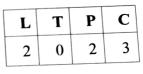
## Nirma University School of Technology, Institute of Technology B. Tech (Electronics and Instrumentation Engineering)



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<b>Course Code</b>	2EIDE53	
<b>Course Title</b>	Advanced Microcontroller and Its applications	1

### Course Outcomes (CO) :

At the end of the course, students will be able to -

- Illustrate the architecture of PIC microcontroller
- program microcontroller using various techniques
- design and develop Raspberry Pi based embedded applications

	Teaching
Syllabus	Hours

#### **UNIT 1: PIC Architecture:**

Overview of PIC series microcontrollers, block diagram, file register set, memory segmentation, hardware input/output ports, memory addresses, 03 support devices

# UNIT 2: Instruction Set and C Language Programming of PIC Series **Microcontroller:**

Instruction formats, addressing modes, instruction set, C directives, PIC series microcontroller programming structures, simple programs involving logical, 06 Branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations, software design using various compilers.

#### **UNIT 3: PIC Hardware Features:**

Overview of PIC series microcontroller parallel ports, PIC series timer and counter with programming, PIC series interrupts, CCP modules, ICSP based 03 programming

#### **UNIT 4: Communication Interface:**

Serial communication standards, serial programming using USART, SPI bus 06 and I<sup>2</sup>C protocols.

#### UNIT 5: Getting started with Raspberry Pi:

Features of Raspberry pi processor, Operating system set up, Controlling the pi remotely, executing python program with IDLE, use of pi store and libraries, programming on the pi.

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## UNIT 6: Embedded application of raspberry pi:

Introduction to hardware set up, understanding GPIO port, use of digital input/output, analog sensor interface using ADC, connection and working of various sensors, controlling of various motors, serial communication interface, controlling GPIO output using web interface, building embedded applications and case studies.

#### Self Study:

The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

#### Laboratory Work:

Laboratory work will consist of minimum 10 experiments based on the above syllabus.

#### **References:**

- 1. Han Way Huang, PIC Microcontroller : An Introduction to Software and Hardware Interfacing, Cengage Learning Publication.
- M.A.Mazidi, PIC Microcontroller & Embedded Systems: Using Assembly and C for PIC18, Pearson Education Publication.
- 3. Martin P Bates, Programming 8-bit PIC Microcontrollers in C With Interactive Hardware Simulation, Newnes Publication.
- 4. Ramesh Gaonkar, Fundamentals of Microcontrollers and Applications In Embedded Systems, Penram International Publishing.
- 5. User Manual of PIC18F/16FXX series controller
- 6. Simon Monk, Raspberry pi cookbook: O'Reilly publisher.