MAT 6561
Stochastic Models
3 credit hours

Prerequisites: MAT353 or MAT 453

Catalog Description: This course covers mathematical models that include probability distributions. Various models are discussed including discrete- and continuous-time Markov Chains, queueing models, and reliability models.

Text*:* Introduction to Probability Models, 11th edition, by Sheldon M. Ross.

Rationale: Stochastic models are widely used. This course is an introduction to the underlying concepts and mathematical structure of various types of stochastic models. Rigorous mathematical proofs of some of the results are presented.

Stochastic models have application to problems in all scientific and social arenas. This course is designed to introduce not only the mathematical vocabulary of the subject but to also instruct the student in proper methods of applying these models to standard problems. The goal is for the student to recognize which models are appropriate for various applications and for the student to be able to answer questions of interest with the chosen model.

Learning Objectives: Upon successful completion of this course, students will be able to:

- Perform least squares regression analysis
- Perform various variable selection techniques
- Select the proper regression model and perform validation methods
- Apply Analysis of Variance (ANOVA) models to non-quantitative data
- Perform diagnostic analysis on regression models

Outline of Topics:

- Conditional Probability
- Markov Chains
- The Exponential Distribution and the Poisson Process
- Continuous Time Markov Chains
- Queueing Theory
    - Exponential Models
    - M/G/1 Systems
    - G/M/1 Systems
    - Multi-server queues
- Reliability Theory

Meetings: The format of class meetings will consist of lectures by the instructor. Student participation will be encouraged via classroom discussions.

This class meets as scheduled. You are expected to be in class on time. University policy states that a student cannot miss more than 25% of class meetings and receive credit for the course. Further, attendance will be necessary in order to understand the material and make a good grade. The student is responsible for work and material missed when absent. Cheating in any way will be properly rewarded per University policy. See the undergraduate Bulletin: Academic Honesty (Policy 2.19).

Assessment: There will be approximately two regularly scheduled exams worth 20% of your grade, two problem sets each worth 10% of your grade, and the final exam worth 40%.

Grading Scale: A 90% - 100%, B+ 87% - 89%, B 80% - 86%, C+ 77% - 79%, C 70% - 79%, D 60% - 69%, F 0% - 59%.
Class participation and attendance will be used as deciding factors for the course grade in borderline cases.

MISSISSIPPI COLLEGE ACADEMIC POLICIES:
Students should consult the Mississippi College policy manual located at http://www.mc.edu/resources/publications/policies/ for official information regarding:

- Class attendance - Policy 2.10
- Grading - Policy 2.15
- Cheating - Policy 2.19
- Counseling and Career Services - Policy 2.25
- Research - Policy 2.27
- Counseling and Testing Center - Policy 2.34

Students who may require accommodation due to a documented handicap should follow the procedures located at http://www.mc.edu/about/offices/counseling/disabilities/

Tutoring Hours:
Hours and location for the departmental tutoring center are posted at http://www.mc.edu/academics/academic-tutoring/ .