**Course Description Form**

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| 1. Course Name: | | | | | | | | |
| Microprocessor | | | | | | | | |
| 1. Course Code: | | | | | | | | |
| WBM-51-06 | | | | | | | | |
| 1. Semester / Year: | | | | | | | | |
| 1st Semester / 2023 2024 | | | | | | | | |
| 1. Description Preparation Date: | | | | | | | | |
| 19/4/2024 | | | | | | | | |
| 1. Available Attendance Forms: | | | | | | | | |
| Weekly (Theoretical & Practical) | | | | | | | | |
| 1. Number of Credit Hours (Total) / Number of Units (Total) | | | | | | | | |
| 30 Hrs. Theoretical & 30 Hrs. Practical / 3 Units | | | | | | | | |
| 1. Course administrator's name (mention all, if more than one name) | | | | | | | | |
| Name: Mustafa Mahmood  Email: mustafa.mahmood@uowa.edu.iq | | | | | | | | |
| 1. Course Objectives | | | | | | | | |
| **Course Objectives** | | | | * Understand Microprocessor Architecture: Students should gain comprehensive knowledge of the 8086 microprocessor architecture, including its bus interface, instruction set, and memory organization. * Programming Skills: Develop proficiency in assembly language programming specifically for the 8086 microprocessor. * Interfacing Techniques: Learn how to interface the microprocessor with other electronic components and devices. * Problem Solving: Equip students with the skills to solve practical and theoretical problems using the 8086 microprocessor. * Application to Biomedical Engineering: Understand the application of microprocessors in designing and implementing medical devices and systems. | | | | |
| 1. Teaching and Learning Strategies | | | | | | | | |
| **Strategy** | | 1. Teaching Methods   * Lectures and Demonstrations: Use lectures to cover theoretical aspects and live demonstrations to show practical applications. * Interactive Sessions: Engage students with interactive sessions where they can explore microprocessor components and its functions through virtual simulations.   2. Learning Activities   * Hands-On Lab Work: Set up lab sessions where students can work with microprocessor kits and other electronics to build and test simple devices. * Project-Based Learning: Implement projects that involve designing a device or a part of a device using the 8086 microprocessor, encouraging creativity and practical application of learned skills. * Simulation Software: Use software tools to simulate microprocessor functions and circuit designs to enhance understanding without the need for physical components all the time.   3. Continuous Improvement   * Feedback Mechanisms: Regularly collect feedback from students to improve the course content and delivery, adapting to changing technological and educational environments. * Professional Development for Instructors: Instructors should continuously update their knowledge and teaching strategies to keep pace with advancements in microprocessor technology and biomedical applications. * Curriculum Updates: Regularly review and update the curriculum to incorporate the latest developments in microprocessor technology and its applications in biomedical engineering. | | | | | | |
| 1. Course Structure | | | | | | | | |
| **Week** | **Hours** | | **Required Learning Outcomes** | | | **Unit or subject name** | **Learning method** | **Evaluation method** |
| 1 | 4 | | Introduction to the microprocessor and computer & microprocessor organization | | | Introduction to the microprocessor | Theoretical & Practical | Daily test and oral questions |
| 2 | 4 | | Introduction to the microprocessor and computer & microprocessor organization | | | Introduction to the microprocessor | Theoretical & Practical | Daily test and oral questions |
| 3 | 4 | | Micro-architecture of the 8086 Microprocessor: Introduction to Microarchitecture of the 8086Microprocessor. and Software Model of the  8086 Microprocessor | | | Architecture of the 8086 Microprocessor | Theoretical & Practical | Daily test and oral questions |
| 4 | 4 | | Micro-architecture of the 8086 Microprocessor: Introduction to Microarchitecture of the 8086Microprocessor. and Software Model of the  8086 Microprocessor | | | Architecture of the 8086 Microprocessor | Theoretical & Practical | Daily test and oral questions |
| 5 | 4 | | microprocessors architecture and its operations  CPU machine and assembly language  Addressing Modes:  Register, immediate,  direct, register indirect,  based-plus-index, register  relative, and base relative plus-  index addressing | | | The operations of  CPU machine and assembly language  Addressing Mod | Theoretical & Practical | Daily test and oral questions |
| 6 | 4 | | microprocessors architecture and its operations  CPU machine and assembly language  Addressing Modes:  Register, immediate,  direct, register indirect,  based-plus-index, register  relative, and base relative plus-  index addressing | | | The operations of  CPU machine and assembly language  Addressing Mod | Theoretical & Practical | Daily test and oral questions |
| 7 | 4 | | microprocessors architecture and its operations  CPU machine and assembly language  Addressing Modes:  Register, immediate,  direct, register indirect,  based-plus-index, register  relative, and base relative plus-  index addressing | | | The operations of  CPU machine and assembly language  Addressing Mod | Theoretical & Practical | Daily test and oral questions |
| 8 | 4 | | Instruction Set and Programming: Data Movement Instructions | | | Instruction Set and Programming: Data Movement Instructions (part 1) | Theoretical & Practical | Daily test and oral questions |
| 9 | 4 | | Instruction Set and Programming: Data Movement Instructions | | | Instruction Set and Programming: Data Movement Instructions (part 2) | Theoretical & Practical | Daily test and oral questions |
| 10 | 4 | | string Instructions | | | string Instructions | Theoretical & Practical | Daily test and oral questions |
| 11 | 4 | | Arithmetic Instructions | | | Arithmetic Instructions | Theoretical & Practical | Daily test and oral questions |
| 12 | 4 | | Arithmetic Instructions | | | Arithmetic Instructions | Theoretical & Practical | Daily test and oral questions |
| 13 | 4 | | Logic Instructions | | | Logic Instructions | Theoretical & Practical | Daily test and oral questions |
| 14 | 4 | | Program control Instructions | | | Program control Instructions | Theoretical & Practical | Daily test and oral questions |
| 15 | 4 | | Subroutine and loop & shift and rotate | | | Subroutine and loop & shift and rotate | Theoretical & Practical | Daily test and oral questions |
| 1. Course Evaluation | | | | | | | | |
| • Continuous Assessment: Employ quizzes and small tests focused on microprocessor architecture and programming throughout the course to ensure ongoing learning.  • Practical Exams: Include practical exams where students must demonstrate their ability to program and troubleshoot the 8086 microprocessor.  • Final Project: Evaluate students through a capstone project that involves designing a biomedical device using the 8086, assessing both technical skills and innovative application. | | | | | | | | |
| 1. Learning and Teaching Resources | | | | | | | | |
| Required textbooks (curricular books, if any) | | | | | 1- Barry B. Brey, “The Intel Microprocessors 8086/8088, 80186/80188, 80286,80386, 80486, Pentium, and Pentium Pro Processor Architecture, Programming,  and Interfacing”, 6th Edition, Prentic-Hall Inc., 2003. | | | |
| Main references (sources) | | | | | Walter A. Triebe, “The 8086 Microprocessor: Architecture, Software, and  Interfacing Techniques”, Prentic-Hall Inc., 1998. | | | |
| Recommended books and references (scientific journals, reports...) | | | | | Walter A. Triebe, “The 8086 Microprocessor: Architecture, Software, and  Interfacing Techniques”, Prentic-Hall Inc., 1998. | | | |
| Electronic References, Websites | | | | | www.sciencedirect.com | | | |