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Ministry of Higher Education and Scientific Research Scientific Supervision and Scientific Evaluation Apparatus Directorate of Quality Assurance and Academic Accreditation Accreditation Department

University of Diyala

College of engineering

Department of Electronic Engineering



**Academic Program and Course Description Guide**

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**Introduction:**



**Concepts and terminology:**



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# TEMPLATE FOR PROGRAMME SPECIFICATION

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| 1. vision |
| The basic vision of the Department of Electronic Engineering is to make the department one of the leading engineering departments in the field of contemporary scientific and technological development. Therefore, the department strives to develop modern scientific curricula in the field of electronic engineering, in addition to completing all requirements for the department’s laboratories. And improving the teaching staff, to provide society with engineering cadres capable of contributing to technological growth. |

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| 1. mission |
| The department offers a high level of knowledge in the field of electronic engineering and its various applications by integrating theoretical knowledge with practical experience. The department strives to advance the process of scientific, engineering and technological research, and to encourage research creativity. The department also provides valuable information to students in their field of specialization, which makes their thinking and ability to solve various technological and scientific problems and meet the needs of society, whether at the public or private sector level, serve our dear country. |

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| 1. Aims of the Program |
| * Train specialized engineers in the field of electronic engineering, with a focus on professional ethics, and prepare them to be distinguished scientifically and practically. |
| * The department supports scientific research to advance knowledge and technology in the field of electronic engineering and its applications. |
| * The department provides a comprehensive training program to equip graduate students with the basic skills needed to be fully prepared to work in community institutions. |
| * Collaborating with all scientific and industrial entities to enhance the engineering education process at the college and elevate its global ranking. |

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| 1. Programmatic accreditation |
| N/A |

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| 1. Other external Supports |
| N/A |

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| 1. Program Structure | | | | |
| Notes | Percentage Notes | of Courses Study | Number of Courses Study | Program Structure |
| متطلبات المؤسسة | 3.9 | 6 | 5 | Institution requirements |
| متطلبات الكلية | 18.7 | 29 | 9 | College requirements |
| متطلبات القسم | 77.4 | 120 | 49 | Requirements of Section |
| There is a summer course | يوجد |  |  | Summer Training |

