	Instrumentation amplifier. **Sampling:** An Anti-aliasing, Multiplexers, Sample and Hold, Track and Hold. **Computer Interfaces:** Serial (RS-232), Parallel, GPIB (IEEE-488), Universal Serial Bus (USB) **Display Devices:** Review of LED, LCD, CRT devices, segmental and dot matrix displays. **General purpose test equipments:** CRO, Digital storage oscilloscope, Digital voltmeter, Wave Spectrum analysis, Lock-in-amplifiers, Pulse generators and waveform generators, **Control System**: Types of control system - open loop, closed loop, linear, non-linear, continuous, discrete, frequency and time response, open loop motor control, DC motor phase control,PD,PI,PID Tutorials: 1. Study of Open loops control System. 2. Electronics Chocks. 3. Design of On/Off temperature controller using thermistor sensor. 4. Study of SEM.5. Study of Scanning Probe technique.	5 5 4 7 10 10
Total		48
Pedagogy:	Lectures/Assignment , Presentation	
References/Readings	1. Industrial Control Electronics – John Webb, Kevin Greshok, Merrill Publications, . 2. Elements of Electronic Instrumentation and Measurement, Joseph J. Carr, Prentice Hall India. 3. Modern Electronic Instrumentation and Measurement Techniques, Albert Helfnick, William Cooper, PHI 4. Instrumentation Measurement by Northrop CRC 2001	
Learning Outcomes	This course is appropriate for the students who would like to make his career in industries. The features of various networks taught in this course will enable him/her to guide an industry for choosing an appropriate instrumentation network and types of interfaces he can adopt for automation of sophisticated instruments used in quality control and analysis. The course empowers a student who is likely to go for higher studies in electronics and Instrumentation technology.	

Course Code: ELC302 **Title of the Course:** Electronics Practical III

Number of Credits: 4

Prerequisites for the course:	Should have knowledge in microcontroller and embedded systems	

Objective:	The course gives hands on experience on TMS 320 DSP, Altera NIOS II and National Instruments Platform	
Content:	1. Design of S/C circuit for Strain gauge /Glucose strip @ 3.3V. 2. Design of S/C circuit for Thermistor sensor @ 3.3 V and interfacing with ARM. 3. FFT using TMS 320. 4. Convolution using TMS 320. 5. Analysis of frequency components using Spectrum Analyzer 6. VHDL implementation for the Multiplexer & Demultiplexer 7. VHDL Implementation for Encoder & Decoder 8. VHDL implementation for the Counter. 9. Verilog implementation for the Memory Module. 10. Verilog implementation for the Latch. 11. Display Hello world and blinking Led's using NiosII soft core 12. Matrix Manipulation on NIOSII Core (Multiplication, determinant, Inverse, Transpose) 13. Android (two experiments) 14. NI ELSVIS(two experiments) 15. Obstacle Avoidance using 89V52 based Robot 16. Obstacle detection for varying range using 89v52 based Robot 17. Line follower using 89v52 based Robot	
Total		96
Pedagogy:	Assignment , Presentation and Laboratory work	
Learning Outcomes	• On completing this couse they are in a position to design signal conditioning circuit, • also they are exposed to Altera FPGA by implementing various digital circuits using VHDL and Verilog. • Student themselves will be able to develop an android app. • Can handle a NI ELVIS board to implement and testing any circuit.	