**University of Management and Technology**

School of Engineering

Department of Electrical Engineering

**Course Outline**

Course code: EE-326L Course Title: Modern Microprocessor Systems Lab

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| Program | BSEE |
| Credit Hours | 1 |
| Duration | One semester |
| Prerequisites | EE 219 Digital Logic Design  EE224 Computer Organization and Architecture |
| Resource Person | Salman Khalid  Maryam Ali  Khalid Umar |
| Counseling Timing  (Room# ) | See Office doors  Digital System Lab, SEN Level 4 |
| Contact | [Salman.khalid@umt.edu.pk](mailto:Salman.khalid@umt.edu.pk)  [Maryam.ali@umt.edu.pk](mailto:Maryam.ali@umt.edu.pk)  [Khalid.umar@umt.edu.pk](mailto:Khalid.umar@umt.edu.pk) |

**Chairman/Director signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Learning Objective:**

This course gives students the knowledge to learn how to use assembly language as wel as C/C++ to program microcontrollers according to desired tasks. Microcontrollers are main part of every project and machines. Students will be able to interface different I/O components for example LCD, Keypad, Serial Communication with microcontrollers. Learning these techniques will enable them to enhance the working of project prototypes and design new embedded systems with much ease. To achieve these outcomes the following objectives were specified for the laboratory component of the course:

* To provide practical experience with microcontroller systems;
* To expose the students to design work where there is no single correct solution, rather competing objectives; and
* To encourage cooperative team work and develop communication skills.

In accordance with HEC curriculum **outcomes** a, b, d and e, the upon completion, students will be able

* To design a simple microcontroller system for real applications
* To use powerful programming languages for designing prototypes
* To Use built in libraries to interface different I/O devices with microcontroller

**Learning Methodology:**

Students will perform lab experiments on simulation and hardware. The designed programmed will be practically implemented on microcontroller boards and then lab tasks/problems will be given which will be based on the technique learned in that experiment.

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Lab Manuals & Performance: 40%

Final Viva or Quiz + Performance: 60%

Total 100%

**Recommended Text Books:**

**Text book:** "80X86 IBM PC and Compatible Computers: Assembly Language, Design, and Interfacing”, Volumes I & II (5th Edition) 2010, Pearson by Muhammad Ali Mazidi

**Reference Books:**

1) The Intel Microprocessors 8th Edition, By Barry B. Brey

2) Assembly Language Programming and Organization IBM PC, By Yatha Yu

**Calendar of Course contents to be covered during semester**

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| --- | --- | --- |
| **Week** | **Course Contents** | **Relevance to Theory Course** |
| 1. | Introduction to Microsoft Macro Assembler (MASM) and Assembly Language Programming | Article …. |
| 2 | DOS Interrupts, I/O instructions and Intel 8086 Microprocessor Registers and Data Manipulation | Article ….. |
| 3 | Introduction to MPLab IDE and PIC Flash | Article …. |
| 4 | Using PORTS of PIC16f887 and Interfacing LEDs with PIC16f887 | Article …. |
| 5 | Internal Registers, Bit Rotation and Arithmetic Instruction Logic Instructions and creating Logic Gates | Article ….. |
| 6 | Interfacing 7-Segment Display with PIC16f887 | Article ….. |
| 7 | Interfacing Keypad with PIC 16f887 | Article ….. |
| 8 | Using Timers of PIC 16F887 | Article …. |
| 9 | Generating PWM in PIC16f887 | Article ….. |
| 10 | Introduction to MikroC and C programing interfacing LEDs, Arithmetic and Logic Instruction.and Seven segment | Article ….. |
| 11 | Timer programming in mikroC. | Article ….. |
| 12 | Generating PWM through MikroC | Article ….. |
| 13 | Keypad Interfacing MikroC | Article ….. |
| 14 | LCD Interfacing in MikroC | Article ….. |