



# INDUSTRIAL AUTOMATION AND CONTROL

**PROF. SIDDHARTHA MUKHOPADHYAY**

Department of Mechanical Engineering  
IIT Kharagpur

**TYPE OF COURSE** : Rerun | Elective | UG/PG

**COURSE DURATION** : 12 weeks (24 Jan' 22 - 15 Apr' 22)

**EXAM DATE** : 23 Apr 2022

**PRE-REQUISITES** : Electrical Networks, Control Systems

**INTENDED AUDIENCE** : Any interested student

**INDUSTRIES APPLICABLE TO** : All Process Control (Oil and Gas, Chemical), Manufacturing (Machine tools, Textile) etc.

**COURSE OUTLINE :**

This course provides an overall exposure to the technology of Industrial Automation and Control as widely seen in factories of all types both for discrete and continuous manufacturing. The course, in 52 lectures, discusses a wide range of related topics from the advantage and architecture of automation systems, measurement systems including sensors and signal conditioning, discrete and continuous variable control systems, hydraulic, pneumatic and electric actuators, industrial communication and embedded computing and CNC Machines. A student of IIT Kharagpur once commented - "because of the course I can identify and relate to much of the equipment that I see in a factory".

**ABOUT INSTRUCTOR :**

Prof. Siddhartha Mukhopadhyay has done B. Tech, M. Tech and Ph. D., all from IIT Kharagpur in 1985, 1987 and 1991 respectively. In 1990 he joined the Electrical Engineering Department of IIT Kharagpur. He is currently a Professor in the Department. He has co-authored about 200 research papers, two books and two video courses. He has about 20 years experience of working with organisations like National Semiconductors, Texas Instruments, General Motors, Indian Railways, SAIL, DRDO, GE R&D and several others. Apart from his research interests he is interested in pedagogy and innovation.

**COURSE PLAN :**

**Week 1:** Introduction

**Week 2:** Measurement Systems Characteristics

**Week 3:** Introduction to Automatic Control

**Week 4:** Feedforward Control Ratio Control

**Week 5:** Special Control Structures

**Week 6:** Sequence Control. Scan Cycle, Simple RLL Programs

**Week 7:** PLC Hardware Environment

**Week 8:** Flow Control Valves

**Week 9:** Industrial Hydraulic Circuit

**Week 10:** Energy Savings with Variable Speed Drives

**Week 11:** The Fieldbus Network - I

**Week 12:** Course Review and Conclusion (Self-study)