

**SEMESTER 1<sup>st</sup>**

**MULTIDISCIPLINARY COURSE**

**Course Title: Introduction to Electronics**

**Code: ELT022I**

**CREDIT: (2+1=3)**

**Course Objectives:**

- ✓ *To learn core components, Devices, process and functionalities of Electronics.*
- ✓ *To understand the basic measuring equipment's required to perform electronic experiments.*
- ✓ *To understand the importance of Electronics in day-to-day life.*
- ✓ *To understand the role of Electronics in consumer, medical, industry products etc.*

**Learning outcomes:**

*After studying the course, the student shall be motivated to pursue the course for higher education. The course will also help the student to select the future area of work. Further, the student will be able to have a comprehensive understanding of electronic devices and circuits and their application in various fields.*

***Unit I: Fundamentals of Electronics***

What is Electronics and why to study it?; The Historical Evolution of Electronics and its Impact on Society ; Electric current & Voltage; Introduction to Basic Electronic Components and their applications (Resistor, Capacitor, Inductor etc); Introduction to Semiconductor Devices and their applications (Diode, Transistor); Introduction to Integrated Circuits (ICs); Various measurements using Multimeter. Power Supply (Brief Idea).

***Unit II: Electronics in Contemporary World***

Electronics for Signal conversion and Control: AC Transformer (Power Transmission), Rectification (Mobile charger), Conversion of DC to AC (Inverters).

Opto-Electronic Devices: LED, Solar Cell, Photo-Diode.

Communication: Electromagnetic Spectrum, Ground Waves, Space Waves and Sky Waves, Basic Communication System, Need for Modulation, Introduction to Modulation of Signals, Repeaters, Geosynchronous Satellite, Satellite Communication.

***Unit III: Laboratory component:***

1. Measurement of current, voltage and resistance using a multimeter.
2. Determine value of resistance using colour code.
3. Study Ohm's Law
4. Study combination of resistors in series and parallel.
5. Study charging and discharging of a capacitor.
6. Draw VI characteristics of a junction diode.
7. Study the operation of LED
8. Study VI characteristics of a Solar Cell
9. Study the process of rectification.
10. Study the process of modulation and demodulation.

**Recommended Books:**

1. Bernard Grob, **Basic Electronics**, Mc Graw-Hill Book Company
2. Ian R. Sinclair and John Dunton, Practical electronics handbook, 6th Edition, Elsevier.
3. Mike Tooley, Electronic circuits: fundamentals and applications, 5th Edition, Taylor & Francis.
4. D. Chattopadhyay and P. C. Rakshit, Basic electronics, New age international (P) limited.
5. Theodore F. Bogart, Electric Circuits, 2nd Edition, McGraw Hill Education.
6. Boylested, R. L. and Nashelsky, L., Electronic Devices and Circuit Theory, Pearson Education
7. Stan Gibilisco, Teach Yourself Electricity and Electronics, McGraw-Hill
8. Edward L. Wolf, Quantum Nanoelectronics, Second Edition, Wiley
9. Getting Started in Electronics by Forrest M. Mims
10. Electronics for Dummies by Shamieh Cathleen, Wiley, 2019
11. Consumer Electronics by S P Bali, Pearson, 2008
12. Handbook of Biomedical Instrumentation, R S Khandpur, Tata Mc Graw Hill, 2014
13. Emerging Trends in Electronics Vijay G. Yangalwar Nirali Prakahshan Publishers, 2020
14. Paul Horowitz The Art of Electronics Cambridge University Press; 1st edition, 2020