2309 CS480-05 Course Outline

Subject Code   :   CS480-05
Subject Title   :   Topics in computer science–Embedded Systems
Course Type   :   Elective
Level   :   4
Credits   :   3
Teaching Activity   :   Lecture
      :   Experiment   (included in lectures)
Prior Knowledge*   :   CS130: Digital Circuits
        CS110: Computer Programming
Class Schedule   :

Class	Week	Time	Classroom	Date
D1	Fri	15:30-18:20	C402	4/9/2023-17/12/2023

Instructor   :   U Kin Tak
Contact Number   :   853-88972249
E-mail Address   :   ktu@must.edu.mo
Office   :   C403
Office Hour   :   Tue. 13:30-15:30; Wed. 15:20-18:20
        Thur. 15:20-18:20; Fri. 13:30-15:30

COURSE DESCRIPTION

This course introduces the hardware architecture of the embedded system. It lets students be familiar with the development tools and skills in embedded system design. It leads students to use the built-in peripherals of the embedded system with other external peripherals to build an application system. Typical experiments will be provided to enhance the students' ability to handle and design a basic embedded system. Therefore, students can learn some practical skills in design with help of the experiments as well as the embedded-system principles.

Course Objectives
Students will try to learn:
I.   Hardware and software architecture of the embedded system
II.   Using Keil C to design C program in controlling embedded system.
III.   Design some functions of the embedded system by using its built-in peripherals with other external peripherals.

TEXT BOOK
Required Text Book:
No recommended textbook, but the learning materials will be provided to students during the classes.

Reference Book:
Book name: The 8051 Microcontroller and Embedded Systems Using Assembly and C
Author: Muhammad Ali Mazidi, Janice Gillispie Mazidi, and Rolin D. McKinlay
2nd Edition, 2005, ISBN: 978-0199681273, Publisher: Pearson India.

INTENDED LEARNING OUTCOMES

Upon successful completion of this subject, students will be able to:

1. Design and implement an AT89C51-based embedded system using IDE tools.
2. Apply some built-in peripherals of embedded system such as GPIOs, interrupts, timers and UART to solve practical problems and meet desired needs.
3. Apply some external peripherals of embedded system such as ADC/DAC, motor, keypad, LCD, Temperature sensor and Sounder to solve practical problems and meet desired needs.
4. Write technical reports.

Weekly Schedule

Index	Topic	Hours	Teaching Method
1	Introduction to embedded systems	3	Lecture
2	Exercises	3	Lecture+Lab
3	Lab1 7-segment LED control	3	Lecture+Lab
4	Lab2 Traffic light control with timer interrupt	3	Lecture+Lab
5	Lab3 Generate a two-step square-wave with DAC	3	Lecture+Lab
6	Lab4 Speed Control of DC Motor with ADC	3	Lecture+Lab
7	Review for Midterm Exam.	3	Lecture+Lab
8	Midterm Exam.	3	Lab
9	Advanced Exercises	3	Lecture+Lab
10	Lab5 4X4 keypad control	3	Lecture+Lab
11	Lab6 Design of a simple calculator	3	Lecture+Lab
12	Lab7 DS1302 Timer with LCD display	3	Lecture+Lab
13	Lab8 Generate music with timer and sounder	3	Lecture+Lab
14	Review for Final Exam.	3	Lecture+Lab
15	Final Exam.	3	Lab

ASSESSMENT APPROACH

Assessment method	% weight
1. Experiment	**50%**
2. Midterm exam.	**25%**
3. Final exam.	**25%**
4. Total	**100%**

Guideline for Letter Grade:

Marks	Grade
93 - 100	A+
88 - 92	A
83 - 87	A-
78 - 82	B+
72 - 77	B
68 - 71	B-
63 - 67	C+
58 - 62	C
53 - 57	C-
48 - 52	D+
43 - 47	D
0 - 42	F