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
Implementation of Functional Units: Memory Management, Arithmetic Logic Unit, Floating Point Unit, Branch Unit, Vector Unit, Load/Store Unit. 5
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