**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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| University of Baghdad | 1. Teaching Institution |
| College of Engineering/ Electronics and Communications Department | 2. University Department/Centre |
| Embedded system / 439 ECES | 3. Course title/code |
| digital communication, real-time system, digital control | 4. Programme(s) to which it contributes |
| In class face-to-face mode | 5. Modes of Attendance offered |
| 1st-2nd / 2015-2016 | 6. Semester/Year |
| 2 hrs per week/ 60 hrs total | 7. Number of hours tuition (total) |
| 5/4/2016 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| This course is intended for students in the fourth class of electronics and communications engineering department. The course introduces the fundamentals of the design with microcontrollers. The course aims to teach the different architectures of microprocessor and architecture and programming of PIC microcontrollers. | |
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methods |
| 1. Knowledge and Understanding   A1. Basics of digital circuits  A2. Microprocessor-based systems architectures  A3.  A4.  A5.  A6 . |
| B. Subject-specific skills  B1. assembly programming  B2. Know the principles of microprocessor operations.  B3. Know building block of a pic microcontroller. |
| Teaching and Learning Methods |
| 1- Lectures.  2- Tutorials.  3- Homework and  4- Mini project.  5- Tests and Exams.  6- In-Class Questions and Discussions |
| Assessment methods |
| 1. Quizzes: 5% 2. 1st term exam: 10% 3. 2nd term exam: 10% 4. Mini project 5% 5. Final exam: 70% |
| C. Thinking Skills  C1.  C2.  C3.  C4. |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.  D2.  D3.  D4. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Quiz/Exam | Lectures | Principle of microprocessor-based systems and embedded system |  | 4 | 1-2 |
| Quiz/Exam | Lectures | Architectures and configurations of memory –processor |  | 4 | 3-4 |
| Quiz/Exam | Lectures | Pic microcontroller architecture and memory organization |  | 12 | 5-11 |
| Quiz/Exam | Lectures | Instruction set |  | 12 | 12-18 |
| Quiz/Exam | Lectures | Clock, rest, I/O, timer, and power supply circuits |  | 14 | 19-25 |
| Quiz/Exam | Lectures | Interrupt |  | 4 | 26 |
| Discussion |  | Mini project |  | 5 | 27-30 |

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| 12. Infrastructure | |
| 1. Designing Embedded systems with PIC microcontrollers, principles and applications, by Tim Wilmshurst. 2. Microchip technical documents, http://www.microchip.com. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Proteus 8.0 | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 13. Admissions | |
| According **to** ministry requirements | Pre-requisites |
| 10 | Minimum number of students |
| 35 | Maximum number of students |