VISION OF THE INSTITUTE:

"Empowerment through knowledge"

MISSION OF THE INSTITUTE:

"Developing human potential to serve the Nation by

- **Dedicated efforts for quality education**
- **Yearning to promote research and development.**
- **Persistent endeavor to imbibe moral and professional ethics.**
- **Inculcating the concept of emotional intelligence.**
- **Emphasizing extension work to reach out to the society.**
- **Treading the path to meet the future challenges**

VISION OF THE DEPARTMENT:

"Imparting quality education blended with timeless core values for development of sustainable and inclusive technology in the area of electronics & Telecommunication".

MISSION OF THE DEPARTMENT:

- **"Nurturing the spirit of innovation & creativity by providing conductive learning ".**
- **"Enabling students to build professional career by imbibing social as well as ethical values as inner strength ".**
- **"Enhancing the potential of the students for higher qualification & lifelong learning**

PROGRAMME EDUCATIONAL OBJECTIVES:

To accomplish the Mission of the Department, the department has established the following Programme Educational Objectives**:**

PEO1:

Possess strong basics of science and engineering and inculcate efficient problem solving skills.

PEO2:

Acquire technical competency in Electronics & Telecommunication field to excel in their career or pursuit of higher studies.

PEO3:

Exhibit proficiency in interdisciplinary approach and conduct themselves in professional and ethical manner at all levels.

PEO4:

Demonstrate attributes for need based learning and utilize their engineering skills and spirit of team work in social context.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Graduate will be able to

PSOs	Statement
PSO1	Ability to analyze, design and develop keys to challenges relevant to Electronics & Telecommunication Engineering.
PSO2	Act effectively to combat societal and environmental issues by using professional ethics.
PSO3	Adaptability to be abreast of the latest trends and acceptance to advancement of the relevant technologies.

COURSE OBJECTIVES

To make the students

1. Understand architecture and features of 8051 and PIC18FXX Microcontroller.
2. Learn interfacing of real-world peripheral devices with microcontroller.
3. Explore different features of PIC 18F Microcontroller with Architecture.
4. Use concepts of timers and interrupts of PIC 18 in programming.
5. Design and develop microcontroller based embedded application.
6. Demonstrate real life applications using PIC 18.

COURSE OUTCOMES

After successfully completing the course students will be able to:

CO1: Understand the fundamentals of microcontroller and programming

CO2: Interface various electronic components with microcontrollers

CO3: Analyze the features of PIC 18F XXXX

CO4: Describe the programming details in peripheral support

CO5: Develop interfacing models according to applications

CO6: Evaluate the serial communication details and interfaces

NPTEL VIDEO/PDF LIST

NPTEL Course **"Microcontroller and Applications"**
Link of the Course: https://nptel.ac.in/courses/117/104/117104072/
https://nptel.ac.in/courses/108/105/108105102/

ASSIGNMENT 1: Introduction to Microcontroller Architecture

Que. No.	Question	Mapping with CO	Mapping with PO	Mapping with PSO	Level of Learning
1	Differentiate between microprocessor and microcontroller	CO1	1	1	2
2	Draw and explain block diagram of 8051.	CO1	2	1	2
2	Explain different timer/counter modes of 8051.	CO1	2	1	2
3	Explain PSW register of 8051	CO1	2	1	2
4	State salient features of 8051 microcontroller	CO1	2	1	1
5	Explain interrupt structure in 8051 microcontroller.	CO1	2	1	2
6	State and explain with the help of examples addressing modes of 8051.	CO1	2	1	2
7	Write a C program for 8051 microcontroller to obtain parity (odd/even) of a given number.	CO1	2	1	2
8	Explain following instructions i) JNZ ii) PUSH iii) ACALL iv) RLC A v) CJN	CO1	2	1	2
9	Write a C program to generate a 10ms delay using timer1.	CO1	2	1	2
10	Draw the format of TCON, TMOD registers in 8051 and explain their usage.	CO1	2	1	2
11	Write a C program to send message 'WELCOME' to COM port of PC at 4800 baud rate. Assume XTAL frequency=11.0592 MHz	CO1	3	1	3
12	Explain internal memory organization of 8051	CO1	3	1	5
13	Write a C program to generate a square wave at port pin P2.5 of 50Hz. Use Crystal	CO1	3	1	5

	frequency=12MHz (use Mode 1 and Timer 0)				
14	Write a C program to flash a LED connected at port pin P1.1.(use Mode 2 and Timer 1)	CO1	3	1	4
15	Write a C program to send message ‘Ganpati’ to COM port of PC at 9600 baud rate. Assume XTAL frequency=11.0592 MHz	CO1	3	1	4