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| 1. Program Structure | | | | 12. Awards and Credits |
| Level/Year | Course or Module  Code | Course or Module Title | Credit rating |
| 1st Year-1st Semester | E 101 | Mathematics 1 | 6 | Bachelor Degree Requires ( 155) credits |
| 1st Year-1st Semester | EE 101 | Electrical Engineering Fundamentals 1 | 8 |
| 1st Year-1st Semester | EE 107 | Electronic Physics | 6 |  |
| 1st Year-1st Semester | EE 106 | Engineering Drawing | 4 |
| 1st Year-1st Semester | U 103 | Computer Skills | 4 |
| 1st Year-1st Semester | U 104 | English Language | 2 |
| 1st Year-2nd Semester | E 102 | Mathematics 2 | 6 |  |
| 1st Year-2nd Semester | EE 102 | Electrical Engineering Fundamentals 2 | 8 |  |
| 1st Year-2nd Semester | EE 103 | Digital techniques | 7 |  |
| 1st Year-2nd Semester | EE 105 | C++ Programming | 4 |  |
| 1st Year-2nd Semester | EE 104 | Workshops skills | 3 |  |
| 1st Year-2nd Semester | U 101 | Human Rights and Democracy | 2 |  |
|  |  |  |  |  |
| 2nd Year-1st Semester | E201 | Advance Mathematics –I | 3 |  |
| 2nd Year-1st Semester | EE 201 | Electronics I | 2 |  |
| 2nd Year-1st Semester | EE 203 | Electric Circuits Analysis I | 2 |  |
| 2nd Year-1st Semester | EE 205 | Advanced Programming | 1 |  |
| 2nd Year-1st Semester | EE 208 | Electro-Magnetics I | 2 |  |
| 2nd Year-1st Semester | EE 210 | Digital Electronic I | 2 |  |
| 2nd Year-1st Semester | EE 206 | Machines (DC) | 2 |  |
| 2nd Year-2nd Semester | E202 | Advance Mathematics- II | 3 |  |
| 2nd Year-2nd Semester | EE 202 | Electronics II | 3 |  |
| 2nd Year-2nd Semester | EE 204 | Electric Circuits Analysis II | 2 |  |
| 2nd Year-2nd Semester | EE 212 | Measurement &Instruments | 2 |  |
| 2nd Year-2nd Semester | EE 209 | Electro-Magnetics II | 2 |  |
| 2nd Year-2nd Semester | EE 211 | Digital Electronic II | 3 |  |
| 2nd Year-2nd Semester | EE 207 | Power and AC Machines | 4 |  |
| 2nd Year-2nd Semester | EE 213 | University Culture Activity | - |  |
|  |  |  |  |  |
| 3rd Year-1st Semester | EE 301 | Digital Signal Processing I | 2 |  |
| 3rd Year-1st Semester | EE 309 | Advanced Electronics I | 3 |  |
| 3rd Year-1st Semester | EE 303 | Communication Systems I | 3 |  |
| 3rd Year-1st Semester | EE 305 | Microprocessor and Microcontroller: Hardware | 3 |  |
| 3rd Year-1st Semester | EE 307 | Engineering Analysis I | 2 |  |
| 3rd Year-1st Semester | EE 311 | Antenna | 3 |  |
| 3rd Year-2nd Semester | EE 312 | Engineering Administration | 2 |  |
| 3rd Year-2nd Semester | EE 302 | Digital Signal Processing II | 3 |  |
| 3rd Year-2nd Semester | EE 310 | Advanced Electronics II | 3 |  |
| 3rd Year-2nd Semester | EE 304 | Communication Systems II | 3 |  |
| 3rd Year-2nd Semester | EE 306 | Microprocessor-Based System: Programming | 2 |  |
| 3rd Year-2nd Semester | EE 308 | Engineering Analysis II | 2 |  |
| 3rd Year-2nd Semester | EE 313 | Optoelectronics | 2 |  |
|  |  |  |  |  |
| Fourth Year-1st Semester | EE 401 | Microelectronic I | 2 |  |
| Fourth Year-1st Semester | EE 403 | Power Electronics I | 3 |  |
| Fourth Year-1st Semester | EE405 | Control System I | 3 |  |
| Fourth Year-1st Semester | EE407 | Digital System Design | 3 |  |
| Fourth Year-1st Semester | EE 409 | Information Theory | 3 |  |
| Fourth Year-1st Semester | EE411 | Hardware Description Language (HDL ) Programming | 3 |  |
| Fourth Year-2nd Semester | EE 413 | Introduction to AI | 2 |  |
| Fourth Year-2nd Semester | E402 | Eng. Graduation Project I | 2 |  |
| Fourth Year-2nd Semester | EE402 | Microelectronic II | 2 |  |
| Fourth Year-2nd Semester | EE404 | Power Electronics II | 3 |  |
| Fourth Year-2nd Semester | EE406 | Control System II | 3 |  |
| Fourth Year-2nd Semester | EE408 | Advanced Digital System Design | 3 |  |
| Fourth Year-2nd Semester | EE410 | Microwave | 2 |  |
| Fourth Year-2nd Semester | E401 | Engineering Profession Ethics | 2 |  |
| Fourth Year-2nd Semester | EE412 | Digital Image Processing | 2 |  |
| Fourth Year-2nd Semester | E403 | Eng. Graduation Project II | 2 |  |

