ME 360 Control Systems
Topic Outline

1. Introduction to Closed Loop Systems and Feedback

2. Mathematical Modeling of Physical Systems
   - Linear differential equations of motion
   - Laplace transforms and partial fractions
   - Block diagram representations
   - Transfer functions
   - Linearization of nonlinear models
   - Examples include DC motors

3. Feedback Control System Characteristics
   - Open and closed loop control
   - Transient and steady-state response
   - Parametric sensitivity, disturbances, and noise

4. Performance of Feedback Control Systems
   - Time & Laplace domains
     - First & second order systems
     - Higher order systems

5. Stability of Feedback Control Systems
   - Routh-Hurwitz criterion
   - Characteristic equation and its roots

6. Root Locus Method

7. Frequency Response Methods
   - Bode diagrams
   - Adding poles and zeros
   - Stability: gain and phase margins
   - Nyquist Diagrams

8. PID (Proportional/Integral/Derivative control)