ASSIGNMENT 2: IO Port Interfacing-I

Que. No.	Question	Mapping with CO	Mapping with PO	Mapping with PSO	Level of Learning
1	Explain port structure with neat diagram. (Any one)	CO2	2	1	2
2	Explain key debounce concept in detail.	CO2	2	1	1
3	Draw a interfacing diagram for Stepper motor with 8051	CO2	2	1	2
4	Write a short note on operation of opto isolators.	CO2	3	1	2
5	Write a short note on Motion detectors and their use.	CO2	3	1	3
6	Interface 8051 with 7 segment display and write a C program to show counting from 0 to 9 on to it.	CO2	3	1	3
7	Write a C program to interface LED in flashing mode to port2	CO2	3	1	3
8	Write a C program to read the data from PORT 1 If it is =10 H then make port 1 =00H else make PORT 2=00 H	CO2	3	1	3
9	Write a program to monitor PORT 1 pin 0 If it is high then make P1=00H else make PORT 2 =00H	CO2	3	1	3
10	Write a program to switch on alaram connected on P1.7 when the lift door is open. The door opening is sensed by the sensor on P1.1	CO2	3	1	3
11	Write a C Program for 8051 microcontroller to blink LED's connected on part P1 after every one second using timer 0	CO2	3	1	4
12	Interface 8-bit ADC to 8051 microcontroller and write a program to generate a waveform continuously.	CO2	3	1	4

13	Design DAS for temperature measurement.	CO2	2	1	4
14	Write a C program to turn on buzzer and LED when a key is pressed.	CO2	3	1	5
15	Interface 8-bit DAC to 8051 microcontroller and write a program to generate a waveform.	CO2	3	1	4

ASSIGNMENT 3 : PIC 18F XXXX Microcontroller Architecture

Que. No.	Question	Mapping with CO	Mapping with PO	Mapping with PSO	Level of Learning
1	Enlist the various features of PIC 18FXXXX series.	CO3	2	1	2
2	State the features of RISC architecture in PIC microcontroller.	CO3	2	1	3
3	Write comparison of series of PIC microcontrollers	CO3	2	1	3
4	Elaborate different criteria for selection of microcontrollers.	CO3	2	1	2
5	State and explain various peripheral supports in PIC18F4550.	CO3	2	1	3
6	Draw and explain status register of PIC microcontroller.	CO3	3	1	3
7	Explain watchdog timer. Also describe rescaling.	CO3	3	1	3
8	Explain different resets in PIC microcontroller	CO3	3	1	3
9	Draw and explain the block diagram of PIC18FXX	CO3	3	1	3
10	Describe the function of BSR register for selection of file register in data RAM	CO3	3	1	3
11	Describe in details Program memory organization of PIC18Fxxxx.	CO3	3	1	4
12	Describe in details Data memory organization of PIC18Fxxxx.	CO3	3	1	5
13	What are configuration bits? Explain.	CO3	3	1	4
14	Draw and explain programming model of PIC18FXX.	CO3	3	1	4
15	Enlist the category f instructions in PIC and explain any 5 in detail and its usage in programming.	CO3	3	1	5

ASSIGNMENT 4 : Peripheral Support in PIC 18FXXXX

Que. No.	Question	Mapping with CO	Mapping with PO	Mapping with PSO	Level of Learning
1	Explain concept of timers in PIC microcontrollers.	CO4	2	1	2
2	Draw and explain functional diagram of Timer 0 and Timer 2 of PIC18F4550.	CO4	2	1	2
3	Explain SFRs in PIC18F	CO4	2	1	2
4	Explain interrupt Structure with Legacy and priority mode of PIC18F.	CO4	2	1	2
5	Write a short note on Compare and capture mode of CCP module	CO4	2	1	2
6	Draw and explain functional diagram of Timer 1 of PIC18F4550. Also differentiate between operating functions of Timer 0, 1 and 2 of PIC	CO4	3	1	3
7	Explain how to control speed of DC Motor	CO4	3	1	4
8	Explain with example PORT B change interrupt	CO4	3	1	3
9	Draw and explain in-built ADC with Control registers	CO4	3	1	4
10	Write a program to generate time delay of 1msec using timer 0 of PIC18F4550	CO4	3	1	3
11	Interface any two sensors with PIC and write a Embedded C program to display data on LCD.	CO4	3	1	4
12	Write an embedded C program to toggle all bits of PORT B continuously with delay of 10ms using timer 0 , 16 bit and no pre scalar.	CO4	3	1	4
13	Write a Program to generate a square wave of 1KHz having a 50% duty cycle using compare	CO4	3	1	4

