

SEMESTER 4

S. No.	Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
								Sessional	Final Exam	Max. Marks
1	ECE-401	Microcontroller and Applications	PCC	4	3	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Understand the fundamentals of architecture of microcontrollers.
CO2	Demonstrate the knowledge of fundamental data types and their usage in Embedded C programming for the 8051 microcontroller.
CO3	Articulate the interrupts and serial communication of 8051 microcontroller.
CO4	Develop interfacing circuits for different peripheral devices.
CO5	Use microcontroller development board to solve the various engineering problems.

Detailed Syllabus**Section-A**

Unit 1: Introduction to Microcontroller: Block Diagram, Pin Diagram, Architecture of Microcontroller, Comparison of Microprocessor and Microcontroller, Assembler Directives, Addressing Modes and Instructions Set of 8051 Microcontroller, 8051 Assembly Language Programming.

(10 hrs)

Unit 2: 8051 Programming In Embedded C: Data Types, Time Delay, Loop, Logic Operations, I/O programming and Data Conversion, Accessing Code Space, Data Serialization and Counter/Timer Programming in Embedded C.

(8Hrs)

Unit3: Serial port and Interrupts: Basics of serial communication, 8051 connection to RS232, serial port operations and programming, basics of 8051 interrupts, timer interrupts, external hardware interrupts, serial port interrupts, Interrupt priority in 8051, Interrupt programming using embedded C.

(6 Hrs)**Section-B**

Unit 4: Interfacing: LCD and Keyboard Interfacing, De-bouncing effect, ADC 0804 interfacing, DAC interfacing, Sensor and actuator interfacing, speed and direction control of DC and Stepper Motors.

(10 Hrs)

Unit 5: Microcontroller Development Board: Introduction to Arduino, Programming Tools and Programming language for development board. Interfacing with LDR's, Temperature Sensor, Ultrasonic Sensor, IR Sensor, display devices and actuator, serial communication, wireless communication using RF module.

(11 Hrs)**Text Books**

S.No	Name of the Books	Author	Publisher Name	Edition (Pub. Yr.)
1	Arduino Cookbook	Michael Margolis	O'Reilly Media, Incorporated	2 nd (2007)
2	The Microcontroller and Embedded Systems Using Assembly and C	Muhammad Ali Mazidi	Pearson Education India	2 nd (2007)

Reference Books

S.No	Name of the Books	Author	Publisher Name	Edition (Pub. Yr.)
1	The 8051 Microcontroller, Architecture, Programming and Applications	Kenneth J. Ayala	Penram International	3 rd (1996)
2	Programming Arduino: Getting Started with Sketches	Simon Monk	McGraw-Hill Education	2 nd (2016)