Course Number: ME 305

- Course Title: Introduction to System Dynamics
- Course Coordinator: Tengxiang Wang
- Course Description: Principles of dynamic system modeling and response with emphasis on mechanical, electrical, and fluid systems.

• Prerequisites: Mech 236 – Dynamics; ME 231 – Kinematics; Math 222 – Differential Equations

• Textbook: Katsuhiko Ogata, System Dynamics, 4th edition, Pearson Prentice-Hall, 2004, ISBN: 0-13-142462-9 (or use Pearson new international edition, 2013)

• Grading: HW 50% + Final exam (open-book) 50%

Class topics:

- 1. Complex Algebra, Linear Algebra, Laplace Transforms, Inverse Laplace Transforms.
- 2. Linear Differential Equations.
- 3. Modeling of Mechanical Systems.
- 4. Block Diagrams, Transfer Functions.
- 5. Electrical Systems, Electromechanical Systems.
- 6. Transient Response Analysis.
- 7. Impulse Response.
- 8. Analysis in Frequency Domain, Frequency Response, Vibration Isolation.
- 9. Feedback Control Systems and Automatic Controllers.
- 10. System Response Analysis and Specification.