

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VIII

ELECTRICAL ENGINEERING

Subject Name: **ADVANCED PROCESSOR AND CONTROLLERS**

Sr. No.	Course Contents	Total Hrs
1.	<p>Programmable Logic Controller: An overview of PLC, General programming procedure, Input and Output module interfacing, Programming ON/OFF inputs to produce ON/OFF outputs, Relation of digital gate logic to contact / coil logic, Creating ladder diagrams from process control descriptions, Basics of register.</p> <p>PLC Functions: Timer function, Counter function, Arithmetic function, Number comparison functions, Numbering systems and number conversion function, Skip and Master control relay functions, Jump functions, PLC data move systems, Digital bit functions and applications, Sequencer function.</p> <p>Analog PLC operations, Applications of PLCs: Stepper motor control, Speed control of D.C. motor & Induction motor, Lift/Elevator control, Water level control, Traffic control, Temperature control.</p>	16
2.	<p>Digital Signal Processing: Discrete Time Signals & Systems: Introduction, Discrete time signals, Discrete time systems, LTI system, Properties of LTI systems. Z-Transform: ROC, Properties of Z-transform, Inverse of Z-Transform.</p>	08
3.	<p>Digital Signal Processor: Introduction to TMS320LF2407 DSP Controller: Introduction, Brief Introduction to Peripherals, Types of Physical Memory and Introduction to Software tools (For Practical Work).</p> <p>C2xx DSP CPU and Instruction Set: Introduction to the C2xx DSP core and code generation, The component of C2xx DSP Core, Mapping external devices to the C2xx core and the peripheral interface, Introduction to system configuration register, Memory, Memory addressing modes, Assembly programming using C2xx DSP Instruction Set.</p> <p>General Purpose I/O Functionality: Pin multiplexing and general purpose I/O overview, Introduction to Multiplexing and general purpose I/O Control registers, General purpose I/O ports, General purpose I/O programming.</p> <p>Interrupts on the TMS320LF2407: Introduction to interrupts, Interrupts hierarchy, Interrupt control registers.</p> <p>The Event Managers: Overview of event manager, Event manager interrupts – Introduction to Interrupt Flag registers, General purpose Timers – GP timer inputs and outputs, GP counting operation, Introduction to control register associated with GP timer, GP timer compare registers, GP timer period registers, GP timer interrupts, PWM output and GP timer compare operation, Compare unit, Input and output of the compare unit, Operation of compare unit, Dead band generation, Register set up for compare unit, Compare unit interrupts, Introduction to Data memory mapped registers associated with compare units, Capture units and Quadrature encoded pulse (QEP) – Operation of capture unit, Capture Stack interrupt flag operation, QEP circuitry, Introduction to capture unit/QEP control register.</p>	24

Experiments:

1. Programs explain uses of different addressing modes and instructions are to be performed.
2. Above programs using C language are to be performed.

Reference Books:

1. Programmable Logic Controllers: PRINCIPLES AND APPLICATIONS, WEBB, JOHN W., REIS, RONALD A., Fifth Edition, PHI
2. Programmable Logic Controllers by John R. Hackworth, Frederick D. Hackworth, Pearson Education Inc.
3. Digital Signal Processing, Palan N. G., TechMax Publication
4. DSP-Based Electromechanical Motion Control, Hamid A. Toliyat, G.Campbell, CRC Press, Indian Edition