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| 1. Learning Outcomes, Teaching, Learning and Assessment Methods |
| 1. Cognitive goals   A1- The ability to have knowledge in the fields of mathematics and specialized sciences Engineering expertise in the application of electronic engineering.  A2 Preparing the student to continue self-learning and acquire technology And new skills in the field of electronic engineering.  A3- Enabling students to obtain knowledge and understanding of designing and implementing various electronic systems.  A4- The student will understand the foundations of creating, programming, and simulating electronic circuits in hardware languages and various engineering programs.  A5- Enabling the student to visualize project management and solve the problems he encounters in the factory. |
| B. The skills goals special to the program.  B1 - The ability to select and perform the required examinations and collect their locations. Review and analyze the results of the relevant tests.  B2 The ability to design and supervise the implementation of relevant systems In electronic engineering.  B3 The ability to derive and approach engineering problems in a Recognize and determine the appropriate method to address the emerging engineering problems. This.  B4 - Provides them with skills to solve practical problems related to various electronic systems and computer programs for those systems. |
| Teaching and Learning Methods |
| 1. Teaching and Learning Methods |
| * Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis. * Forming discussion circles during or outside lectures to discuss scientific engineering topics that require thinking and analysis. * Asking students, a set of thinking questions during lectures, such as (what, how, when, why) for specific topics. * Giving students homework and periodic reports. |
| 1. Assessment methods |
| * Daily exams with practical and scientific questions. * Participation marks for difficult competition questions among students. * Assigning grades to homework assignments and reports assigned to them. * Semester exams for the curriculum in addition to the final exam. |

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| 1. Academic staff | | | |
| Number of teaching staff | | **Specialization** | **Scientific degree** |
| 1 | Electronic and communication | | Prof |
| 5 | Electronic | | Asst. Prof |
| 1 | Control | | Asst. Prof |
| 5 | Electronic and communication | | Lect. |
| 3 | Electronic | | Lect. |
| 1 | communication | | Lect. |
| 1 | Power | | Lect. |
| 5 | Electronic and communication | | Asst. LECT |

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| 1. Personal Development Planning |
| It is planned to develop the students’ personalities by holding discussion circles with them and asking them for periodic reports and seminars throughout the four stages and on various topics to develop their personal development. |
| 1. Admission criteria . |
| According to the rules and regulations of Ministry of Higher Education and Scientific Research. |
| 1. Key sources of information about the program |
| * College website. * The department’s website and contact the department by email. |

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| **Curriculum Skills Map** | | | | | | | | | | | | | | | | |
| **please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed** | | | | | | | | | | | | | | | | |
|  | | | | **Programme Learning Outcomes** | | | | | | | | | | | | |
| Year / Level | Course Code | Course Title | Core (C)  Title or Option (O**)** | Knowledge and understanding | | | | | Subject-specific skills | | | | Thinking Skills | | | |
| **A1** | **A2** | **A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **C1** | **C2** | **C3** | **C4** |
| 3rd Year -2nd Semester | **EE 306** | Microprocessor Based System Programming | C | √ | √ | √ |  | √ | √ | √ | √ | √ | √ | √ | √ | √ |
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# TEMPLATE FOR COURSE SPECIFICATION

