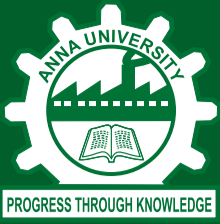# MHRD SCHEME ON GLOBAL INITIATIVE OF ACADEMIC NETWORKS (GIAN)

Practical PID Control (11/12/2017 – 15/12/2017)

Venue : Department of Instrumentation Engineering
Madras Institute of Technology Campus, Anna University, Chennai-44.

Last Date for Registration: 31-10-2017

Course overview

This 1 credit course consisting of 12 lecture hours and 4 tutorial hours, for a period of 5 days, to be conducted jointly by Prof. Ing. Antonio Visioli, University of Brescia, Italy and Dr. J. Prakash, MIT Campus, Anna University Chennai. A detailed introduction to PID Control, its features and its application in various domains will be covered in this course. Topics covered in this workshop are as follows: Structures of PID Controller, PID Controller Tuning, PID Implementation Issues, PID Enhancements, Assessment of PID Controller Performance, Introduction to Event Based and Fractional PID Controllers. This course will help students (UG/PG /Research Scholars) to keep in pace with the recent developments in the field of PID Controller Design. Based on a survey of over eleven thousand controllers in the refining, chemicals and pulp and paper industries, it is reported that 97% of regulatory controllers utilize PID feedback (Desborough Honeywell, 2000).

Who shoud attend this course ?

The course is suitable for under graduate and graduate students in engineering, engineers working in industry and faculty members and research scholars.

Course Objectives

This short course covers all the essential theoretical and practical aspects of PID Control. The specific objectives are as follows:

- To introduce technical terms and nomenclature associated with Process control domain.
- To provide an overview of the features associated with Industrial type PID controller.
- To make the students (UG / PG / Research Scholars) understand the various PID tuning methods and their Pros & Cons.
- To elaborate different types of control schemes such as cascade control, feed-forward control and Model Based control schemes.
- To provide basic knowledge about fractional-order systems and fractional-order- controller and
- To lay the foundation for the systematic approach to design controller for Integer order and fractional order systems.

Prerequisites: Basic knowledge of Control System.

The Practical PID Control Course Schedule is as follows:

Date	Time	Session	Topic
11/12/2017 Monday Day-1	08.30 AM - 09.00 AM		Inaugural Function
	09.00 AM - 10.00 AM	Lecture 1 (1 hour)	Introduction to PID Control (Physical meaning of P, I, D actions) - **Prof. Antonio Visioli**
	10.15 AM - 11.15 AM	Lecture 2 (1 hour)	Different formulations for PID Controllers. **- Prof. Antonio Visioli**
	11.15 AM - 12.15 PM	Lecture 3 (1 hour)	PID Implementation issues (filter of the derivative action, set-point weighting, anti-reset-windup, bumpless-A/M Transfer) **- Prof. Antonio Visioli**
	12.15 PM - 01.15 PM	Tutorial 1 (1 hour)	Hands-on sessions/Discussions/ Solving assignments on the Topics covered in Lectures 1-3 **Prof. Antonio Visioli & Prof. J. Prakash**
12/12/2017 Tuesday Day-2	09.00 AM - 10.00 AM	Lecture 4 (1 hour)	PID Controller Tuning and Tuning rules- Part-1 **- Prof. Antonio Visioli**
	10.15 AM - 11.15 AM	Lecture 5 (1 hour)	PID Controller Tuning and Tuning rules- Part-2 **- Prof. Antonio Visioli**
	11.15 AM - 12.15 PM	Lecture 6 (1 hour)	PID Controller Tuning and Tuning rules- Part-3 **- Prof. J. Prakash**
	12.15 PM - 01.15 PM	Tutorial 2 (1 hour)	Hands-on sessions/Discussions/ Solving assignments on the Topics covered in Lectures 4-6 **Prof. Antonio Visioli & Prof. J. Prakash**
1312/2017 Wednesday Day-3	09.00 AM - 10.00 AM	Lecture 7 (1 hour)	PID Enhancements – Control structures based on PID control (Feedforward, Cascade, Ratio, etc..) - Part-1 **- Prof. Antonio Visioli**
	10.15 AM - 11.15 AM	Lecture 8 (1 hour)	PID Enhancements – Control structures based on PID control (Feedforward, Cascade, Ratio, etc..) - Part-2 **- Prof. J.Prakash**
	11.15 AM - 12.15 PM	Lecture 9 (1 hour)	Control Loop Performace Assessment **- Prof. Antonio Visioli**
	12.15 PM - 01.15 PM	Tutorial 3 (1 hour)	Hands-on sessions/Discussions/ Solving assignments on the Topics covered in Lectures 7-9 **Prof. Antonio Visioli & Prof. J. Prakash**
14/12/2017 Thursday Day-4	09.00 AM - 10.00 AM	Lecture 10 (1 hour)	Future of PID Control: Introduction to Event-based & Fractional PID controllers -**Prof. Antonio Visioli**
	10.15 AM - 11.15 AM	Lecture 11 (1 hour)	Simulated case studies will be presented to demonstrate the power of PID Control Scheme **- Prof. J.Prakash**
	12.15 PM - 01.15 PM	Tutorial 4 (1 hour)	Hands-on sessions/Discussions/ Solving assignments on the Topics covered in Lecture 10 **- Prof. Antonio Visioli & Prof. J. Prakash**
15/12/2017 Friday Day-5	09.00 AM - 10.00 AM	Lecture 12 (1 hour)	Recap of the topics covered in the Course **- Prof. Antonio Visioli**
	10.15 AM - 10.45 AM		Valedictory Function & Course Feedback

Coffee break : 10.00 AM -10.15 AM

Course Registration:

Procedure to be followed to register for the 'Practical PID Control' GIAN course:

Step 1: The registration for this course is only possible through the GIAN web portal. GIAN course registration fee is Rs 500/- (One time payment needed to register the participant details under GIAN and makes the participant eligible to register for any course/courses listed in GIAN).

Step 2: For "Practical PID Control" course registration, select "Practical PID Control" while doing the course registration.

Step 3: The course coordinator will shortlist the participants based on the merits of the application and will send separate e-mails to the shortlisted candidates.

Step 4: On receiving the email, the Participants should send the completed registration form (registration format will be shared in mail) with DD to the course coordinator.

Step 5: The registration fee would be collected in the form of Demand Draft (DD) drawn in favour of **"The Director, CTDT, Anna University"** payable at chennai as mentioned in the registration form.

Students (UG / PG / Research Scholar)	: Rs.1,000/-
Faculty Members	: Rs.4,000/-
Industry/Research Organization	: Rs.8,000/-

The above fee is towards participation in the course, the course material, computer use for tutorials and assignments, and laboratory equipment.

Maximum Number of Participants: 30

Accommodation: The participants will be provided with hostel accommodation, depending on availability, on payment basis.

Faculty

Dr. Antonio Visioli is a full professor of Control Systems at the Department of Mechanical and Industrial Engineering of the University of Brescia, Italy, The main areas of his current research are PID control, fractional control, event-based control, inversion-based control, control of biomedical systems, trajectory planning and control of industrial robot manipulators. He currently teaches Fundamentals of Automatic Control Systems and Control Systems Technologies. He has (co-) authored 3 research monographs, 1 edited book, 1 international textbook, 2 national textbooks, 7 book chapters, 84 international journal papers in peer reviewed international journals with high impact factor, 154 papers in peer reviewed international conference proceedings. He has been the general chair of the IFAC Conference on Advances in PID Control 2012 and of the IFAC Workshop on Internet Based Acontrol Education 2015. He has also been the IPC chair of the International Conference on Event-based Control. Communication and Signal Processing 2016 and 2017 and of the IFAC Conference on Advances in PID Control 2018. He has also served as IPC member in many international conferences. He is a member of the IFAC Technical Commitee on Education, a member of the Technical Committee on Education of the IEEE Control Systems Society, a member of the subcommittee on Industrial Automated Systems and Control of the IEEE Industrial Electronics Society Technical Committee on Factory Automation.

Faculty & Course Coordinator

Name: Dr. J. Prakash (ISA FELLOW)
Professor & Head
Department of Instrumentation Engineering, MIT Campus,
Anna University, Chromepet, Chennai-44
Phone: 044-22516320 | Mobile No.: 09444860188
Fax No. 044-22232403
Email: prakaiit@gmail.com