PEI308: MICROCONTROLLER BASED SYSTEM DESIGN

	L	T	P	Cr
	2	1	2	3.5

Course Objectives: To understand the concepts of microcontroller based system, to enable design and programming of microcontroller based system

Review of 8-bit microcontrollers: Introduction to 16-bit microcontrollers, Introduction to 32-bit ARM microcontrollers Architecture, Functional blocks, Programmer's model, Timer, Counter, Interrupts, ISR, GPIO. A/D configuration and interfacing.

Assembly and C-programming: ARM microcontrollers, Programming for Timer, Delays, Port interfacing, LED, A/D, LCD and Keypad programming. Introduction to Rs232, Rs485, CAN, Ethernet, Wireless 802.11 standards/protocols. MODBUS

Data communication and interfacing: communication using I2C, SPI, RS232, RS485, CAN, and CAN, USB , Bluetooth, protocols. Interfacing with Optocoupler/Relay, RTC, EEPROM, GPS, GPRS, Ethernet interface design principles.

Introduction to RTOS: A case study based on 32-bit ARM Cortex microcontrollers for Web monitoring of a system using transducers and display running free RTOS.

Laboratory Work: basic programming of ARM microcontroller, Programming of Timer/counters, Port interfacing, LED, A/D, LCD and Keypad. Interfacing with I2C, SPI, RS232, RS485, CAN, RTC, EEPROM, GPS, Ethernet and CANBUS.

Minor Project (if any):

Designing of signal and data acquisition circuits related to sensors and control

Course learning outcome (CLO):

1. Review 8-bit microcontrollers

Use assembly and c-programming of ARM microcontrollers.

Design of basic circuits for ARM microcontroller.

Design interfacing circuits for ARM microcontroller.

Recommended Books:

1. *Elahi, A., Arjeski, T., ARM Assembly Language with Hardware Experiments, Springer, (2014)*

2. *Hintenaus, P. ,Engineering Embedded Systems, Springer, (2015)*

Evaluation Scheme:

S.No	Evaluation Elements	Weightage (%)

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1.	MST	20
	EST	40
	Sessionals (May include Assignments/ Projects/ Tutorials/ Quizes/ Lab Evaluations)	40