

6. RTOS-I with RTLINUX
7. RTOS-II with RTLINUX
8. Video processing on Altera DSP kit
9. Audio processing on Altera DSP kit
10. Multirate signal processing using Xilinx Spartan XC3S400
11. Echo implementation on Xilinx Spartan XC3S400
12. Obstacle detection for varying range using 89C52 based Robot
13. Line follower using 89C52 based Robot

ELD203: NANO-ELECTRONICS & NANOSYSTEMS

Introduction: Development of microelectronics;	5
Potentials of Silicon Technology; Basics of Nanoelectronics, some physical fundamentals, basics of information theory;	6
Biology Inspired Concepts.- Biological networks, Biology Inspired Concepts;	7
Bio-chemical and Quantum-Mechanical Computers.- DNA computer, Quantum computer;	7
Parallel Architectures for Nanosystems.- Architectural principles, Architectures for parallel processing;	7
Softcomputing and Nanoelectronics.- methods of soft computing, characteristics of neural networks in nanoelectronics;	6
Quantum Electronics; Bio and Molecular Electronics.- Bio electronics, molecular electronics;	1
Nanoelectronics with Tunneling Devices;	0
Single Electron Transistor (SET); Nanoelectronics with Superconducting Devices;	5
The Limits of Integrated Electronics	3
Tutorials:	
5. Laser tweezers.	
6. Study of AFM.	
7. Study of STM.	

Reference Books:

1. NANO-ELECTRONICS AND NANOSYSTEM BY K. GOSER, P. GLOSEKOTTER & J. DIENSTUHL
SPRINGER
2. Introduction to Nanoelectronics Science, Nanotechnology, Engineering, and Applications
By Vladimir V. Mitin et al.; From Cambridge
3. Handbook of Nanoscience, Engineering, and Technology, Second Edition by William A. Goddard CRC.

ELD303: LASER SYSTEM ENGINEERING

Wave Propagation: Wave Propagation in Isotropic and An-Isotropic media, Index Ellipsoid, Normal Index Surfaces, Half and Quarter wave Retardation Plates, Intensity transmission Using retardation plates, Circular Polarization.	7
Optical Resonators: Energies in resonator, Fabry-Perot Etalon, Fabry-Perot Etalon as Optical Spectrum Analyzer, Mode Stability Criteria, Resonance Frequency of Optical Resonator, Unstable Resonator.	9
Interaction of Radiation with Atomic System: Spontaneous transmission between Atomic layer, Homogeneous and In-Homogeneous broadening, Line shape functions, Stimulated transmission, Absorption and amplification, gain saturation in Homogeneous media.	8

Theory of Laser Oscillator: Febyry Perot Laser , Three and Four Level Laser , Power in Laser Oscillator, Optimum Light coupling , Multimode Laser Oscillator and Mode Locking Methods of Mode locking , Pulse length Measurements , Q-Switching , methods of Q-Switching . 8

Laser Systems: Pumping and laser Efficiency, Ruby Laser, Flash Pumping ,Nd-YAG Laser , Nd-Glass Laser , Threshold for CW and Pulse operation , He-Ne Laser , CO2 Laser , Ar-Ion Laser , Excimer Laser , Dye Laser. 6

Non –Linear Optics: Origins of Non-Linear Polarization , relation between induced Polarization and Electric Field , Non – Linear Optical Coefficient , SHG , Phase Matching Experimental verification. 8

Interaction of Light and Sound: Scattering of Light by Sound, RamanNath and Bragg diffraction , Defraction of light by Sound , Intensity modulation . 6

Optical Communication: Advances in optical Communication, Optical Network. 6

Tutorials:

1. Understanding Diffraction of Laser Light using grating
2. Comparison of resolving power of Prism and Grating.
3. Focusing of Laser Light.
4. Collimation of Laser Light.
5. Study of Raman Laser system.

Reference Books:

1. Optical Electronics, 4th Edition by A. Yariv, HRW publication, 1991.
2. OptoElectronbics , by Ghatak and Tyagarajan TMH Publication 1994.

ELD404: PROJECT

Student project of 200 marks of duration 6 months in the area of electronics hardware/software. Normally students are encouraged to undertake these projects in industrial/research organizations. In such case the student/batch of student will have one external guide and one internal guide

UEL104: PHARMACEUTICAL INSTRUMENTATION

Introduction to Chemical Instrumental Analysis, advantages over classical methods, classification, various units used in chemical analysis. Introduction to Electroanalytical methods, potentiometry, voltametry, coulometry. 5

Spectrometric Methods-I: A. Laws of Photometry, Instrument components, UV-visible instrument component, photocolorimeters, single and double beam instruments, various types of UV-visible spectrophotometers. 8

B. Atomic absorption spectrophotometer: Principle, working, hollow cathode lamp, atomizer, back-ground correction.

Spectrometric Methods-II: IR spectroscopy: Principle, IR sources, IR detectors, dispersive and Fourier , Transform IR spectroscopy. Atomic Emission Spectroscopy: Principle, types, Flame photometer, DC arc and AC arc excitation, plasma excitation. 8

Spectrometric Methods-III and Miscellaneous Instruments: Fluorimeters and Phosphorimeters: Principle, spectrofluorimeters, spectrophosporimeter, Raman effect, Raman spectrometer
Nuclear Magnetic Resonance (NMR) spectrometry: Chemical shift, principle, working of NMR, FT-NMR Gas analysers: CO, CO2, Hydrocarbons, O2, NOx 8