**University of Asia Pacific (UAP)**

**Department of Computer Science and Engineering (CSE)**

**Course Outline**

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

**Course Title:** Microprocessors and Assembly Language Lab

**Course Code:** CSE 312

**Semester:** Spring-2020

**Level:** 5th Semester

**Credit Hour:** 1.5

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

Hasan Murad, Lecturer

**Office/Room:** 7th Floor

**Class Hours: Monday: A1 (2.00PM - 4.50PM)**

**Wednesday: B1 (12.30PM - 3.20PM)**

**Thursday: A2 (12.30PM - 3.20 PM)**

**Consultation Hours: Sunday: B2 (5.00-6.15)**

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**Rationale:** Required course in the CSE program

**Pre-requisite** (if any)**: None**

**Course Synopsis:**

Basics of Microprocessor and Assembly Language, Introduction to assembly language, Processor Status and Flags Register, Flow Control Instructions, Logic, Shift, Rotate, Multiplication and Division Instruction, Stack and Introduction to Procedures, Recursion, Arrays and Addressing Modes, String Instructions, Introduce with various types of microprocessor, Interfacing 8086 with external devices.

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

1. **Introduce** the basic of microprocessor elements of 8086.
2. **Introduce** the basic of 8086 Assembly Language and its instruction set.

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

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| --- | --- | --- | --- | --- | --- |
| **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 | **Describe** Low level /Mid-level machine specific language and their importance, 8086 Assembly language, Basics of 8086 Microprocessor. | 1 | 1/Understand | Lecture, multimedia | Written exam |
| CO2 | **Use** 8086 Instruction Set and write assembly language program. | 3 | 1/Apply | Lecture, Problem Solving | Programming test, Short Quizzes, Oral exam, Written exam |
| CO3 | **Solve** problems using Assembly language with Emulator of 8086 (EMU8086). | 2 | 1/Create | Lecture, multimedia | Lab test,  Short Quizzes, Oral exam, Written exam |

**Weighting COs with Assessment methods:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment Type** | **% weight** | **CO1** | **CO2** | **CO3** |
| Final Term:  Written Exam, Oral Exam | 30% | 10 | 10 | 10 |
| Mid Term:  Written Exam, Oral Exam | 20% | 10 | 10 | 0 |
| Continuous Evaluation:  Class Performance, Short Quizzes, Programming Test, Oral Exams, Lab test | 50% | 10 | 30 | 10 |
| Total | 100% | 30 | 50 | 20 |

**Course Content Outline and mapping with COs**

| **Weeks** | **Topics / Content** | **Course Outcome** | **Delivery methods and activities** | **Reading Materials** |
| --- | --- | --- | --- | --- |
| 1 | Introduction | CO1 | Lecture, multimedia | Slides, Assembly Language Programming and Organization of the IBM PC: Chapter 1,2 |
| 2 | Basics of Microprocessor and Assembly Language | CO1 | Lecture, multimedia | Slides, Assembly Language Programming and Organization of the IBM PC: Chapter 3 |
| 3 | Introduction to assembly language, Processor Status and Flags Register | CO1,CO2 | Lecture, multimedia | Slides, Assembly Language Programming and Organization of the IBM PC: Chapter 4, 5 |
| 4 | Flow Control Instructions, Code Demo, Assigning Offline, Assignment Checking | CO1,CO2 | Lecture, multimedia | Slides, Assembly Language Programming and Organization of the IBM PC: Chapter 6 |
| 5 | Logic, Shift, Rotate, Multiplication and Division Instruction, Assigning Offline | CO1,CO2 | Lecture, multimedia | Slides, Assembly Language Programming and Organization of the IBM PC: Chapter 7,9 |
| 6 | Test on Previous classes | CO2 |  |  |
| 7 | Stack and Introduction to Procedures, Recursion, Assigning Offline. | CO1,CO2 | Lecture, multimedia | Slides, Assembly Language Programming and Organization of the IBM PC: Chapter 8, 17 |
| 8 | **Mid Exam** | | | |
| 9 | Evaluation of Offline, Online |  |  |  |
| 10 | Arrays and Addressing Modes, String Instructions | CO1,CO2 | Lecture, multimedia | Slides, Assembly Language Programming and Organization of the IBM PC: Chapter 10,11 |
| 11 | Evaluation of Offline, Online | CO2 |  |  |
| 12 | Introduce with various types of microprocessor | CO1 | Lecture, multimedia | Provided Slides, The Intel Microprocessors *by Barry B. Brey* |
| 13 | Interfacing 8086 with external devices | CO3 | Lecture, multimedia | Provided Slides, The Intel Microprocessors *by Barry B. Brey* |
| 14 | **Final Exam** | | | |

**Minimum attendance:** 70% class attendance is mandatory for a student in order to appear at the final examination.

**Textbook:** Assembly Language Programming and Organization of the IBM PC, Ytha Yu and Charles Marut

Intel Microprocessors, Barry B Brey

**Grading System:** As per the approved grading scale of University of Asia Pacific (Appendix-3).

**Special Instructions: Late attendance:** Students who will enter the class after the attendance call will be marked as absent.

**Assignment**: **Unfinished** work should be submitted as assignment. **Additional** assignments may be given as needed. Copied home work will be graded as zero. Late submission will result a 50% deduction in score.

**Student’s responsibilities:** Students must come to the class prepared for the course material covered in the previous class (es).

They must submit their assignments on time.

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| **Prepared by**  **(**Course Teacher**)** | **Checked by**  **(**Chairman, PSAC committee**)** | **Approved by**  **(**Head of the Department**)** |
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**Appendix-1:**

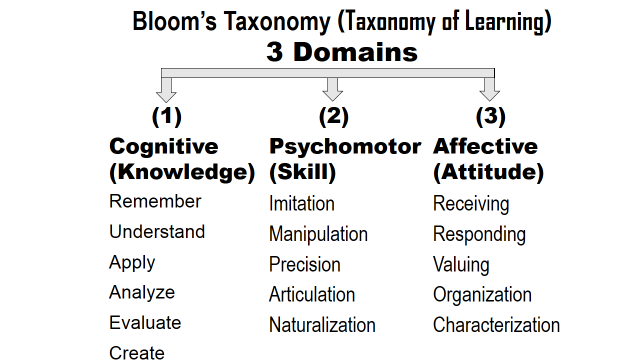
**Washington Accord Program Outcomes (PO) for engineering programs:**

|  |  |  |
| --- | --- | --- |
| **No.** | **PO** | **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. |

**Generic Skills (Detailed):**

1. **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems;
2. **Problem Analysis (T)** – Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;
3. **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues.
4. **Investigation (D)** Conduct investigation into complex problems, displaying creativeness, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
5. **Modern Tool Usage (A & D)** -Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations;
6. **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices.
7. **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development;
8. **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices.
9. **Communication (S)** -Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
10. **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
11. **Life Long Learning (S)** -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
12. **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one’s own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities of entrepreneurship.

**Appendix-2**



**Appendix-3**

**UAP Grading Policy:**

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| **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 |