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**Computer Organization and Assembly Language**

**University of Central Punjab (UCP)**

**Johar Town, Lahore.**

**Course Title: Computer Organization and Assembly Language (Theory)**

**Course Code: \_\_\_\_\_\_\_\_\_\_\_\_**

**Semester: Fall 2019**

**Lead Instructor:**

**Email:**

**Course Description:**

The objective of this course is to understand the organization of microprocessor for instance Intel x88 in terms of assembly language instruction. This course primarily focuses on the detailed analysis and working of microprocessor.

**Course Goals:**

Upon successful completion of this course, students will be able:

* To develop the understanding, working and organization of microprocessor.
* Develop a habit to write both memory and time optimized code using assembly language.

**Teaching-Learning Methodology:**

More emphasis will be on coding assignments and practical lab sessions. Regular and online quizzes will be held to help students improving their understanding. Extra tutorial session will be conducted to increase problem solving kills.

**Assessment & Evaluation:**

Quizes (Best 3) 15%

Assignments (Best 3) 15%

Mid Term: 30 %

Final Exam: 40 %

**Total 100**

**CALENDAR OF ACTIVITIES**

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| --- | --- | --- |
| **Ser. #** | **Topics/contents (Weekly Plan)** | **Assignments/ Quizzes** |
| **1** | **Introduction to Assembly Language**   * Basic Computer Architecture * General purpose registers * Registers Architectures * Segment registers * MOV instruction and its variations * Introduction to Debugger and Assembler   Physical Address Calculation |  |
| **2** | **Addressing Modes**   * Direct Addressing and variations * Size Mismatch Errors * Indirect Addressing and variations * Address Wraparound |  |
| **3** | **Branching**   * Comparison Conditions * Types of jumps * Conditional jump * Unconditional jumps   Solve sorting examples through jumps , comparison condition in different ways | **Assignment #1**  **Quiz # 1 (Paper Based)** |
| **4** | **Bit Manipulation**   * Multiplication Algorithm * Shifting and Rotations variations * Bitwise logical operation   1. Set or reset Specific bit.  2. Bit Masking |  |
| **5** | **Subroutines**   * Introduction to Stack * Saving and restoring variable in stack * CALL and RET statements * Simple subroutines * Parameter passing through stack * Solve examples cover above concepts | **Assignment #2**  **Quiz # 2 (Paper Based)** |
|  | **MID TERM** |  |
| **6** | **Display Memory**   * Introduce with video Memory * Familiarize with ASCII and attribute * Screen Calculation and Printing * MUL and DIV Instruction * Solve examples covers above concepts |  |
| **7** | **String Instructions**   * Introduce basic string instructions with the help of examples. * Further elaborate the concept of string instructions. * LES and LDS instruction. | **Assignment #3**  **Quiz # 3 (Paper Based)** |
| **8** | **Software Interrupts**   * Basic introduction of interrupts * BIOS and DOS interrupts * Explain the concept of IVT(interrupt Vector Table ) and Interrupts hooking |  |
| **9** | **Real Time interrupts and Hardware Interfacing**   * Introduction of Hardware Interrupts * I/O Ports * Introducing Timer | **Assignment # 4**  **Quiz # 4 (Paper Based)** |
| **10** | **Multitasking**   * Introduction of Multitasking * Run example 11.1 and extend the concept of multitasking. |  |
|  | **FINAL TERM EXAM** |  |

**Text book:**

1. **Assembly Language Programming Lecture Notes by Bilal Hashmi and complied by Junaid Haroon (Available in soft form as well)**
2. **Assembly Language Intel based Computers, 4th Edition, by KIP, R, IRVINE**
3. **Computer Architecture and organization 8th Edition, by William Stallings.**