

Course Title	Fundamentals of Electronics and Instrumentation			Course Code	BST 21183		
Year	2	Semester	1	Credits	03	Theory (hr)	30
						Practical (hr)	30
						Independent Learning (hr)	30

Aim of the Course:

To develop understanding on the operation and application of basic electronic instruments, electronic components and circuitry in instrumentation systems

Intended Learning Outcomes:

After completion of this course, the learner should be able to:

- Describe the characteristics and function of basic circuit elements.
- Explain the application of basic electronic measuring instruments.
- Explain the characteristics and circuit applications of transducers.
- Identify and describe the function of components of an instrumentation system.
- Design and implement a simple monitoring / automation system.

Course Capsule:

Theory
DC and AC currents and voltages, Circuit elements: Resistors, Capacitors, Inductors, Power supplies; Electronic instruments: Voltmeters, Ammeters, Ohmmeters, Multimeters, Signal generators, Oscilloscopes; Electrical circuit analysis: Measuring resistance; Bridge circuits, Potentiometers, Semiconductor devices: Semiconductor materials, p-n junctions, Diodes, Zener diodes, Transistors, Thyristors, Optoelectronic devices, ICs; Diode and Zener diode characteristics and circuit applications; Transistor characteristics and circuit applications; Amplifiers switches, Drivers; Rectification and DC power supplies; Operational / Inverting / Summing amplifiers, Comparators; Digital electronics: Number systems, Logic gates, FFs, Counters, ICs; Instrumentation / Automation systems: System components, A/D and D/A conversion; Sensors; Signal conditioners: Filters, Amplifiers/attenuators, Instrumentation amplifiers; Controllers: Microcontrollers/microprocessors, Microcontroller based systems, PLCs; Actuators: Electromechanical switches, Relays, Motors; Automated bio-systems

Practical
Electronic instruments; Wheatstone bridge /meter bridge for measuring resistance; Diode and Zener diode characteristics; Transistor characteristics and amplifiers; Rectifier circuits and DC power supplies; Operational amplifiers: Filters; Basic logic gates and applications; Interfacing ICs: LED displays and counters; Waveform generation and timer circuits; Sensors: Characteristics and applications interfacing a simple automation system with sensors-controller unit-actuators

Assessment:

Continuous assessment: 30%
 End semester assessment: 70%