Fiber Optics Technology: Glass fiber fabrication, cable design, coupling, splicing and connectors, splicing methods, connectors, fiber measurements. 2

Optical Sources: LED and LDs, development of Laser diodes structures, transmitter circuits, Coupling efficiency of source to fiber. 5

Optical detectors: Photodiodes, Avalanche diodes and other detectors. 6

Receiver sensitivity and BER: Receiver design, Noise in detectors. 8

Communication System design: System requirement, System design, Link analyses, Power budgeting. 7

Voice Transmission: Characteristics of Voice signals, TDM, Undersea fiber optics communication system , fibers in telephone network. 7

Tutorials: 8

1. Goa University network of Optical Fiber in LAN.
2. Coupling Efficiency in connectors.
3. Optical fiber as Sensor
4. Power budget calculation
5. Study of different detectors and comparison.

Reference Books:

1. Optical Fiber Communication by A. Selvarajan and etal TMH, 2002.
2. Optical Fiber Communication by Gerd Keiser , MGH , 1998.
3. Optical Electronics, 4th Edition by A. Yariv, HRW publication, 1991.
4. Optical Communication Systems, By J. Senior, Printice Hall India, (1992).

Optical Communication Systems, J. Franz and V. K. Jain, Narosa Publications

ELC 203: ELECTRONICS PRACTICALS II

1. LCD & LED Interfacing to ATMEL 89C52
2. 7-segment Interfacing to ATMEL 89C52 (BCD counter)
3. Display Temperature using ATMEL 89C52
4. Serial Transmission and reception PIC16F877
5. Configuring On-chip ADC PIC16F877
6. Waveform generation using I2C based Max5822 interfaced to PIC 16F877
7. Hex Keypad Interfaced to ARM controller
8. LCD & LED Interfacing using ARM controller
9. Switching of tasks using ARM controller
10. OS-I using ARM
11. OS-II using ARM
12. Coping the memory segment using 8086 Assembler
13. Sorting of numbers using 8086 Assembler
14. Multiplication & Division using 8086 Assembler
15. Shell programming -I
16. Shell programming -II
17. Shell programming -III

UEL102: MICROPROCESSOR ARCHITECTURE AND PROGRAMMING

Introduction and Historical Perspectives: Architecture basics, Complex Instruction Set Computers (CISC) and Reduced Instruction Set Computers (RISC) processors, Advantages and Drawbacks of CISC & RISC, Logical Similarity with example of a typical microprocessor, Short Chronology of Microprocessor Development with reference to CISC families such as INTEL, AMD and MOTOROLA, RISC families development of POWER PC, Alpha, Sparc. 1

Fundamental Architectures: Defining a Computer Architecture e.g. degree of pipelining, basic topology, technology used etc., Neumann and Haward Architectures, Single Processor Systems, Parallelism Implementation using pipelines and multiple units, Super-pipelining, Superscalar, Very Long Instruction Word (VLIW) architectures, Building multithreaded processors, Multiple Processor Systems - SIMD, MIMD and multi-computer approaches. 5

Implementation Considerations: Memory Hierarchy, pre-fetching techniques, coherent caches, pipelining, ternary logic, packaging considerations, wafer scale integration. 1 5

Implementation of Functional Units: Memory Management, Arithmetic Logic Unit, Floating Point Unit, Branch Unit, Vector Unit, Load/Store Unit.

Development Tools: Microcomputer Development Systems (MDS), In Circuit Emulator (ICE), Assembler, Editors, Logic Analyser 5

Case Study of INTEL X 86 families: Overview and Features in brief.

Tutorials: 5

1. Memory test problem. 5
2. Study of Z-80 microprocessor.
3. Study of Motorola Microprocessor family.
4. Coprocessor studies.
5. Cache memory and importance.

Reference Books:

1. Microprocessors and Interfacing, D.V. Hall, McGraw Hill (1986)
2. The Intel Microprocessors: Barry B. Brey, Prentice Hall Of India Ltd. (1997)
3. Microprocessors and Microcomputer Based Systems: M. Rafiqzzuman, Universal Book Stall (1990)
4. The Electronics Handbook Edited by Jerry C. Whitaker, Published by CRC, Press and IEEE Press (1996), Section VII: Microelectronics and Section XIX: Computer Systems

Semester III

ELC 204: INSTRUMENTATION & CONTROL THEORY

Introduction: Basic Concepts of measurements, calibrations and standards.
Transducers (Types and parameters) and Sensors: Displacement, strain, vibration, Pressure, Flow, Temperature, Force and Torque (linearity, accuracy, precision, bandwidth, repeatability) 4

Amplification: Simple ended, Differential and Instrumentation amplifier. 6

Sampling: An Anti-aliasing, Multiplexers, Sample and Hold, Track and Hold. 6

Computer Interfaces: Serial (RS-232), Parallel, GPIB (IEEE-488), Universal Serial Bus (USB) 4

Display Devices: Review of LED, LCD, CRT devices, segmental and dot matrix displays. 6

General purpose test equipments: CRO, Digital storage oscilloscope, Digital voltmeter, Wave Spectrum analysis, Lock-in-amplifiers, Pulse generators and waveform generators, Box-car averager. 2

Control System: Types of control system - open loop, closed loop, linear, non-linear, continuous, 8

discrete, time invariant, modes of linear systems, frequency and time response, sampled data system, open loop motor control, DC motor phase control.

1

Tutorials: 4

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.

Reference Books:

1. Industrial Control Electronics – John Webb, Kevin Greshok, Merrill Publications, 1990.
2. Elements of Electronic Instrumentation and Measurement, Joseph J. Carr, Prentice Hall India, (1996).
3. Modern Electronic Instrumentation and Measurement Techniques, Albert D. Helfnick, William D. Cooper, Prentice Hall of India, 1996.
4. Instrumentation Measurement by Northrop CRC 2001

ELC301: ELECTRONICS PRACTICALS – III

Hardware.

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. Serial (Rs232) implementation with 89C52.
4. EO to OE Convector for Analog Signal.
5. EO to OE converter for PWM Signal.
6. Implementation of FIR BP using Xilinx XC3S400Cyclone II.
7. FFT using TMS 320.
8. Convolution using TMS 320.
9. Analysis of frequency components using Spectrum Analyzer

Software.

10. Simulink HPF & BPF Simulation
11. VHDL implementation for the Multiplexer & Demultiplexer
12. VHDL Implementation for Encoder & Decoder
13. VHDL implementation for the Counter.
14. Verilog implementation for the Memory Module.
15. Verilog implementation for the Latch.
16. Display Hello world and blinking Led's using NiosII soft core
17. Matrix Manipulation on NIOS II core (Multiplication, determinant, Inverse, Transpose)

ELD 201: SIGNAL AND SYSTEMS

Signal And Signal Processing: Characterization and classification of signal, Typical signal Operations. 4

Discrete time signal and Systems: Time Signal , Sequence representation, Sampling process, Simple Interconnection schemes, Correlation of Signal, Ramdom Signal. 6

Discrete Time Fourier Transform: Continuous Discrete-time FT, Energy Density Spectrum, Phase and Group Delays, Sampling of continuous tie signal, Low pass & Band pass Signal, Anti-Alising Filter design, Sample and Hold, A to D, D to A convertors, Effects of sample and hold. 1