic on a microcontroller.</p>	
<p>8. Course Objective:</p> <ol style="list-style-type: none"> 1. To introduce students with the architecture and operation of typical microprocessors and microcontrollers. 2. To familiarize the students with the programming and interfacing of microprocessors and microcontrollers. 3. To provide strong foundation for designing real world applications using microprocessors and microcontrollers Explain the effect of P,PI, PID controllers on closed loop system performance if the reference signal is a constant or a ramp signal and in the presence of constant disturbances. 4. Differentiate between the different implementation of PID controllers: series PID and parallel PID implementation. 5. Review Bode plots, and analyze and evaluate the frequency response of closed loop system. 6. Designing and analyzing system in state space modeling. 7. Ability of using MATLAB software for studying different types of control system aspects 	
<p>9. Student's Obligation</p>	

- Regular attendance is required according to the university rules.
- The use of mobile phone during the class is prohibited.
- Only the students who are officially enrolled can attend the class, guests and children are not admitted.
- Daily participation and conducting assignments are required.

10. Forms of Teaching

Teaching methods include overhead project presentation, online materials, classroom website, in class whiteboard usage.

11. Assessment Scheme

1 st Term Exam	15%
2 nd Term Exam	15%
Daily + assignments + Quizzes	10%
Final Exam	60%
Total	100%

12. Course Reading List:

Textbook: M. Saravanan, N. Senthil Kumar, S. Jeevananthan, S.K. Shah, Microprocessors and Interfacing: 8086, 8051, 8096, and advanced processors, Oxford University Press, 2012

Reference Text: John Crisp, Introduction to Microprocessors and Microcontrollers, Elsevier, 2004

26 Weeks: From the 7th of October to 10th of May

Week	Subject
1 st	Introduction and brief history of Microprocessors
2 nd and 3 rd	Introduction to assembly language, brief concept of compiler, assembler, linker and debugger
4 th and 5 th	Architecture of 8085 Microprocessor, CPU module, Bus Configuration of 8085
6 th and 7 th	Instruction Set of 8085, some basic examples
8 th and 9 th	ROM and RAM families, memory interfacing, Interfacing I/O ports, Timing Diagrams, 8155 and 8255 programmable peripheral devices

10 th	Counters and Time Delays, Stack and Subroutines
11 th	Interrupt and Interrupt Handling, 8259-Programmable Interrupt Controller
12 th	DMA and DMA Controller
13 th	1 st Midterm Exam
14 th and 15 th	Programmable Interval Timer
16 th	A/D and D/A Converter
17 th and 18 th	Programmable Keyboard and Display I/O Interface
19 th	Serial and Parallel Data Transfer
20 th	Introduction to 16 bit 8086 Microprocessor, its architecture, Min-Max Mode
21 st and 22 nd	Introduction to Microcontrollers, comparison with Microprocessor
23 rd and 24 th	Architecture and programming of 8051 microcontroller & brief introduction to PIC Microcontroller
25 th	2 nd Midterm Exam
26 th	Introduction to ARM