**Course Description Form**

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| 1. Course Name:
 |
| Microprocessor |
| 1. Course Code:
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| WBM-51-06 |
| 1. Semester / Year:
 |
| 1st Semester / 2023 2024 |
| 1. Description Preparation Date:
 |
|  19/4/2024 |
| 1. Available Attendance Forms:
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| Weekly (Theoretical & Practical) |
| 1. Number of Credit Hours (Total) / Number of Units (Total)
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| 30 Hrs. Theoretical & 30 Hrs. Practical / 3 Units |
| 1. Course administrator's name (mention all, if more than one name)
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| Name: Mustafa Mahmood Email: mustafa.mahmood@uowa.edu.iq |
| 1. Course Objectives
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| **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.
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| 1. Teaching and Learning Strategies
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| **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.
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| 1. Course Structure
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| **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 the8086 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 the8086 Microprocessor | Architecture of the 8086 Microprocessor | Theoretical & Practical | Daily test and oral questions |
| 5 | 4 | microprocessors architecture and its operationsCPU machine and assembly languageAddressing Modes: Register, immediate,direct, register indirect,based-plus-index, registerrelative, and base relative plus-index addressing | The operations of CPU machine and assembly languageAddressing Mod | Theoretical & Practical | Daily test and oral questions |
| 6 | 4 | microprocessors architecture and its operationsCPU machine and assembly languageAddressing Modes: Register, immediate,direct, register indirect,based-plus-index, registerrelative, and base relative plus-index addressing | The operations of CPU machine and assembly languageAddressing Mod | Theoretical & Practical | Daily test and oral questions |
| 7 | 4 | microprocessors architecture and its operationsCPU machine and assembly languageAddressing Modes: Register, immediate,direct, register indirect,based-plus-index, registerrelative, and base relative plus-index addressing | The operations of CPU machine and assembly languageAddressing 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
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| • 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
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| 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, andInterfacing Techniques”, Prentic-Hall Inc., 1998. |
| Recommended books and references (scientific journals, reports...) | Walter A. Triebe, “The 8086 Microprocessor: Architecture, Software, andInterfacing Techniques”, Prentic-Hall Inc., 1998. |
| Electronic References, Websites | www.sciencedirect.com |