

Course Code	Course Title	L	T	P	C
1152EC110	ELECTRONIC INSTRUMENTATION	3	0	0	3

a) Course Category

Program Elective

b) Preamble

This course Electronic Instrumentation provides adequate knowledge in Electronic instruments.

c) Prerequisite

Basic Electronics Engineering.

d) Related Courses

Analog Electronics, Circuit theory.

e) Course Outcome

Upon the successful completion of the course, student will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Explain the working and measurement of electronic parameters with various types of electronic measurement devices.	K2
CO2	Describe the working principle and measurement techniques of various types of oscillators and signal analyzers.	K2
CO3	Explain the working and measurement techniques of different types of waveform generators.	K2
CO4	Explain the standard forms of interfaces used in electronic instrumentation for various applications.	K2
CO5	Describe the working principle of telemetry modules.	K2

f) **Correlation of COs with Pos**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	-	-	-	-	-	-	-	-	-	-	L	L	-
CO2	M	-	-	-	L	-	-	-	-	-	-	M	L	-
CO3	M	-	-	-	L	-	-	-	L	L	L	L	L	-
CO4	M	-	-	-	-	-	-	-	-	-	-	L	L	-
CO5	M	-	-	-	L	L	L	-	L	L	L	L	-	-

g) **Course Content**

UNIT I ELECTRONIC INSTRUMENTS

9

Electronic voltmeter and their advantages – types, digital IC tester, source follower, rectifier – True RMS reading voltmeter – electronic multi meter and ohmmeter – current measurement – power measurement - microprocessor based DMM with auto ranging and self-diagnostic features

UNIT II CATHODE RAY OSCILLOSCOPE & SIGNAL ANALYZERS

9

General purpose cathode ray oscilloscope – Dual trace, dual beam and sampling oscilloscopes – analog and digital storage oscilloscope - frequency selective and heterodyne wave analyser – harmonic distortion analyser – spectrum analyser.

UNIT III WAVEFORM GENERATORS

9

Wien's bridge and phase shift oscillators – Hartley and crystal oscillators – square wave and pulse generators – triangular wave-shape generator - signal and function generators – Q meter – electronic counters

UNIT IV COMMON INSTRUMENTATION INTERFACES

9

Modern instrumentation and control systems – OSI model – EIA 232 interface standard - EIA 485 interface standard - EIA 422 interface standard – 20 mA current loop – serial interface converters

UNIT V TELEMETRY

9

General telemetry system – voltage, current and position telemetry systems – radio frequency telemetry – frequency modulation, pulse-amplitude modulation and pulse-code modulation telemetry – frequency and time multiplexing.

Total 45 Hrs

h) Learning Resources

Text Books

1. A.K. Sawhney, A Course in “Electrical & Electronic Measurements and Instrumentation”, Nineteenth revised edition, Dhanpat Rai and Co, New Delhi, 2011
2. David A Bell, “Electronic Instrumentation and Measurements”, Third edition, Oxford University Press, 2013.
3. N. Mathivanan , “PC based Instrumentation”, First edition, Prentice Hall India Private Ltd, Delhi 2007.

Reference Books

1. A.D. Helfrick and W.D. Cooper, Modern Electronic Instrumentation and Measurement Techniques, Prentice Hall India Private Ltd., New Delhi, 2010
2. J.J. Carr, Elements of Electronic Instrumentation and Measurement, Pearson Education India, New Delhi, 2011
3. M.M.S. Anand, Electronics Instruments and Instrumentation Technology, Prentice Hall India, New Delhi, 2009.

Online Resources

1. <http://www.getbookee.org/electrical-measurement-sawhney/>
2. <http://ebookbrowse.com/measurements-and-instrumentation-pdf- d97159998>
3. <http://www.bookpump.com/bwp/pdf-b/2335004b.pdf>