**University of Asia Pacific (UAP)**

Department of Computer Science and Engineering (CSE)

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**Course Outline**

**Program:** Computer Science and Engineering (CSE)

**Course Title:** Microprocessors & Assembly Language

**Course Code:** CSE 311

**Semester:** Spring -2020

**Level:** 3-1 ( 5th Semester), Sec – A

**Credit Hour:** 3.0

**Name & Designation of Teacher:**  Shaila Rahman,

Assistant Professor

Hasan Murad,   
 Lecturer

**Office/Room:** 7th Floor, teacher’s compound

**Class Hours: Sunday: 12:30PM- 1:50 PM  
Saturday : 3:30PM- 4:50 PM**

**Consultation Hours:**

**E-mail:** shaila@uap-bd.edu

**Mobile:** 01819818234

**Rationale:**

.

**Pre-requisite** (if any)**: No**

**Course Synopsis:** Introduction to Intel microprocessor family. 8086 architecture, pipelining concept, addressing modes, Instruction format, Instruction set, Bus cycle, 8086 system design, Interrupt system, Interfacing, Serial and parallel interface, Assembly language programming using 8086 instruction set for arithmetic logic and decision making looping string and DOS interrupts.

**Course Objectives:** The objectives of this course are to:

|  |  |
| --- | --- |
| **1.** | P**rovide** knowledge on microprocessors, internal architecture of a general purpose Microprocessor and its operation, Internal Architecture, Functional Units and Operation of Intel 8086 Microprocessor, Register Architecture, Memory Management, Instruction Set Architecture of Intel 8086 Microprocessor |
| **2.** | **Explain** Instruction set, addressing modes and Instructions (Data Transfer, Arithmetic, Logical, String, Stack I/O etc.) of 8086 Microprocessor |
| **3.** | **Demonstrate** System Design using 8086 Microprocessor in different modes including hardware details, functions & operations of Pins of Intel 8086 and associated interfacing components, advanced Intel processor: internal architecture, memory management, programming and interfacing design |
| **4.** | S**olve** Program Development and problem solving using Assembly Language Programming. |

**Course Outcomes (CO) and their mapping with Program outcomes (PO) and Teaching-Learning Assessment methods:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO**  **No.** | **CO Statements:**  Upon successful completion of the course, students should be able to: | **Corresponding**  **POs**  **(Appendix-1)** | **Bloom’s taxonomy domain/level**  **(Appendix-2)** | **Delivery methods and activities** | **Assessment**  **Tools** |
| CO1 | **Provide** knowledge on microprocessors, architecture, functional units, registers, memory Management, Instruction Set. | 1 | Remember | Lecture, multimedia, | Quiz,  Written exam |
| CO2 | **Explain** Instruction set, addressing modes and Instructions (Data Transfer, Arithmetic, Logical, String, Stack I/O etc.) of 8086. Microprocessor | 1 | Understand | Lecture, Multimedia | Quiz, class assignments |
| CO3 | **Demonstrate** System Design 8086 in different modes including hardware details, functions & operations of Pins and associated interfacing components, | 2 | Apply | Lecture, Problem Solving, Group discussion | Class quiz |
| CO4 | **Solve** Program Development and problem solving using Assembly Language Programming. | 3 | Create | Lecture, multimedia, | Assignment, Project |

**Weighting COs with Assessment methods:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Assessment Type** | **% weight** | **CO1** | **CO2** | **CO3** | **CO4** |
| Final Exam | **50%** | 15 | 15 | 10 | 10 |
| Mid Term | **20%** | 10 | 10 |  |  |
| Class performance,  Quizzes,  Presentation, case study, open book exam,  Assignment,  Project, reports on field trip/workshop attended  Others.. | **30%** | 10 | 10 | 5 | 5 |
| **Total** | **100%** | 35 | 35 | 15 | 15 |

