OPERATIONS RESEARCH AND SYSTEM ANALYTICS, MS

Program Director

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Program Description

There is a need from both industry and government for employees with a combination of skills in optimization, data analysis, programming, systems thinking, and managing uncertainty. The MS program in Operations Research and System Analytics brings together topics in mathematics, analytics, computation, and engineering to prepare graduates to take on roles that require advanced degrees, such as data engineer, operations research analyst, systems analyst, management engineer, applied scientist, industrial engineer, and analytics engineer. Students apply their skills and knowledge, gained throughout the program, to solve real-world and industry-inspired problems.

Admissions

Applicants will have completed a B.S. degree in a STEM (Science, Technology, Engineering, Mathematics) area with a 3.0 or better grade point average (GPA) and have completed prior coursework in:

- Introduction to programming
- Multivariate calculus
- Linear algebra
- Elementary probability and statistics

The course work requirements can be waived for applicants who demonstrate equivalent knowledge obtained through work or other experience.

Student Learning Outcomes

Students graduating from this program will be able to:

1. Apply operations research models and methods to identify, formulate, and solve problems in engineering systems
2. Use principles of mathematical programming to make informed holistic decisions while being cognizant of their societal, economic, and environmental impact
3. Demonstrate proficiency in scientific tools to efficiently operate systems with significant uncertainty and predict their performance
4. Perform descriptive, predictive, and prescriptive analytics using data-driven approaches and communicate the outcomes effectively
5. Integrate concepts from mathematics, programming, and engineering to design and optimize systems, analyze tradeoffs, and interpret results for engineering practice

Degree Requirements

Students are required to complete 30 credit hours of courses, consisting of 18 credits of core including a capstone course, and 12 credits of electives as described below:

Core Courses

Students must complete all of the following core courses:

Code	Title	Credits
CIS 662	Introduction to Machine Learning & its Algorithms	3
ECS 629	Modeling and Optimization Techniques	3
ECS 697	Capstone Project in Operations Research and System Analytics	3
ELE 603	Functional Methods of Engineering Analysis	3
ELE 606	Probabilistic Methods in Electrical Engineering	3
MAE 630	Advanced Practical Optimization	3

Elective Courses

Students must complete 12 credits of electives in areas such as artificial intelligence, machine learning, engineering management, and industrial engineering. The program coordinator maintains the list of approved electives.

Capstone Course

All candidates are required to successfully complete the capstone course ECS 697 Capstone Project in Operations Research and System Analytics.