**ELEC4404 MICROCONTROLLER BASED SYSTEM DESIGN AND CONTROL
COURSE CATALOG INFO**

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| **Course Code :**ELEC4404 | **Course Name :**Microcontroller Based System Design And Control |
| **Semester** | **Lecture + Laboratory + PS** | **Local Credit** | **ECTS** | **Language** | **Category** | **Instructional Methods** | **Prerequisites** |
|  | (3+0+0) | 3 | 5 | English | Core | Course | ELEC3301OR ELEC3305O |
| **Course Content** | Review of embedded systems. Basic architecture of microcontrollers (PIC) and microcomputers (RPI). Review of number systems. Algorithm developing. Basics of project development. Industrial measurement and process control. Motor control. Utility meter system. Development of animated (Proteus) PIC projects. Development of physical PIC and RPI projects in the lab. |
| **Course Outcomes** |  **CO 1.** Explain and interpret the differences between microprocessors, microcontrollers and microcomputers **CO 2.** Explain and interpret the basic properties of the PIC18F family microcontrollers and RPI microcomputers. **CO 3.** Analyze and create C programs for the PIC microcontrollers and also for RPI microcomputers **CO 4.** Create a PIC microcontroller system that works with peripherals such as push-button, keypad, led, 7-segment display, LCD display, and temperature sensor etc. and write application codes on this system. **CO 5.** Create a mini single board computer (SBC) based on RPI that works with peripherals such as keyboard, mouse, PC monitor, PC camera, ethernet, WiFi, etc. and write application codes on this system. **CO 6.** Create a unified microcomputer-microcontroller system that uses both PIC microcontroller and RPI microcomputer in a system and write application codes on this system. |
|  | **Program Outcomes** |
| **PO1** | Adequate knowledge in fundamentals of mathematics (algebra, differential equations, integrals, probability etc), science (physics, chemistry, biology etc.) and computer science (programming and simulation); ability to use theoretical and applied knowledge in these areas in complex engineering problems. |
| **PO2** | Ability to identify, define, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose. |
| **PO3** | Ability to design and integrate components of a complex system or process, as they relate to Electrical and Electronics Engineering discipline, under realistic constraints and conditions, in such a way as to meet desired requirements; ability to apply modern design methods. |
| **PO4** | Ability to devise, select, and use techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively. |
| **PO5** | Ability to design and conduct experiments, gather, analyze and interpret data. |
| **PO6** | Ability to work in intra-disciplinary and multi-disciplinary teams; ability to take individual responsibilities. |
| **PO7** | Ability to effectively communicate in Turkish, ability to express his/her knowledge, ideas and work in English via oral, written and visual means; ability to write effective reports and comprehend written reports; ability to give and follow instructions. |
| **PO8** | Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself. |
| **PO9** | Consciousness to behave according to ethical principles, and about professional and ethical responsibility; knowledge on standards used in engineering practice. |
| **PO10** | Knowledge about business life practices such as project management, risk management, and change management; awareness in entrepreneurship, innovation; knowledge about sustainable development. |
| **PO11** | Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions. |

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| **CONTRIBUTION OF COURSE OUTCOMESONELECTRICAL AND ELECTRONICS ENGINEERING PROGRAM OUTCOMES** |
| **Course\Program** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** | **CO6** |
| **PO1** |  |  |  |  |  |  |
| **PO2** |  |  |  |  |  |  |
| **PO3** |  |  |  |  |  |  |
| **PO4** |  |  |  |  |  |  |
| **PO5** |  |  |  |  |  |  |
| **PO6** |  |  |  |  |  |  |
| **PO7** |  |  |  |  |  |  |
| **PO8** |  |  |  |  |  |  |
| **PO9** |  |  |  |  |  |  |
| **PO10** |  |  |  |  |  |  |
| **PO11** |  |  |  |  |  |  |

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| **COURSE ASSESMENT AND ECTS WORK LOAD** |
| **Type of Work** | **Count** | **ECTS WORK LOAD** |
| **Time (Hour)(Including prep. time)** | **Work Load** |
| Attendance | 14 | 3 | 42 |
| Final Exam | 1 | 2 | 2 |
| Quizzes |  |  | 0 |
| Term project |  |  | 0 |
| Reports |  |  | 0 |
| Final Project |  |  | 0 |
| Seminar |  |  | 0 |
| Assignments |  |  | 0 |
| Presentation |  |  | 0 |
| Midterms |  |  | 0 |
| Project |  |  | 0 |
| Laboratory |  | 0 | 0 |
| Tutorial |  | 0 | 0 |
| Other(Self study) |  |  | 0 |
|  | **Total work load** | 44 |
|  | **Total work load/25** | 1.76 |
|  | **ECTS Credit** | 2 |