**Instruction: 70% attendance is mandatory for final exam**

**Grading Policy:** As per the approved grading policy of UAP (Appendix-3)

**Course Content Outline and mapping with COs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Weeks** | **Topics / Content** | **Course Outcome** | **Delivery methods and activities** | **Reading Materials** |
| 1. | Introduction to Microprocessors, 8086 Microprocessors its Features. 8086 Architecture, Functional units, Pipelining and 8086 registers. | CO1 | Books, class lectures and slides provided. | Douglas V. Hall, Microprocessors and interfacing: programming and hardware, McGraw-Hill. |
| 2. | 8086 Flag Register, Memory Segmentation, Physical Address Calculation, and Instruction set. | CO1 | Books, class lectures and slides provided. | Douglas V. Hall, Microprocessors and interfacing: programming and hardware, McGraw-Hill. |
| **Class Test #1** | | | | |
| 3. | Addressing Modes- Finding the addressing mode of an operand in instruction Introduction to IBM PC assembly language, Flow control instructions, Logic, shift and rotate instructions, | CO2 | Books, class lectures and slides provided. | Douglas V. Hall, Microprocessors and interfacing: programming and hardware, McGraw-Hill. |
| 4. | The stack and introduction to procedures, Multiplication and division instructions, | CO2 | Books, class lectures and slides provided. | Assembly Language Programming and Organization of the IBM PC by Ytha Yu and Charles Marut. |
| **Class Test #2** | | | | |
| 5. | 8086 hardware details, functions & operations of pins & signals of Intel 8086, Minimum versus Maximum mode operation, | CO3 | Books, class lectures and slides provided. | Douglas V. Hall, Microprocessors and interfacing: programming and hardware, McGraw-Hill. |
| 6. | System design in Minimum and Maximum modes and associated interfacing components, | CO3 | Books, class lectures and slides provided. | Douglas V. Hall, Microprocessors and interfacing: programming and hardware, McGraw-Hill. |
| 7. | Bus Operation, Processor Read & Write bus cycles, | CO3 | Books, class lectures and slides provided. | Douglas V. Hall, Microprocessors and interfacing: programming and hardware, McGraw-Hill. |
| **Mid-Term Examination** | | | | |
| 8. | Interrupts and Interrupt Handing system design using 8086, Basic I/O Interfacing: Parallel I/O, Programmed I/O | CO3 | Books, class lectures and slides provided. | Douglas V. Hall, Microprocessors and interfacing: programming and hardware, McGraw-Hill. |
| 9. | The 8255A Programmable Peripheral Interface (PPI), programming 8255, Operation modes with examples | CO3 | Books, class lectures and slides provided. | Barry B. Brey, The Intel Microprocessors, Processor Architecture, Programming, and Interfacing, Eighth Edition, 2009, Prentice Hall |
| 10. | Architectural overview of advanced Intel Processors-  80186/80286/80386/80486 | CO4 | Books, class lectures and slides provided. | Barry B. Brey, The Intel Microprocessors, Processor Architecture, Programming, and Interfacing, Eighth Edition, 2009, Prentice Hall |
| 10. | Pentium Processor, Cache memory, TLB segment register formats, Paged memory operation, page Directory and page table address translation. Linear to physical address translation, Protected Mode Memory Management; segmentation and virtual addressing, segment selectors segment descriptor tables, segment descriptor, Cache Memory, TLB | CO4 | Books, class lectures and slides provided. | Barry B. Brey, The Intel Microprocessors, Processor Architecture, Programming, and Interfacing, Eighth Edition, 2009, Prentice Hall |
| **Class Test #3** | | | | |
| 11. | Handling Arrays and solving addressing modes, | CO4 | Books, class lectures and slides provided. | Assembly Language Programming and Organization of the IBM PC by Ytha Yu and Charles Marut. |
| 12. | Memory management, DOS interrupts, and advanced arithmetic | CO4 | Books, class lectures and slides provided. | Assembly Language Programming and Organization of the IBM PC by Ytha Yu and Charles Marut. |
| **Class Test #4** | | | | |
| 13. | The string instructions, Subroutines and solving related problems. | CO4 | Books, class lectures and slides provided. | Assembly Language Programming and Organization of the IBM PC by Ytha Yu and Charles Marut. |
| 14. | Review |  | Books, class lectures and slides provided. |  |

