Design Innovation Centre, IUST

Course Title	Microcontroller Based System Design
Course Code	DIC-E01T/P (L-T-P:2-0-2) 3 credits
Course Type	Discipline Centric Elective
Timing	4 hours/week (Slot G of the Central Time Table)
Eligibility	6th Semester students of EE, ECE, ME, and CSE
Pre-requisites	Basic Programming Skills, Digital Electronics
Venue	AB VI-101
Course Objectives	This course aims at: 1. Enabling students to enrich their knowledge with hands-on experiments and project based learning. 2. Giving the students a firm understanding of micro-controllers and their application through practice, in an action oriented setting. 3. Introducing the concepts of Robotics, Haptics and their applications to the students.
Course Outcomes	By the end of this course the student will be able to: Design and develop a practical micro-controller based solution to a real life problem.

Course Contents	• Introduction to Microprocessors, Micro-controllers and Embedded Systems • Product realisation and design • Embedded System applications, features and case studies • Introduction to 8-bit micro-controllers(PIC and ATmega) • Micro controller architecture and programming in ALP and C • Introduction to KEIL and Atmel Studio • Micro controller I/O programming • Hardware connections and uploading the HEX file to micro-controllers • Interfacing of sensors and actuators with micro-controllers • Design of linear and SMPS power supplies • Arduino and Raspberry Pi Platforms • Introduction to Robotics- Fundamentals, Spatial descriptions, Positions, Orientations, Frames, Robot Kinematics & Position Analysis- DH representation, Hands on experiments. • Special lectures on contemporary topics eg. Haptics • Design and development of various projects related to home automation and robotics

Books Recommended:

1. PIC Microcontroller and Embedded Systems, Mazadi, Mckinley, Causey, 2008, Pearson.
2. The 8051 Microcontroller and Embedded Systems, Mazadi and Mazadi, 2004, PHI.
3. Getting Started with Raspberry Pi, Matt Richardson, Shawn Wallace, 2013, Makermedia.
4. The Robotics Primer. Mataric, Maja J. , 2007, Mit Press
5. ES Application and Computer Organization, Carl Harmchar

Note: *Students interested in taking the course and needing any further clarification may visit DIC during working hours.*