**National University**



**of Computer & Emerging Sciences**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Title** | | | Basic Electronics | | **Course Code** | | EE 185 |
| **Pre-requisite(s)** | | | Computer Logic Design | | **Credit Hrs** | | 3 |
|  | | | | | | | |
| **Text Book(s)** | | | **Title** | Basic Electronics for Non-Electrical Engineers | | | |
| **Author** | Theodore Deliyannis, and Konstentinos Giannakopoulos | | | |
| **Publisher** | Lulu Author, 2012 | | | |
| **Ref. Book(s)** | | | **Title** | Basic Engineering Circuit Analysis, 8th Edition | | | |
| **Author** | J.Irwin & R. Nelms | | | |
|  | | | **Title** | Electronic Devices and Circuit Theory | | | |
|  | | | **Author** | Boylestad | | | |
|  | | | | | | | |
| **Objective:** | | | It is a basic course on applied electronics for students with no background in circuit analysis. The course covers circuit’s fundamentals, electronic devices and circuits, including amplifiers, analog filters. Digital electronics and processing of digital signals shall also be covered. | | | | |
|  | | | | | | | |
| **Week** | **Course Contents Covered** | | | | **Chapter\*** | |
| 1 | Course overview, introduction to electric circuit, voltage and current, ideal basic circuit elements, power and energy, concept of polarity, Introduction to ideal voltage and current sources: DC ( independent + dependent) & AC | | | | (1) | |
| 2 | Ohm’s Law, Power sign convention, Kirchhoff’s laws (KCL & KVL) | | | | 1 (2) | |
| 3 | Analysis of circuits containing dependent sources using KCL & KVL, Series & parallel circuits, non-ideal sources | | | | (2) | |
| 4 | Mesh Analysis | | | | 1 (3) | |
| 5 | Node Analysis  MATLAB Session – I | | | | (3) | |
| 6 | Basics of capacitor, Serial/parallel equivalent, First order RC circuit | | | | (6-7) | |
| 7 | Application of first order RC circuit: Differentiator , Integrator  Introduction to ideal operational amplifier | | | | 1, 3 (7,4) | |
| 8 | Analysis of circuits containing OP-AMP using DC sources, Inverting amplifier circuit, summing amplifier circuit, non-inverting amplifier circuit, difference amplifier circuit (DC sources only) | | | | 3, (4) | |
| 9 | Analysis of circuits containing OP-AMP using AC sources, Inverting amplifier circuit, summing amplifier circuit, non-inverting amplifier circuit, difference amplifier circuit (AC sources only), Differentiator & Integrator | | | | 3 | |
| 10 | MATLAB Session – II  Semiconductor Diodes | | | | 2 | |
| 11 | Semiconductor Diodes, Rectification | | | | 2 | |
| 12 | Constant voltage drop model of diodes, Clipper Circuits | | | | 2 | |
| 13 | Transistor basic structure(*npn, pnp*), Transistor’s operating regions | | | | 2 [3] | |
| 14 | Transistors: Common Emitter, Current and voltage amplifier | | | | 2 [3] | |
| 15 | MATLAB session – III & IV | | | |  | |

\*Reference book 1 chapters are given in parenthesis & Reference book2 chapters are given in square brackets

**Evaluation Criteria:**

|  |  |
| --- | --- |
| **Quizzes + Assignments** | 15% |
| **Project** | 5% |
| **Midterm (I+II)** | 30% |
| **Final Exam** | 50% |