

# Fundamentals of Electronics Engineering

1.1 Course Number: ECE102

1.2 Contact Hours: 3-1-0 Credits: 11

1.3 Semester-offered: 1<sup>st</sup> Year-Both (Odd & Even)

1.4 Prerequisite: None

1.5 Syllabus Committee Member: Dr. Umakant Dhar Dwivedi, Dr. Abhishek Kumar Singh, Dr. Sajal Agarwal, Dr. Vijay Kumar Singh, Dr. Ankur Pandey.

**2. Objective:** To introduce the students to the basics of both theoretical and practical aspects of broader area of Electronics Engineering

### 3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Circuit analysis	Passive components, Signal Sources, DC Circuit analysis techniques: KCL, KVL, nodal, mesh, superposition, Thevenins, and Nortons theorems, maximum power transfer	8
2	Semiconductor Devices	Introduction to Semiconductors; Diodes and Zener circuits and their applications, BJT and their applications: structure and modes of operation; NPN and PNP transistor in active mode, DC analysis, BJT as a switch and amplifier, single stage CE amplifier FET based devices and applications: Introduction to JFET, MOSFET, MESFET, their structures operations, and I-V characteristics and applications.	12
3	Integrated Circuits	Introduction to ICs, Operational Amplifiers, Op-Amp characteristics, summing amplifier, inverting and non-inverting configuration, voltage follower, differentiator and integrator; different feedback configurations, Introduction to 555 timer IC.	6
4	Digital Electronics	Number system, logic gates, logic minimization, Boolean algebra, K-Map, Truth tables, introduction to combinational circuits, Introduction to Field programmable gate arrays (FPGAs).	9
5	Introduction to Communication Engineering	Introduction to communication, Communication system, concept of multiplexing and modulation, types of communication, Electromagnetic Spectrum, Bandwidth concept.	5
		Total	40

## **4. Readings**

### 4.1 Textbook:

- i. *Charles K. Alexander, Matthew N.O. Sadiku, Fundamentals of electric circuits, McGraw-Hill, 5th Edition 2013*
- ii. *S. Sedra and K. C. Smith, Microelectronic Circuits, Oxford University Press , 6th edition*
- iii. *M. Moris Mano, 'Digital Design', PEARSON, 5th edition 2013.*
- iv. *Boylestad, Robert L., Louis Nashelsky, Electronic Devices and Circuit, Pearson , 11th edition*

### 4.2 Reference books:

- i. *E. Hughes, Electrical and Electronic Technology, PEARSON, 2010*
- ii. *William H. Hayt , Jack Kemmerly , Steven M. Durbin, Engineering Circuit Analysis, McGrawHill , 8th Edition 2013*
- iii. *David. A. Bell, Electronic Devices and Circuits:, Oxford University Press, 5th Edn. , 5th edition*
- iv. *Leach, Malvino, Saha, Digital Principles and Applications, McGraw Hill Education , 8th edition*

## **5. Outcome of the Course:**

The student will learn about fundamentals of Electronics Engineering. They will also be able to learn and use circuit analysis techniques.