

ME 635 Modeling and Simulation

Course Objectives

The student will be able to:

- describe the behavior of a physical system using a mathematical, logical or an iconic model.
- simulate the behavior of the physical system using appropriate model and input conditions
- differentiate between static, dynamic and stochastic models; Apply appropriate approximations for physical problems
- construct models and simulate systems to determine failure conditions, , transient and steady state heat transfer, rigid body motion, flow and conjugate heat transfer, and stochastic manufacturing process simulations.

Syllabus/Topics

- I. Modeling and Simulation, Introduction and definitions
- II. Modeling static failure, the constraint-based assessment of simulation results
- III. Simulation of mode of failure: buckling, natural frequencies
- IV. System models: rigid body motion simulations
- V. Steady state and transient thermal simulations
- VI. Transient flows and coupled flow-thermal models
- VII. Stochastic system simulations – Definitions
- VIII. Basic process modeling and simulation
- IX. Process modeling with materials handling
- X. Advanced manufacturing process simulations.

Textbooks/Reference Materials: Course will use web-ct for course materials, etc.

1. Simulation with ARENA, Kelton, Sadowski, Sturock, 4th Ed., Mc Graw Hill, 2007, ISBN: 0-07-352341-0
2. Class Notes and Handouts will be provided online.
3. Software media and tutorials will be provided on the course DVD.