|  |  |  |
| --- | --- | --- |
| dau_logo_BW | **EASTERN MEDITERRANEAN UNIVERSITY**  **SCHOOL OF COMPUTING AND TECHNOLOGY**  **DEPARTMENT OF INFORMATION TECHNOLOGY**  **COURSE POLICY SHEET** |  |

|  |  |
| --- | --- |
| **Course Title** | Electronics for Information Technology |
| **Course Code** | ITEC 424 |
| **Type** | Full Time |
| **Semester** | Fall/Spring |
| **Category** | AE (Area Elective) |
| **Workload** | 180 Hours |
| **EMU Credit** | (3,0,1) 3 |
| **Prerequisite** | - |
| **Language** | English |
| **Level** | Undergraduate |
| **Teaching Format** | 3 Hours Lecture and 1 Hour Lab per week |
| **ECTS Credit** | 6 |
| **Course Web Site** | <http://staff.emu.edu.tr/>alperdoganalp |

|  |  |  |  |
| --- | --- | --- | --- |
| **Instructor(s)** | Asst. Prof. Dr. Alper Doğanalp | **Office Tel** | +90 392 6301600 |
| **E-mail** | alper.doganalp@emu.edu.tr | **Office No** | CT 205 |

|  |
| --- |
| **Course Description** |
| The aim of this course is to teach information technology (IT) students the basic elements of electrical circuits and analyzing techniques: currents and voltages, power and energy, Kirchhoff’s current and voltage laws. Basic diode concepts: ideal diode model, Zener diode, rectifiers and AC/DC power supplies. Bipolar Junction Transistors: current and voltage relationships, types of transistors, using of transistor as a switch and an amplifier. Operational amplifiers (op-amp): ideal model of op-amp, inverting and non-inverting amplifier, summer and difference amplifiers and comparators. Sensors: Position, speed, stress, strain, temperature and semiconductor sensors. Actuators: Relays, DC, step and servo motors. |

|  |
| --- |
| **General Learning Outcomes** |
| On successful completion of this course students should be able to:   * Understand differences among resistance, capacitance, and inductance * Be able to define Kirchhoff’s voltage and current laws and apply them to passive circuits that include resistors, capacitors, inductors, voltage sources * Know how to make reliable voltage and current measurements * Comprehend the basic physics of semiconductor devices * Be aware of the different types of diodes and how they are used as a switch and as an amplifier * Understand how to use the model of an ideal operational amplifier in circuit analysis * Know how to design op amp circuits * Understand the fundamentals of simple electromechanical sensors, including proximity sensors and switches, potentiometers, linear variable differential transformers, optical encoders, strain gages, load cells, thermocouples, and accelerometers * Be able to describe how natural and binary codes are used to encode linear and rotational position in digital encoders * Understand what does an actuator do and DC, Step and Servo motor operations and applications * Be able to design electronics to control a stepper motor |

|  |
| --- |
| **Teaching Methodology / Classroom Procedures** |
| * The course has three hours of lectures and an hour laboratory in a week. * Lecture notes will be available on the course web site. * There will be two quizzes and two homework during the semester. * There are a mid- term and a final exam based on the lecture materials. * Class attendance and laboratory is compulsory. * The student is responsible to check the course web site regularly and view the latest announcements. Also mails are important to follow sent by instructor during the whole semester. |

|  |
| --- |
| **Course Materials / Main References** |
| ***Text Book:***  Introduction to Mechatronics and Measurement Systems by David G. Alciatore, 5th Edition, 2019, Mc Graw Hill. |

|  |  |
| --- | --- |
| **Weekly Schedule / Summary of Topics** | |
| **Week 1** | Basic electrical elements, resistor, capacitor and inductor, Ohms law, Power and Energy |
| **Week 2** | Kirchhoff’s laws and applications to Series and Parallel circuits. Analysis of RC circuits |
| **Week 3** | Semiconductor physics and PN-junction diode characteristics, ideal diode model and practical diode, Zener diode and optical diodes. |
| **Week 4** | Diode applications: Half-wave, full-wave rectifiers and AC\DC power supplies. |
| **Week 5** | Bipolar Junction Transistor (BJT) structures, current and voltage relations, operating regions, transistor as a switch and as an amplifier |
| **Week 6** | Ideal model for operational amplifiers (op-amp) , inverting and non-inverting amplifiers |
| **Week 7** | Op-amp Adder and op-amp difference amplifier and comparators |
| **Week 8-9** | **Midterm Examinations Period** |
| **Week 10** | Position, speed, stress and strain measurement by sensors |
| **Week 11** | Temperature, vibration, acceleration measurements and semiconductor sensors |
| **Week 12** | Electromagnetic principles of actuators, solenoids and relay |
| **Week 13** | Electric motors, DC motors |
| **Week 14** | Principles of step motors and servo motor |
| **Week 15** | General summary of the course. |
| **Week 16-18** | **Final Examinations Period** |

|  |
| --- |
| **Requirements** |
| * Each student can have only one make-up exam. * One who misses an exam should provide a medical report or a valid excuse within 3 days after the missed exam. * The make-up exam is done at the end of the term and covers all the topics. * No make-up exam is given for the quizzes or term project. * Students who fail to attend the lectures regularly may be given NG grade. * Once the grades are announced, the students have only one week to do objection about their grades. * It is the students’ responsibility to follow the announcement in the course web site and mails sent by instructor during the semester. |

|  |
| --- |
| **Background Requirements** |
| * No expected background requirement for the course. Course is designed to benefit any student who deals with electronics and embedded systems in their practical projects. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | **Method of Assessment** | | | | |
| **Evaluation and Grading** | **Quizzes** | | **Homework** | **Laboratory** | **Midterm Exam** | **Final Exam** |
| **Percentage** | 10 % | | 10% | 20 % | 25 % | 35 % |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Grading Criteria \*** | | | | | | | | | | | |
| **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **C-** | **D+** | **D** | **D-** | **F** |
| 90 -100 | 85 - 89 | 80 - 84 | 75 - 79 | 70 - 74 | 65 - 69 | 60 - 64 | 56 - 59 | 53 - 55 | 50 - 52 | 40 - 49 | 0 – 39 |

\* Letter grades will be decided upon after calculating the averages at the end of the semester and distribution of the averages will play a significant role in the evaluation of the letter grades.