Hashemite University
College of Engineering
Department of Computer Engineering
Digital Integrated Circuits and Embedded Systems Lab
(1 Credit Hours/Dept. Compulsory)

Instructor

Instructor (s)	Dr. Bassam Jamil Dr. Khalil Yousef
Lab Supervisor	Eng. Sara Alshaer
Email:	
Office:	E-3059
Office hours:	11-12 Every day

Grading info

Lab work	10%
Assignments	10%
Quizzes	10%
Project	10%
Mid Exam	20%
Final Exam	40%

Class Info

Days	Sec 2: Monday Sec 1: Tuesday
Time	2:00 – 5:00
Location	Eng. 2036

Course

Course Number:	110408326
Prerequisite:	Embedded Systems (110408362)
Textbook:	• **"CMOS VLSI Design,"** by: Neil Weste, David Harris • **"Programming Android:Java Programming for the New Generation of Mobile Devices,"** by:Zigurd Mednieks, Laird Dornin, G. Blake Meike, and Masumi Nakamura • **"Programming and Customizing the PIC Microcontroller,"** by: Myke Predko Third Edition • Lab Manual given by the lab supervisor.
Course Description:	This course aims to provide students with a lab experience of Embedded Systems principles. It will focus on the software approach of designing the Embedded systems including the microcontroller programming, also this course will cover the basics of Android programming and the basics of Spice Approach.
Specific Outcomes of Instruction (Course Learning Outcomes)	1. **Understand** the fundamentals and the main concepts in Embedded Systems design especially the software approach.(e, c) 2. **Connect** the 7-segment display with PIC Microcontroller.(a,k) 3. **Explain** the HD44780 controller based LCDs and how to use them.(a, c,k) 4. **Compose** software and hardware co-design techniques by using the Proteus IDE package to simulate a user built circuits.(b, c, e, g, k) 5. **Understand** the basic ingredients of an Android Application. (k) 6. **Create** simple Android application with multi screens.(c,k) 7. **Administer** the use of the Intents, Filters, Events and Event Listeners.(c). 8. **Introduce** the Pspise utility to the students which help them build small Integrated Circuits and test it. (a, c)
Important material	- Lecture notes - Lab manual - References - Internet resources

Major Topics Covered and Schedule in Weeks:

Topic	# Weeks	# Contact hours*
Exp1: Basis of PIC Microcontroller & MPLAB IDE.	1	3
Exp2: I/O Interfacing & the 7-Segment Display.	1	3
Exp3: PIC Microcontroller Interrupts.	1	3
Exp4: Controlling the LCD	1	3
Midterm Exam	1	1
Exp5:Interfacing the Keypad.	1	3
Exp6: Introduction to Android.	1	3
Exp7: Adding UI Components and Events	1	3
Exp8: Multi Activity Applications, Intents and	1	3

Filters.		
Exp9: Introduction to Pspice.	1	3
Exp10: Design an Experiment	1	3
Project submission and discussion	1	3
Final Practical Exam	1	5
Total	**13**	**39**

Lab Policy

- Attendance: Mandatory. No more than 15% absence is permitted.
- Entering the Class Room: You have 5 minutes to enter the class after the starting time. The door will be closed after that. Note that if you enter after the first 5 minutes you will lose the quiz if any.
- Make ups: Make up exams will be only conducted for students who have a valid excuse for missing the exams. Bear in mind that make up will be much harder than the normal exam.
- Cell Phones: must be closed before entering the class.
- Cheating: Don't risk your semester. Be smart enough to pass.

Student Outcomes (SO) Addressed by the Course:

#	*Outcome Description*	*Contribution*
General Engineering Student Outcomes		
(a)	An ability to apply knowledge of mathematics, science, and engineering	***M***
(b)	An ability to design and conduct experiments, as well as to analyze and interpret data	***L***
(c)	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	***H***
(d)	An ability to function on multidisciplinary teams	
(e)	An ability to identify, formulate, and solve engineering problems	***H***
(f)	An understanding of professional and ethical responsibility	
(g)	An ability to communicate effectively	***L***
(h)	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	A recognition of the need for, and an ability to engage in life-long learning	
(j)	A knowledge of contemporary issues	
(k)	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	***L***

H=High, **M**= Medium, **L**=Low