

## Elective Course Options for MSE in Systems Engineering

Current as of November 2022

(list updated regularly)

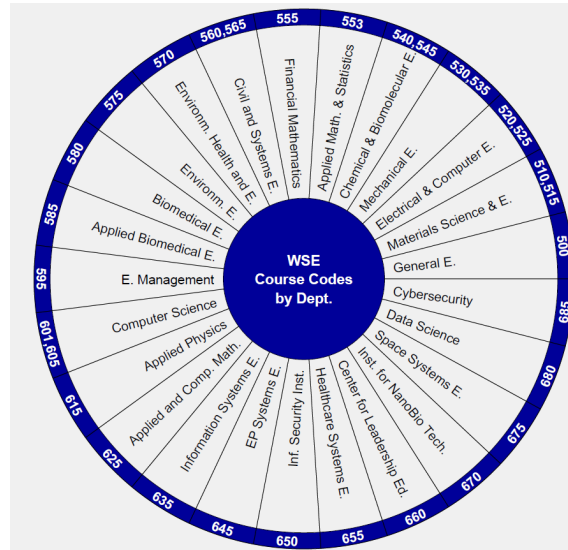


Figure 1: Department Codes

### Courses from the Department of Civil and Systems Engineering

- 560.653 An Introduction to Network Modeling
- 560.601 Applied Math for Engineers
- 560.688 Computing for Applied Mathematics
- 560.641 Equilibrium Problems in Systems Engineering
- 560.649 Energy Systems
- 560.608 Multilevel and Multi-objective Optimization
- 560.741 Modern Machine Learning: Applicability, Interpretability, and Uncertainty Quantification
- 560.658 Natural Disaster Risk Modeling
- 560.650 Operations Research
- 560.740 Optimization and Learning
- 560.643 Optimization Modeling Foundations
- 560.618 Probabilistic Methods in Civil Engineering and Mechanics
- 560.643 Energy Markets and Risk Management
- 560.646 Smart Cities
- 560.656 Space Systems Cybersecurity
- 560.657 System Dynamics
- 560.645 Topics in Optimization: Integer and Robust Optimization
- 560.775 Bilevel Optimization in Energy Systems

### Courses from other Departments



### **Department of Applied Mathematics and Statistics (AMS)**

553.694 Applied and Computational Linear Algebra  
553.613 Applied Statistics and Data Analysis  
553.671 Combinatorial Analysis  
553.766 Combinatorial Optimization  
553.753 Commodities and Commodity Markets  
553.667 Deep Learning in Discrete Optimization  
553.665 Introduction to Convexity  
553.636 Intro to Data Science  
553.673 Intro to Nonlinear Dynamics and Chaos  
553.653 Mathematical Game Theory  
553.600 Mathematical Modeling and Consulting  
553.764 Modeling, Simulation, and Monte Carlo  
553.633 Monte Carlo Methods  
553.646 Risk Measurement/Management in Financial Markets  
553.639 Time Series Analysis  
553.663 Network Models in Operations Research  
553.761 Nonlinear Optimization I  
553.762 Nonlinear Optimization II  
553.661 Optimization in Finance  
553.763 Stochastic Search and Optimization

### **Department of Environmental Health and Engineering (EHE)**

570.616 Data Analytics in Environmental Health and Engineering  
575.611 Economic Foundations, Public Decision Making  
570.607 Energy Policy Planning Models  
570.695 Environmental Health and Engineering Systems Design  
570.654 Geostatistics: Understanding Spatial Data  
570.697 Risk and Decision Analysis  
570.608 Uncertainty Modeling for Policy & Management Decision Making

### **Department of Biomedical Engineering (BE)**

580.618 Probabilistic Methods  
580.750 Surgineering: Systems Engineering and Data Science in Interventional Medicine

### **Department of Computer Science (CS)**

601.664 Artificial Intelligence  
601.636 Algorithmic Game Theory  
601.477 Causal Inference  
601.661 Computer Vision  
601.633 Intro Algorithms  
601.690 Intro to Human-Computer Interaction  
601.662 Intro to Spatial Computing  
601.675 Machine Learning  
601.676 Machine Learning: Data to Models  
601.682 Machine Learning: Deep learning

601.771 Self-Supervised Statistical Models: Opportunities, Challenges and Risks

**Center for Leadership Education (CLE)**

663.617 Storytelling with Data  
663.667 Decision Analytics Fundamentals  
663.670 Project Management

**Other Departments (and Schools)**

PH.221.604 Case Studies in Management Decision-Making  
BU.420.710 Consumer Behavior  
PH.646-649 Essentials of Probability and Statistical Inference I-IV  
AS.180.611 Economics of Uncertainty  
550.661 Foundations of Optimization  
520.447 Intro to Information Theory and Coding  
650.601 Intro to Information Security  
650.658 Intro to Cryptography  
491.691 Learning Theory I  
520.640 Machine Intelligence on Embedded Systems  
645.756 Metrics, Modeling, and Simulation for Systems Engineering  
535.737 Multiscale Modeling and Simulation of Mechanical Systems  
520.698 Networks Meet Machine Learning  
520.629 Networked Dynamical Systems  
550.690 Neural Networks and Feedback Control Systems  
520.622 Principles of Complex Networked Systems  
530.641 Statistical Learning for Engineers  
PH.140.644 Statistical Machine Learning: Methods, Theory, and Applications  
525.640 Satellite Communications Systems  
550.636 System Identification and Likelihood Methods  
645.771 - System of Systems Engineering

**Electives Organized by Tracks**

Current as of November 2022

(list updated regularly)

**Theme: Cybersecurity and Space Systems**

560.656 Space Systems Cybersecurity  
650.601 Intro to Information Security  
601.477 Causal Inference  
650.658 Intro to Cryptography  
525.640 Satellite Communications Systems  
520.447 Introduction to Information Theory and Coding



491.691 Learning Theory I  
601.690 Intro to Human-Computer Interaction  
601.661 Computer Vision

### **Theme: Decision-Making Frameworks**

PH.221.604 Case Studies in Management Decision-Making  
663.667 Decision Analytics Fundamentals  
575.611 Economic Foundations, Public Decision Making  
575.608 Optimization Methods for Public Decision Making  
580.618 Probabilistic Methods  
570.697 Risk and Decision Analysis  
570.608 Uncertainty Modeling for Policy & Management Decision Making

### **Track: Energy Infrastructure Systems**

560.643 Energy Markets and Risk Management  
560.775 Bilevel Optimization in Energy Systems  
570.607 Energy Policy and Planning Models  
553.753 Commodity Markets and Green Energy Finance  
575.608 Optimization Methods for Public Decision Making

### **Theme: Healthcare Systems**

601.664 Artificial Intelligence  
PH.221.604 Case Studies in Management Decision-Making  
570.695 Environmental Health and Engineering Systems Design  
655.767 Healthcare System Conceptual Design  
655.662 Intro to Healthcare Systems Engineering  
605.201 Intro Programming Using Java  
553.653 Mathematical Game Theory  
520.629 Networked Dynamical Systems  
553.762 Nonlinear Optimization II  
PH.140.621 Statistical Methods in Public Health I  
PH.140.621 Statistical Methods in Public Health II  
553.763 Stochastic Search and Optimization  
550.636 System Identification and Likelihood Methods

### **Theme: Natural Disaster Risk Management & Policy**

553.753 Commodities and Commodity Markets  
663.667 Decision Analytics Fundamentals  
575.611 Economic Foundations, