

Applications and Modeling (3)

(Effective Fall 2015)

Prerequisite: Math 310 and Math 320.

Catalog Description: Practical applications of mathematics including optimization, interpolation and best fit, simulation and dimensional analysis. Mathematical model building including problem identification, model construction or selections, fine tuning and validation.

Learning Outcomes for Major: This course addresses one or more of the student learning outcomes for the major. Upon completion of his/her degree from the University of Tennessee at Martin with a major in mathematics, the graduate will be able to:

- i. apply mathematical concepts and principles to perform numerical and symbolic computations.
- ii. use technology appropriately to investigate and solve mathematical and statistical problems.
- iii. write clear and precise proofs.
- iv. communicate effectively in both written and oral form.
- v. demonstrate the ability to read and learn mathematics and/or statistics independently.

Teaching Objectives: The student will:

1. Create and select appropriate models including problem identification, data collection, and model validation.
2. Implement and maintain models using experimentation, simulation, data fitting, exposing assumptions and estimating stability.
3. Develop and use models involving linear algebra, differential equations and calculus.

Text(s): Textbook provided by instructor.

Outline:

Chapter	Title (Sections)
1	Mathematical Modeling (Introduction)
2	Dimensional Analysis
3	Graph Theory introduction and models
4	Models using differential equations (if time permits)
5	Stochastic models (if time permits)
6	Introduction to partial differential equation models (if time permits)

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