

Course Code	Course Title	L	T	P	C
1154EC106	BASICS OF EMBEDDED SYSTEM	3	0	0	3

**a) Course Category**

Institutional Elective

**b) Preamble**

The purpose of this course is to acquire knowledge on complete design of an embedded system with functional requirements for hardware and software components including processor, sensors and subsystem interfaces to connect real world applications systems.

**c) Prerequisite**

Nil

**d) Related Courses**

Embedded System Design

**e) Course Outcomes**

On successful completion of this course the student will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Explain the general purpose 8-bit and 16-bit microprocessor and instruction set	K2
CO2	Explain the 8-bit microcontroller architecture and its instruction set	K2
CO3	Describe the memory and peripheral interfacing techniques required to design an embedded system for given specifications	K2
CO4	Familiarize various types of sensors and actuators required to design an embedded system for given specifications	K2
CO5	Discuss the various aspects of complete embedded system design through case studies	K2

**f) Correlation of COs with POs**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	-	-	-	-	-	-	-	-	-	-	L	L	-
CO2	M	-	-	-	-	-	-	-	-	-	-	L	L	-

CO3	M	-	-	-	-	-	-	-	-	-	-	-	L	-
CO4	M	-	L	-	-	-	-	-	-	-	-	M	L	-
CO5	M	-	-	-	-	-	-	-	L	L	-	-	M	M

**g) Course Content**

**UNIT I ARCHITECTURE OF MICROPROCESSORS 9**

8085 Architecture, pin diagram, addressing Modes, instruction formats, instruction set, Architecture 8086, Register organization of 8086, Signal descriptions of 8086 chip, Physical Memory organization, Introduction to Maximum and Minimum mode operation.

**UNIT II MICROCONTROLLER 9**

Overview of the architecture of 8051 microcontroller, Memory organization, special function registers, Addressing Modes, Instruction formats, Instruction set, Interrupt and Interrupt routines, I/O Ports.

**UNIT III INTERFACING PERIPHERALS 9**

Interfacing with RAMs, ROMs, Introduction to Serial Communication, Interfacing I/O Ports: 8255, 8279, 8259, 8257, Analog-to-Digital Converters (ADCs), Digital-to-Analog Converters (DACs).

**UNIT IV SENSORS AND ACTUATORS 9**

Keyboard Interfacing, Sensors: temperature, pressure, light, ultrasonic. Actuators: LEDs, 7 segment display, LCDs, stepper motor, DC motor, servo motor.

**UNIT V EMBEDDED SYSTEMS 9**

Embedded system definition, classification of embedded system, Embedded system design process, skills required for an embedded system designer, reset circuit, power up reset, watch dog timer.

Case study: washing machine, Traffic light controller, Microwave oven.

**Total 45 Hrs**

**h) Learning Resources**

**Reference Books**

1. Ramesh Gaonkar, "Microprocessor Architecture, Programming, and applications with the 8085", Sixth Edition, Penram International Publishing Pvt. LTD, 2013.
2. Ajoy Ray, K Bhurchandi, "Advanced Microprocessors and Peripherals", Second Edition, McGraw Hill Education – 2006.
3. Mohamed Ali Mazidi, Janice Mazidi, RolinMcKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson education, 2011
4. Raj Kamal, "Embedded Systems: Architecture, Programming and Design", Second Edition, Tata McGraw-Hill Education, 2011.