**University of Management and Technology**

**Course Outline**

**Course code :** EE 227 **Course title:** Computer Organization and Architecture

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| --- | --- |
| Program | BSEE |
| Credit Hours | 3 |
| Duration | One semester |
| Prerequisites | Digital Logic Design |
| Resource Person | Ahmed malik |
| Counseling Timing  (Room# ) | See Office Window  Office: 501 |
| Contact | [ahmed.malik@umt.edu.pk](mailto:ahmed.malik@umt.edu.pk) |

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

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

**Learning Objective:**

* Program MIPS using assembly language
* Translate higher language code (C) to assembly and machine languages
* Understand CPU / ALU design and evaluate its performance under a given scenario
* Understand conventional single and multi-cycle data path
* Appreciate pros and cons of pipelined data path
* Comprehend virtual memory systems (storage disks, peripherals, etc)

**Learning Methodology:**

Lecture, interactive, participative

**Grade Evaluation Criteria**

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

**Marks Evaluation Marks in percentage**

Quizzes & Assignments 25

Mid Term 25

Final exam 50

Total 100

**Recommended Text Books:**

1. Computer Organization and Design (The Hardware / Software Interface), D.A. Patterson and J.L. Hennessy (5th Edition), 2013.

**Reference Book:**

1. Computer Architecture, 4th Edition: A Quantitative Approach D.A. Patterson and J.L. Hennessy,2007.

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

**Course code: EE220 Course title: Computer Organization and Architecture**

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| --- | --- | --- | --- |
| **Week** | **Course Contents** | | **Reference Chapter(s)** |
| 1 | Introduction  Introduction to MIPS Processor  Operations of the Computer Hardware  Operands of the Computer Hardware  Signed and Unsigned Numbers | | **Chapter 1:**  Computer Abstractions  And Technology **Chapter 2**: Language of the Computer |
| 2 | Representing Instructions in the Computer  Logical Operations  Instructions for Making Decisions | | **Chapter 2:** Language of the Computer |
| 3 | Supporting Procedures in Computer Hardware  MIPS Addressing for 32-bit Immediates and Addresses | | **Chapter 2:** Language of the Computer |
| 4 | Technologies for Building Processors and Memory  Performance | | Chapter 1:  Computer Abstractions  And Technology |
| 5 | Introduction  Logic Design Conventions | | **Chapter 4:** The Processor |
| 6 | Building a Datapath | | **Chapter 4:**  The Processor |
| 7 | Completion of Data path and Control  A Simple Implementation Scheme | | **Chapter 4:**  The Processor |
| 8 | | **Mid Term Examination** |  |
| 9 | | An Overview of Pipelining  Pipelined Datapath and Control | **Chapter 4:**  The Processor |
| 10 | | Data Hazards: Forwarding versus Stalling  Control Hazards  Exceptions | **Chapter 4:**  The Processor |
| 11 | | Introduction  Addition and Subtraction  Multiplication | **Chapter 3:**  Arithmetic for Computers |
| 12 | | Division  Floating Point | **Chapter 3:**  Arithmetic for Computers |
| 13 | | Introduction  Memory Technologies  The Basics of Caches | Chapter 5:  Exploiting Memory Hierarchy |
| 14 | | Measuring and Improving Cache Performance | Chapter 5:  Exploiting Memory Hierarchy |
| 15 | | Virtual Memory (tentative) | Chapter 5:  Exploiting Memory Hierarchy |