

Hours Per Week :

L	T	P	C
2	0	2	3

Total Hours :

L	T	P	WA/RA	SSH/HS	CS	SA	S	BS
30	-	30	20	30	-	5	-	5



Source :

http://info.shine.com/media/images/148/2148_instrumentation_engineer_large.jpg

COURSE DESCRIPTION AND OBJECTIVES:

To provide an overview of the principles, operation and application of the building blocks like diodes, BJT, OP-amps, Feedback amplifiers, oscillators etc for performing various functions. To understand the internal structure of all instruments that are used in measuring parameters related to electronics and to understand how different bridge networks are constructed and balanced to find out values of capacitance, resistance and inductance. To understand about different transducers, that are used for measurement purpose and their working principles.

COURSE OUTCOMES:

Upon completion of the course, student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Understand the notation and usage of components in electric circuits.	1
2	Analyse AC (single and three phase) and DC and AC circuits using different methods and laws.	2
3	Apply various electrical machines used in agriculture and troubleshoot the problems associated with it.	3
4	Application of various electronic devices to perform small tasks.	3

SKILLS:

- ✓ Distinguish between linear and nonlinear elements by looking at VI characteristics.
- ✓ Develop a simple loop generator.
- ✓ Design a voltage regulator using Zener diode.
- ✓ Design a half wave rectifier using PN junction diode.
- ✓ Design a full wave rectifier using PN junction diodes.

- UNIT - I** **L-06**
Semiconductors: P - N junction. V - I characteristics of P - N junction. diode as a circuit element. rectifier. clipper. clamper, voltage multiplier, capacitive filter. diode circuits for OR and AND (both positive and negative logic).
- UNIT - II** **L-06**
Bipolar junction transistor: Operating point. Classification (a,b & c) of amplifier. Various biasing methods (Fixed. Self-potential divider). H-parameter model of a transistor. Analysis of small signal. Ce amplifier. Phase shift oscillator, analysis of differential amplifier using transistor.
- UNIT - III** **L-06**
Ideal OP-AMP characteristics: Linear and non-linear applications of OP-AMP (adder. Subtractor. Integrator, active rectifier. Comparator. Differentiator. Differential, instrumentation amplifier and oscillator). Zener diode voltage regulator. Transistor series regulator. Current limiting. OP-AMP voltage regulators.
- UNIT - IV** **L-06**
Basic theorem of Boolean algebra: Combination all logic circuits (basic gates. SOP rule and Kmap). binary ladder D/A converter, successive approximation A/D converter.
- UNIT - V** **L-06**
Generalized instrumentation: Measurement of displacement. temperature. velocity, force and pressure using potentiometer. Resistance thermometer, thermocouples. LVDT. strain gauge and tachogenerator.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS TOTAL HOURS-30

1. To study V-I characteristics of P - N junction diode.
2. To study half wave. full wave and bridge rectifier.
3. To study transistor characteristics in CE configurations.
4. To design and study fixed and self-bias transistor.
5. To design and study potential divider bias transistor.
6. To study a diode as clipper and clamper.
7. To study a OP-AMP IC 741 as inverting and non- inverting amplifier.
8. To study a OP-AMP IC 741 as differentiator and integrator to study a differential amplifier using twotransistor.
9. To study a OP-AMP IC 741 as differential amplifier.
10. To study a zener regulator circuit.
11. To study a OP-AMP IC 741 as a active rectifier.
12. To study a OP-AMP IC 741 as a comparator.
13. To familiarize with various types of transducers.
14. Practical examinations.

TEXT BOOK :

1. Anand Kumar. 2014, "Fundamentals of Digital Circuits". PHI Pvt. Ltd., New Delhi.

REFERENCE BOOK:

1. A.K. Sawhney. 2010, "Course in electrical and electronics measurements and instrumentation". Dhanpat Rai Publications (P) Limited, New Delhi.