



EMBEDDED SYSTEM DESIGN WITH ARM

PROF. INDRANIL SENGUPTA

Department of Computer Science and Engineering
IIT Kharagpur

TYPE OF COURSE : Rerun | Elective | UG

COURSE DURATION : 8 weeks (18 Jan' 21 - 12 Mar' 21)

EXAM DATE : 21 Mar 2021

PROF. KAMALIKA DUTTA

Department of Computer Science and Engineering
IIT Kharagpur

PRE-REQUISITES : Basic concepts in digital circuits and microprocessor

INTENDED AUDIENCE : Computer Science and Engineering / Electronics and Communication Engineering / Electrical Engineering

INDUSTRIES APPLICABLE TO : ARM, Intel, Texas Instruments, Qualcomm, Samsung, TCS, HP

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.

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 had been the former Heads of the Department of Computer Science and Engineering and also the School of Information Technology of the Institute. He has over 28 years of teaching and research experience.

Prof. Kamalika Datta completed her B.Sc. (Computer Science) from Ravenshaw College, Cuttack, India in the year 2003, Master of Computer Application from Biju Pattanaik University of Technology, Bhubaneswar, India in the year 2006, and then Master of Science 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. She is presently working as an Assistant Professor in the Department of Computer Science and Engineering at National Institute of Technology (NIT), Meghalaya, India.

COURSE PLAN :

Week 1: Introduction to Embedded Systems and Microcontrollers

Week 2: Instruction Set Architecture of ARM Microcontroller, and Assembly Language Programming

Week 3: D/A and A/D converter, Sensors, Actuators and their Interfacing

Week 4: Microcontroller Development Boards and Embedded Programming platforms

Week 5: Hands-on and Demonstration I: Temperature sensing unit, Light sensing unit, Sound sensing unit

Week 6: Hands-on and Demonstration II: Feedback control system, Relay control unit, Driving electrical appliances like motors, bulb, pump, etc.

Week 7: Hands-on and Demonstration III: Object tracking using GPS and GSM

Week 8: Hands-on and Demonstration IV: Introduction to Internet of Things, Smart home concepts, Motion sensing using accelerometer, control of appliances over SMS