(III) Area of Specialization Courses in General Electronics
TEACHING OF GENERAL ELECTRONICS

Course Code: EDBET366 Credit Hours: 3

Course Description:

The objective of this programme is to give deep knowledge in electronics devices and systems with a focus on sensor systems. The programme provides knowledge, methods, and tools for modelling and design of components, circuits, and systems. A theoretical base is given that covers a wide field within electronics system designs, from semiconductor technology to design of embedded systems. The different areas are integrated in order to give a good understanding of the different technologies possibilities and limitations. The student's knowledge and understanding of the different technologies is strengthened by independent problem solving for specific technological problems.

Learning Outcomes

- Be able to base on a given problem in electronics select the optimum technology and process
- Be able to analyze problems in the specification, design and verification of digital systems
- Implement a digital function within a larger system
- Be able to analyze a technology problem and based on that plan and document knowledge acquisition and implementation of the project
- Understanding the different technological possibilities and limitations of a system
- Understand the nature, functions and scope of electronic devices.
- Understand basic function, individual behavior and operation in electronic equipment.
- Understand basic performance in electronic equipment.

Contents

Semi Conductors

1.9 Concept of semiconductors
1.10 Covalent Bond
1.11 N-type & P-type semiconductors
1.12 Hole Charge
1.13 Majority & Minority Charges on semiconductor
1.14 Fixed ion charge in the doped semiconductor

PN Junction

2.5 Concept of old electronic theory on Tubes
- Diode Tube
- Triode Tube

2.6 Concept of PN junction
2.7 Internal barrier potential
2.8 Polarity reverse biased and forward biased

Semi conductor Diodes

Basic Concept of diode
Diode applications

Rectifier packaging

- Full wave Rectifier
- Half Wave Rectifier

Bridge rectifier

Different kinds of Diodes.

- Zener Diode
- Tunnel diode
- Light Emitting diode

Practical

16. PNP & NPN Transistors
    - 4.9 Basic Concept of Transistors
    - 4.10 Transistor action
    - 4.11 Collector base junction
    - 4.12 Emitter Base junction
    - 4.13 Base current controls and collector current
    - 4.14 Practical
17. Field Effect Transistors (FET)
    - 5.9 Concept of FET's
    - 5.10 Function of gate in FET's
    - 5.11 Function of Insulation in FET's
    - 5.12 Depletion or enhancement mode
    - 5.13 Practical
18. Uni- junction Transistors (UJT)
    - 9.6 Basic construction & functioning
    - 9.7 Working principle
    - 5.14 Exercises and Problems
19. Thyristors
    - 6.3 Introduction
    - 6.4 Characteristics
    - 6.5 Functioning
20. Silicon controlled Rectifier (SCR)
    - 7.5 Basic concept of construction functioning
    - 7.6 Latching current in SCR
    - 7.7 SCR power control circuit
    - 7.8 Practical
21. Diac & Triac
    - 8.5 Concept of Diac
    - 8.6 Functioning and construction
    - 8.7 Concept of Traic
    - 8.8 Functioning of Triac
22. Visual Character display
    - 10.5 Function of LED / LCD
    - 10.6 Construction of VCD
    - 10.7 Functioning

10.8 Practical

Digital Electronics

11.4 Introduction to gates

11.5 IC (integrated circuit) Encoder & Decoders

11.6 Different kinds of gates

- Or, and, not, nand & nor gates

11.4 DTL, TTL & DDL circuits.

Final Project

Edn.) South-Western College Publishing, Cincinnati, Ohio

Teaching-learning Strategies

The instructional strategies will focus on constructionist learning approach. These strategies will be diverse in line with the course contents. Therefore, these strategies will include but not limited to demonstration, cooperative learning, collaborative learning, teacher and student-led discussion, individual and group presentations, reflective practices and classroom activities.

Assessment and Examinations

The students will be assessed according to the following criteria.

Examination	Marks Distribution
Sessional work	25 %
Mid Semester	35%
Final Semester	40%

Suggested Readings

Industries (). *Unique & fun DIY electronics and kits* Practical Electronics for nventors *(4th ed).* ID: 1261 - THE ELECTRONICS KNOW-HOW YOU.

F. F. Jr. (1997). *Electronic Devices and Circuits (11th ed).* _____: McGraw-Hill

1999). *Electronic Devices* (19th *ed).* _____: McGraw -Hill

M. *Mims.III.* (2000).*Electronic Sensor Circuits and Projects.* Lincolnwood: Master Publishers.

L. J. (2011). *How to diagnose* and *fix everything electronic*. New York:McGraw-Hill.

992). *Basic Electronics* (7th*ed*). _____: McGraw- Hill International Editions.

P., &Monk, S. (2016). *Practical Electronics for Inventors* (4th ed). New York:McGraw-Hill.

Newby, T. M., Lehman, J., Russell, J., Stepich, D. A. (2000). *Instructional Technology for Teaching and Learning: Designing Instruction, Integrating Computers, and Using Media (2nd ed).* Upper Saddle River, **N.J.:** Prentice Hall.

Shrader,R. L. (1994).*Electronic Communication(6th ed).*_____.