EMBEDDED SYSTEM DESIGN
WITH ARM

COMPUTER SCIENCE & ENGINEERING

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COURSE OUTLINE:
This course will discuss about the basic concepts of embedded system design, with particular emphasis on hands-on and demonstration sessions on system design using ARM microcontrollers. Keeping in view of the recent developments, this course will be based on state-of-the-art microcontroller boards and programming environments. This course will also help the participants to understand the developmental aspects of Internet of Things (IoT) based designs. Starting from the basics, the participants will be introduced to various interfacing issues with sensors and actuators. It is highly recommended that the participants procure some of the low cost microcontroller development boards and actually carry out the experiments that would be demonstrated.

ABOUT INSTRUCTOR:
Prof. Indranil Sengupta has obtained his B.Tech., M.Tech. and Ph.D. degrees in Computer Science and Engineering from the University of Calcutta. He joined the Indian Institute of Technology, Kharagpur, as a faculty member in 1988, in the Department of Computer Science and Engineering, where he is presently a full Professor. He has served as Heads of the Department of Computer Science and Engineering and also the School of Information Technology of the Institute. He has over 29 years of teaching and research experience and he has guided 21 PhD students, and has more than 200 publications to his credit in international journals and conferences.
Dr. Kamalika Dutta completed her Master of Science (M.S.) degree from Indian Institute of Technology, Kharagpur, India in 2010. She completed her Ph.D. from Indian Institute of Engineering Science and Technology, Shibpur, India in 2014. She is presently working as an Assistant Professor in the Department of Computer Science and Engineering at National Institute of Technology Meghalaya, India since August 2014. She is currently guiding four PhD students, handling three sponsored projects, and has published more than 50 papers in peer reviewed journals and conferences.

COURSE PLAN:
Week 01: Introduction to Embedded Systems and Microcontrollers
Week 02: Instruction set architecture of ARM microcontroller, and assembly language programming
Week 03: D/A and A/D converter, sensors, actuators and their interfacing
Week 04: Microcontroller development boards and embedded programming platforms
Week 05: Hands-on and demonstration I: Temperature sensing unit, Light sensing unit, Sound sensing unit
Week 06: Hands-on and demonstration II: Feedback control system, relay control unit, driving electrical appliances like motors, bulb, pump, etc.
Week 07: Hands-on and demonstration III: Object tracking using GPS and GSM
Week 08: Hands-on and demonstration IV: Introduction to Internet of Things, smart home concepts, motion sensing using accelerometer, control of appliances over SMS

TYPE OF COURSE: New | Elective | UG/PG
INTENDED AUDIENCE: CS/EE/EC
COURSE DURATION: 8 weeks (28 Jan’19 - 22 Mar’19)
EXAM DATE: 31 March 2019
PRE-REQUISITES: Basic concepts in digital circuits and microprocessor
INDUSTRIES APPLICABLE TO: Intel, Texas Instruments, Cadence, Qualcomm, Samsung, ARM, TCS, HP