**Required Reference(s):**

1. Barry B. Brey, The Intel Microprocessors, Processor Architecture, Programming, and Interfacing, Eighth Edition, 2009, Prentice Hall
2. Douglas V. Hall, Microprocessors and Microcomputer Based System Design, McGraw-Hill.
3. M. Rafiquzzaman., Microprocessors Theory and Applications: Intel and Motorola, 2003, Prentice Hall of India. *Pvt. Ltd., New Delhi*, *6*.
4. Assembly Language Programming and Organization of the IBM PC by Ytha Yu and Charles Marut.

**Recommended Reference(s):**

1. Intel 64 and IA-32 Architectures Software Developer's Manual, http://www.intel.com/design/literature.htm

**Special Instructions:**

•Minimum Required Attendance: 70% class attendance is mandatory for a student in order to attend the final examination.

•Late presence: Consecutive two days late presence in the class will be counted as one day absent

•Assignment submission rules: Have to submit assignment by the last date of submission.

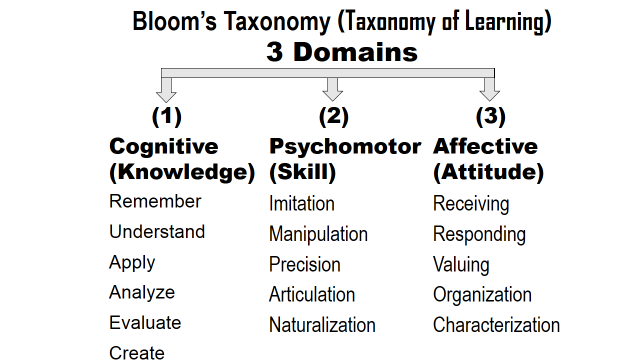
|  |  |  |
| --- | --- | --- |
| **Prepared by** | **Checked by** | **Approved by** |
| Shaila Rahman |  |  |

**Appendix-1:**

**Washington Accord Program Outcomes (PO) for engineering programs:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | | **POs** | | **Differentiating Characteristic** |
| 1 | | Engineering Knowledge | | Breadth and depth of education and type of knowledge, |
|  | |  | | both theoretical and practical |
| 2 | | Problem Analysis | | Complexity of analysis |
| 3 | | Design/ development of solutions | | Breadth and uniqueness of engineering problems i.e. the |
|  | |  | | extent to which problems are original and to which |
|  | |  | | solutions have previously been identified or codified |
| *4* | Investigation | | Breadth and depth of investigation and experimentation | | |
|  |  | |  | | |
| 5 | Modern Tool Usage | | Level of understanding of the appropriateness of the tool | | |
|  |  | |  | | |
| 6 | The Engineer and Society | | Level of knowledge and responsibility | | |
|  |  | |  | | |
| 7 | Environment and Sustainability | | Type of solutions. | | |
| 8 | Ethics | | Understanding and level of practice | | |
|  |  | |  | | |
| 9 | Individual and Team work | | Role in and diversity of team | | |
|  |  | |  | | |
| 10 | Communication | | Level of communication according to type of activities | | |
|  |  | | performed | | |
| 11 | Project Management and Finance | | Level of management required | | |
|  |  | | for differing types of activity | | |
| 12 | Lifelong learning | | Preparation for and depth of Continuing learning. | | |

**Appendix-2**



**Appendix-3**

**UAP Grading Policy:**

|  |  |  |
| --- | --- | --- |
| **Numeric Grade** | **Letter Grade** | **Grade Point** |
|  |  |  |
| 80% and above | A+ | 4.00 |
| 75% to less than 80% | A | 3.75 |
| 70% to less than 75% | A- | 3.50 |
| 65% to less than 70% | B+ | 3.25 |
| 60% to less than 65% | B | 3.00 |
| 55% to less than 60% | B- | 2.75 |
| 50% to less than 55% | C+ | 2.50 |
| 45% to less than 50% | C | 2.25 |
| 40% to less than 45% | D | 2.00 |
| Less than 40% | F | 0.00 |