



**SECOND SEMESTER 2019-2020**

Course Handout Part II

Date: 16-01-2021

In addition to Part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

*Course No.* : EEE F245  
*Course Title* : **Control systems Laboratory**  
*Instructor-in-Charge* : Dr. Ankur Bhattacharjee  
*Instructors' team* : Dr. Ankur Bhattacharjee, Dr. Gopal Krishna Kamath

**Scope and Objective of the Course:** Automatic control systems are an essential feature of numerous industrial processes, scientific instruments and even commercial, social and management situations. A thorough understanding of the elementary principles of this all embracing technology is of great relevance to all engineers and scientists. This laboratory course gives hands-on experience to the theoretical concepts covered in the theory course.

**Textbooks:**

1. Nagrath I. J. and M. Gopal, Control Systems Engineering, New Age International (P) Limited, 5th ed., 2007
2. LabVIEW manuals, Quanser-QUBE-Servo manuals.

**Reference books**

1. Kuo, B. C., and Golnaraghi, F., Automatic Control Systems, John Wiley & Sons, 8th ed., 2003.
2. Dorf, R. C., and Bishop, R. H., Modern Control Systems, Addison Wesley, 7th ed., 1995.
3. Getting Started with MATLAB®, The MathWorks.

**Course Plan:**

The laboratory classes will be conducted in the Control system lab. The experiments are intended to provide experience to the students in different engineering applications using Simulation environment upon the concepts learned in the class under Control Systems course. Details of the experiments will be available in the "Laboratory Manual". Laboratory marks mentioned includes marks for record and attendance in lab practical.

SL.NO.	TITLE OF EXPERIMENTS
01	Introduction to Control System Laboratory; familiarization with MATLAB and its different simulation toolbox
02	Mathematical modelling of physical systems



<b>03</b>	Bump test modelling
<b>04</b>	Second order systems
<b>05</b>	PD control
<b>06</b>	Root locus 1 Root locus analysis of servo model 2 DC motor with controller
<b>07</b>	Measurement of servo speed and pendulum moment of inertia A: Filtering B: Pendulum moment of inertia
<b>08</b>	Rotary pendulum modelling and stability analysis A: Rotary pendulum modelling B. Stability analysis
<b>09</b>	Balance control
<b>10</b>	Controller design for DC-DC converters

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Regular Laboratory Practical work	Each lab session for 2 Hours	45%	Time Table	Open Book
Lab Quiz (Mid-Sem)	½ Hour	15%	Will be announced	Open Book
Lab Exam (End-Sem)	1 Hour	40%	Will be announced	Open Book

**Chamber Consultation Hour:** Consultation hours of Instructors will be announced separately.

**Notices:** All notices of this course will be displayed in CMS

**Make-up Policy:** Make-up for components will be granted for genuine reasons, only when prior-permission is taken from Instructor-in-charge.

**Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**Ankur Bhattacharjee**  
**INSTRUCTOR-IN-CHARGE**

