ELECTRONIC CIRCUIT DESIGN I(THEORY) EE-202

Pre-requisite: Circuit analysis-I
Credit Hours 03
Contact Hours 48

RECOMMENDED BOOKS

- Electronic Devices and Circuit Theory by Robert L. Bolylestad, Louis Nashelsky, Eleventh edition, Prentice Hall

REFERENCE BOOKS

- Electronics Fundamentals: Circuits Devices and Applications by Thomas L. Floyd, Ninth edition, Prentice Hall.

OBJECTIVE OF COURSE

The objective of this course is to explain the basic construction and concepts of semi-conductor devices. Different applications of junction diode are discussed and various types of diodes are also explained. Bipolar Junction Transistors (BJTs) and Field-Effect Transistors (FETs) are evolved as two PN-junction devices. Relations of various DC currents and voltages in these transistors are explained through analsis and design in detail. A variety of applications of various types of transistors are dealt with. The course is directly supported with lab experiments embracing the design principles.

S.NO	CLO/PLOS MAPPING	DOMAIN	PLO
01	**Describe** and explain the basic construction, operation and characteristics of semiconductor devices	**C2**	**01**
02	Apply the acquired knowledge to solve and **analyze** small-scale circuits consisting of semiconductor devices.	**C3**	**02**
03	**Analyze** and **design** BJT and FET transistor circuits in DC domain.	**C4,C5**	**03**

COURSE CONTENTS

Semiconductor Theory

- Introduction.
- Intrinsic and Extrinsic Semiconductors.
- Doping and energy levels.

Diodes

- PN junction/ Biased PN junction.
- V-I Characteristics.
- Load Line and dynamic resistance.
- Diode models.
- Reverse recovery time and temperature effects.

Diode Applications

- Half wave and Full wave rectifiers.
- Clippers and Clampers.
- Logic gates.
- Zener Diods

Bipolar Junction Transistors

- Construction, operation and characteristics.
- Amplifying action and variation in current gain.
- Common Emitter, Common Collector and Common Base Configurations.
- Power Ratings.

BJT Biasing Circuits

- Fixed Bias, Voltage Divider Bias and Emitter feedback Bias Circuits
- DC load line and operating point
- Biasing circuit design and stabilization
- Transistor as a switch

Field Effect Transistors

- JFET Construction and Operation
- Transfer characteristics and parameters

FET Biasing Circuits

- Fixed Bias, Self-Bias and Voltage divider Bias
- Design of a bias circuit