MATH 430: Advanced Mathematical Modeling

A. Course Description

Credits: 2

Prerequisites:
ICS 140 Computational Thinking with Programming AND
MATH 230 Introduction to Mathematical Modeling AND
MATH 315 Linear Algebra and Applications AND
MATH 320 Probability AND
MATH 350 Ordinary Differential Equations AND
STAT 201 Statistics I

OR

ICS 141 Programming with Objects AND
MATH 330 Optimization AND
MATH 355 Introduction to Stochastic Processes AND
MATH 420 Numerical Analysis AND
STAT 311 Regression Analysis

Lab Hours/ Weeks:
Corequisites: None

Lecture Hours/ Week:

MnTC Goals: None

This course provides students with significant problem-solving experience through investigating complex, open-ended problems arising in real-world settings. Working in teams, students apply mathematical modeling processes to translate problems presented to them into problems that can be investigated using the mathematical, statistical, and computational knowledge and thinking they have gained from previous coursework. Significant emphasis is placed on justifying approaches used to investigate problems, coordinating the work of team members, and communicating analyses and findings to technical and non-technical audiences.

B. Course Effective Dates: 12/17/2018 - Present

C. Outline of Major Content Areas:

See Course Description for major content areas.

D. Learning Outcomes (General)

1. Formulate problem statements for investigation.
2. Identify assumptions.
3. Define variables and parameters.
5. Apply mathematical, statistical, and/or computational knowledge to investigate and solve problems.
6. Validate model outputs.
7. Refine and enhance teamwork and communication skills to produce professional presentations and written reports.

E. Learning Outcomes (MN Transfer Curriculum)

This contains no goal areas.

G. Special Information
Note: The first set of prerequisite courses are for students pursuing either the Mathematics, B.A. or the Applied Mathematics, B.S. program. The second set of prerequisite courses are for students pursuing the Industrial & Applied Mathematics, B.S. program. Note: Students whose prerequisites are not identified by the system would contact the Math and Statistics department for an override at MATH@metrostate.edu. First day attendance required except by instructor permission.