University of Wisconsin - Madison
College of Engineering [EGR]
Last Offered: 2014 Spring [1144]
Direct Link to this Syllabus :

http://aefis.engr.wisc.edu/index.cfm/page/CourseAdmin.ViewABET?coursecatalogid=261&pdf=True

1. **ISyE 320, Simulation and Probabilistic Modeling**
2. **Credits :** 3.00   **Contact Hours :** 2.5
3. **Textbook and Materials :** Discrete event system simulation, 5th edition; Banks, Carson, Nelson, Nicol; 1st edition; No Year Given
    a. **Other Supplemental Materials :** None
4. **Specific Course Information :**
    a. **Brief description of the content of the course (Course Catalog Description) :** Analysis of stochastic systems using both analytic methods and computer simulation. Empirical and theoretical models of arrival and service processes. State spaces and state transition probabilities. Simulation of queuing and manufacturing systems. Continuous time Markov analysis of manufacturing systems.
    b. **Pre-requisites or Co-requisites :** Stat 311 or equiv, Stat 312 or con reg, Math 320 or Math 340
    c. **This is a Required course.**
5. **Specific Goals for the Course :**
    a. **Course Outcomes :**
        1. Understand the stochastic nature of real systems. Learn modeling techniques and tools for stochastic systems. Be able to use simulation software tools to model a system and to estimate performance measures of the system. Be able to present the results of the modeling process to users in a non-technical presentation.
    b. **ABET Student Learning Outcomes :**
        (a) Ability to apply mathematics, science and engineering principles.
        (b) Ability to design and conduct experiments, analyze and interpret data.
        (d) Ability to function on multidisciplinary teams.
        (e) Ability to identify, formulate and solve engineering problems.
        (g) Ability to communicate effectively.
        (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
6. **Brief List of Topics to be Covered :**

    Probability, Random Number Generation, Input Analysis, Poisson Process, Introduction to Queues, Discrete Time Markov Chain, Continuous Time Markov Chain, Queueing Theory, Verification and Validation, Little's Law, Output Analysis, Comparing Systems, Variance Reduction