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification. |

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|  | 1. Course title | Microprocessor Based System Programming | |
|  | 2. Course code | EE 306 | |
|  | 3. Semester/Year | 2nd Semester – 3rd Year | |
|  | 4. Date of production/revision of this specification | March 2024 | |
|  | 5. Modes of Attendance offered | Class Lectures | |
|  | 6. Number of Credit Hours (Total) / Number of Units (Total) | 45 hours /3 units | |
|  | 7. Course administrator's name (mention all, if more than one name) | Ayad Q. Abdulkareem  eyadqais\_eng@uodiyala.edu.iq | |
|  | 8. Aims of the Course | | |
|  | The topic of the microprocessor aims to clarify the practical and philosophical challenges of current engineering programming that have stimulated this continuous development, as well as to present the basic concepts of the physical and software components used in many programmed devices, which demonstrate their applied importance in the scientific and practical field. This is done by clarifying and learning the basic definitions used in computers, such as counting systems, the central processing unit and memory, computer peripherals and secondary storage units, as well as operating systems, and making the student able to build programs in assembly language for the 8085 processor and their applications in the field of electronics. | | |
| A- Cognitive objectives  A1- Making the student able to write programs in the 8085 processor assembly language and their applications in the field of electronics.  A2- Learning and understanding the basic definitions used in computers, such as counting systems, the central processing unit and memory, computer peripherals and secondary storage units, as well as operating systems.  A3- Identifying the two most important physical components within the computer system: the microprocessor, known as the microprocessor, and the memory.  A4- Focus on number systems and their importance in digital processing. | | |
| B. The skills goals special to the course.  B1- Familiarity with arithmetic operations, including conversion between different counting systems. | | |
| C. Affective and value goals  C2- Familiarity with how to connect the input and output peripherals to data using logic pins.  C3- Familiarity with the importance of memory, its different types, and the mechanism of linking it with the internal processor components via data paths and addresses.  C4- Familiarity with how to design the interlock circuits between the microprocessor and the external environment. | | |
| 9- Teaching and Learning Methods | | |
| * Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis. * Forming discussion circles during or outside lectures to discuss scientific engineering topics that require thinking and analysis. * Asking students, a set of thinking questions during lectures, such as (what, how, when, why) for specific topics. | | |

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| 11. Course structure | | | | |
| Week | Hours | Unit/Module or Topic Title | Teaching Method | Assessment Method |
| Week 1 | 3 | **Assembly Programming:**  **Machine Language Instruction Formats, Addressing Modes of 8050, Instruction set of 8050, Assembler directives and operators of ALP**  Part I | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 2 | 3 | **Assembly Programming:**  **Machine Language Instruction Formats, Addressing Modes of 8050, Instruction set of 8050, Assembler directives and operators of ALP**  **Part II** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 3 | 3 | **Assembly Programming:**  **Machine Language Instruction Formats, Addressing Modes of 8050, Instruction set of 8050, Assembler directives and operators of ALP**  **Part III** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 4 | 3 | **Memory Interface and Bus Interface programming:**  **Memory Devices, Address Decoding- Memory Interface** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 5 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 6 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 7 | 3 | **I/O Interfacing**  **programming:**  **Basic I/O interfacing (I/O mapped I/O and Memory mapped I/O). I/O ports address.**  **Part II** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 8 | 3 | **Interrupts Programming :**  **Interrupts and Interrupt Service Routines, Interrupt Cycle of 8050,**  **Non-Maskable Interrupt Maskable Interrupt (INTR), Interrupt Programming**  **Part I** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 9 | 3 | **Interrupts Programming :**  **Interrupts and Interrupt Service Routines, Interrupt Cycle of 8050,**  **Non-Maskable Interrupt Maskable Interrupt (INTR), Interrupt Programming**  **Part II** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 10 | 3 | **Interrupts Programming :**  **Interrupts and Interrupt Service Routines, Interrupt Cycle of 8050, Non Maskable Interrupt Maskable Interrupt (INTR), Interrupt Programming**  **Part III** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 11 | 3 | **Memory Interface and Bus Interface programming:** **Memory Devices, Address Decoding- Memory Interface 8085**  **Part I** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 12 | 3 | **Memory Interface and Bus Interface programming: Memory Devices, Address Decoding- Memory Interface 8085**  **Part II** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 13 | 3 | **Memory Interface and Bus Interface programming: Memory Devices, Address Decoding- Memory Interface 8085**  **Part III** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 14 | 3 | **Programmable Peripheral Devices:**  **The 8255A Programmable Peripheral Interface, Bidirectional Data Transfer between two Microcomputers, Direct Memory Access (DMA)..** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 15 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |

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| 11. Infrastructure | |
| 1. Books Required reading: | Microprocessor Architecture Programming and Applications with the 8085 |
| 2. Main references (sources) | • Lectures presented by the Lecturer  • Books available in the college library |
| A- Recommended books and references (scientific journals, reports…). |  |
| B-Electronic references, Internet sites… | Microprocessor 8085 online simulator. |