	mode.				
14	Write a program for 2.5KHz and 75% duty cycle PWM generation with N=4.	CO4	3	1	4
15	Write a program for 2.5KHz and 50% duty cycle PWM generation with N=16.	CO4	3	1	4

ASSIGNMENT 5 : Real Word Interfacing With 18FXXXX

Que. No.	Question	Mapping with CO	Mapping with PO	Mapping with PSO	Level of Learning
1	Explain port structure of PIC microcontroller	CO5	2	1	2
2	Explain any one port in detail.	CO5	2	1	2
3	Write an Embedded C program to interface LED of Port B in flashing mode.	CO5	2	1	2
4	Explain significance of key debounce in detail.	CO5	2	1	2
5	Explain step wise procedure and design methodology of PIC test board.	CO5	2	1	2
6	Write embedded C program to blink LED connected to part B of PIC.	CO5	3	1	4
7	Draw interfacing diagram to interface 16×2 LCD with PIC in 8-bit mode and write Embedded C program to display “UNIPUNE” on first line and “BCUD” on second line.	CO5	2	1	3
8	Draw an interfacing diagram of motion detector with PIC18F4550 and write embedded C program for the same.	CO5	2	1	3
9	Draw and explain interfacing of 4X4 keypad with PIC microcontroller and algorithm to detect key pressed.	CO5	3	1	3
10	Write an embedded C program to generate a triangular wave.	CO5	3	1	
11	Draw an interfacing diagram of LED connected to PORT B of PIC18f and write an embedded C program for Hex counter.	CO5	3	1	5
12	Design a home automation system to protect home from intruders entry and automatic light ON and OFF as per sunlight.	CO5	3	1	4
13	Draw interfacing diagram to interface 16×2 LCD with PIC in 4-bit mode and write a C Program to display “UNIPUNE” on first line and “BCUD” on second line.	CO5	3	1	4
14	Draw interfacing diagram to interface 16×2 LCD and 4x4 keypad with PIC and write Embedded C program to display “Your Name” on first line when	CO5	3	1	4

	a key is pressed on Keypad.				
15	Write an Embedded C program to display “SPPU” data on LCD first line and “Pune” on second line using busy status flag.	CO5	3	1	4

ASSIGNMENT 6: Serial Port Programming interfacing with 18FXXXX

Que. No.	Question	Mapping with CO	Mapping with PO	Mapping with PSO	Level of Learning
1	Compare RS232 and RS 485 serial communication protocols.	CO6	2	1	2
2	Write a short note on I2C.	CO6	2	1	1
3	Explain SPI in detail.	CO6	2	1	1
4	Explain interfacing of RTC with I2C.	CO6	2	1	1
5	Explain interfacing of EEPROM with SPI.	CO6	2	1	2
6	Write a note on MSSP.	CO6	3	1	3
7	Explain the SPI mode of MSSP structure used for serial communication.	CO6	3	1	3
8	Compare I2C and SPI Protocols.	CO6	2	1	2
9	Draw and explain block schematic of USART.	CO6	2	1	2
10	List the features of RTC with block schematic.	CO6	2	1	2
11	Explain the use of BRGH register for calculation of baud rate with USART block diagram.	CO6	3	1	4
12	Design a traffic light controller system for four ways.	CO6	3	1	4
13	How SPI is better than I2C bus. Explain MSSP for I2C master mode.	CO6	3	1	4
14	Write an embedded C program to transfer string of data “GST INDIA” using PIC18F4550, baud rate of 9600 use XTAL=10MHz.	CO6	3	1	4
15	Write an embedded C program to transfer string of data “INDIA” using PIC18F4550, baud rate of 4800 use XTAL=10MHz	CO6	3	1	5