



DESIGN FOR INTERNET OF THINGS

PROF. TV PRABHAKAR

Department of DESE

IISc

TYPE OF COURSE : New | Elective | PG

COURSE DURATION : 8 Weeks (26-Jul' 21 - 17-Sep' 21)

EXAM DATE : 26 Sep 2021

COURSE OUTLINE :

An overview of IOTs, design of smart objects that provide collaboration and ubiquitous services will be explored. Design for longevity/energy efficiency will be highlighted. Step by step system design will be introduced. Small video chips that will allow students to prototype will be displayed. At the end of the course, the student is expected to make the right choice of hardware, software and protocols for the proposed application.

ABOUT INSTRUCTOR :

Prabhakar is a Principal Research Scientist at IISc. He works in the area of Networked Embedded Systems where he focuses on hardware system design, micro energy harvesting systems and power management algorithms. Prabhakar leads the effort in Zero Energy Networks Laboratory (Zenlab) at DESE, IISc, where his PhD, master's students, project associates and interns work on building embedded electronic systems for application areas such as Airplane cabin, Industrial IoT, Air Quality, Tactile Internet applications, Autonomous drone charging systems, Machine Learning and AI for IoT applications.

COURSE PLAN :

Week 1: Introduction to IoT – Definition, Applications, Challenges – Unique ID, Power, Security, Location

Week 2: Addressing the Power challenge – RFID, Energy harvesting, Battery based systems, Power management systems

Week 3: System design for low power – LDO, DC-DC converters, low power software

Week 4: Sensors and actuators – Temperature sensor, Air quality, Solenoid valves

Week 5: Power management algorithms

Week 6: IoT protocols – MQTT, COAP, and Websockets with associated applications

Week 7: Low power wireless technologies – BLE, IEEE 802.15.4e, Wi-Fi

Week 8: Low Power Wire area technologies – NBIoT, CAT – LTE-M1, , LORA