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| **INFE242 – Electronics** |
| **Department:** Electrical and Electronic Engineering |
| **Program Name:** Information Systems Engineering | **Program** **Code:** 28 |
| **Course Number:** INFE242 | **Credits:**4 |
| [x]  Required Course [ ]  Elective Course  |
| **Prerequisite(s):** INFE221 |
| **Catalog Description**: Semiconductor devices, basic amplifier concepts, diodes, P-N junction diodes, Schottky diodes, Bipolar Junction Transistors (BJTs), Field-Effect Transistors: MOSFETs, JFETs, transistor biasing. |
| **Course Web Page:** https://staff.emu.edu.tr/alperdoganalp/en/teaching/infe242 |
| **Textbook(s):** 1) Adel S. SEDRA and Kenneth C. SMITH, Microelectronic Circuits, Fifth Edition, Oxford: International Edition. |
| **Indicative Basic Reading List :**Jaeger, R.C., *Microelectronic Circuit Design (1st Ed.)*, McGraw-Hill, 1997, ISBN: 0-07-032482-4 |
| **Course Outline:**

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| Week 1: | **Basic Amplifier Concepts**The four amplifier types; circuit models for amplifiers; input and output resistances; amplifier gain; frequency response of amplifiers. |
| Week 2 -4:    | **Semiconductors** Intrinsic semiconductors; doped semiconductors; charge carriers; drift and diffusion currents; the p-n junction.  |
| Week 5-6: | **Diode Circuits and Applications**Ideal diode model; diode's *i*-*v* characteristics; piecewise-linear diode model; constant-voltage-drop diode model; graphical analysis; small-signal model; rectifier circuits; voltage regulation; wave-shaping circuits. |
| Week 7-8:  | **BJTs**Physical structure; current-voltage characteristics; npn and pnp BJTs; dc operation and biasing; small-signal modelling. |
| Week 9:  | **Mid-Term Examination**  |
| Week 10-11: | **MOSFETs**Physical structure; *i*-*v* characteristics; NMOSFET; PMOSFET; biasing; small-signal modelling. |
| Week 16: | **Final Examination** |
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| **Course Learning Outcomes:** On successful completion of this course, all students will have developed **knowledge** and **understanding** of:1. Amplification and types of amplifiers
2. Semiconductors
3. Diode circuits
4. Transistors (BJT) amd Mosfets
5. Basic Amplifiers

On successful completion of this course, all students will have developed **their skills in**:* Analysis and design of diode circuits
* Analysis and design of transistor circuits
 |
| **Class Schedule:**  4 hrs of lectures per week  | **Laboratory Schedule:**  1 hrs of laboratory per week |
| **Assessment** | **Method** | **No** | **Percentage** |
| Midterm Exam(s) | 1 | 25% |
| Lab Work(s) | 5-7 | 20 % |
| Quiz(zes) | 2 | 10 % |
| Homework(s) | 2 | 5% |
| Final Examination | 1 | 40% |
| **Contribution of Course to Criterion 5**Credit Hours for: Mathematics & Basic Science : 2Engineering Design : 2 General Education : 0  |
| **Relationship of Course to Student Outcomes**The course has been designed to contribute to the following student outcomes:(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors (6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. |
| **Contribution of Course Learning Outcomes to Student Outcomes** |
|  | **Student Outcome:** |
| **Course Learning Outcome** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 1. Amplification and types of amplifiers
 | **•** | **•** |  |  |  | **•** | **•** |
| 1. Semiconductors
 | **•** | **•** |  |  |  | **•** | **•** |
| 1. Diode circuits
 | **•** | **•** |  |  |  | **•** | **•** |
| 1. Transistors (MOSFETS, BJTS)
 | **•** | **•** |  |  |  | **•** | **•** |
| 1. Basic Amplifiers
 | **•** | **•** |  |  |  | **•** | **•** |
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| **Prepared by: Asst Prof. Dr. Alper Doğanalp** | **Date Prepared: 20** February 2023 |