Department of Mechanical Engineering
NIT Srinagar

Babar Ahmad

Course Plan and Syllabus

Course:	MEC 601 Automatic Control
Instructor:	Babar Ahmad
CLT:	4 3 1 (Credit Lecture Tutorial)
Textbook:	K. Ogata, Modern Control Systems, Prentice-Hall of India, 5th edition, 2010 (ISBN 10: 0-13-615673-8)
Reference:	Norman S. Nise, Control Systems Engineering, Fourth Edition 2004 by John Wiley and Sons.[1]
NPTEL link:	https://nptel.ac.in/courses/112/107/112107240/

Course Description:

Control engineering is an exciting and a challenging field. By its very nature, control engineering is a multidisciplinary subject, and it has taken its place as a core course in the engineering curriculum. It is reasonable to expect different approaches to mastering and practicing the art of control engineering. Our approach is to present a control engineering methodology that is based on mathematical fundamentals with an emphasis on physical system modeling.

Course Topics (Primarily from the book by Ogata)

Topic 1 Introduction to Control Systems, Examples of Control Systems, Closed-Loop Control Versus Open-Loop Control

Topic 2 Mathematical Modeling of Control Systems, Inertial and Non-inertial frames of reference

Topic 3 Transient and Steady-State Response Analyses

First-Order Systems, Second-Order Systems, Higher-Order Systems, Performance characteristics of control systems

Topic 4 Basic Control Actions

Effects of Proportional, Derivative and Integral Control actions on system performance, Steady-State Errors in Unity-Feedback Control Systems

Topic 5 Stability

Asymptotic Stability, Bounded Input Bounded Output (BIBO) Stability, Routh's Stability Criterion.

Topic 6 Control Systems Analysis and Design by the Root-Locus Method

Topic 7 Control Systems Analysis and Design by the Frequency-Response Method

Topic 8 Control Systems Analysis in State Space

State-Space Representations of Control Systems, Controllability, Observability, Pole Placement, Design of Control Systems with Observers, Quadratic Optimal Regulator Systems

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[1]**The study material provided in the folders UNIT1 and UNIT2 is to be studied in conjunction with the book by Norman Nise. The chapter-wise distribution of the notes is aligned with this book.**