The course exposes students to control design for continuous-time linear time-invariant (LTI) systems. The course focuses primarily on using Laplace and frequency-domain techniques. It discusses design of 1-degree of freedom (i.e., single controller) and 2-degree of freedom control systems for Single Input-Single Output (SISO) plants, using a range of tools including Nyquist plots, Bode plots, Evans plots (root locus), and Nichols plots. It also discusses the fundamental limits associated with control design and the related trade-offs that need to be made during design.

G. R. Jayanth obtained his B. Tech from IIT Madras in 2002, MS and PhD from The Ohio State University in 2004 and 2008 respectively, all in Mechanical Engineering. Since 2010 he has been with Indian Institute of Science where he is currently an Associate Professor in the Department of Instrumentation and Applied Physics. His research interests include precision motion measurement and control, nanometrology and manipulation, scanning probe microscopy, micro-robotics and optical sensors.

**COURSE PLAN:**

- **Week 01**: Linear system theory, Fourier and Laplace transforms, Transfer functions
- **Week 02**: Fundamentals of feedback control, Nyquist stability theory
- **Week 03**: Bode plots, Design of 1-degree of freedom control systems
- **Week 04**: Design of 1-degree of freedom control systems
- **Week 05**: Robust control
- **Week 06**: Quantitative Feedback Theory
- **Week 07**: Quantitative Feedback Theory, Bode sensitivity integral
- **Week 08**: Bode Gain-Phase relationship, Ideal Bode Characteristic
- **Week 09**: Control of non-minimum phase systems
- **Week 10**: Control of unstable systems
- **Week 11**: Describing functions, Solved examples
- **Week 12**: Solved examples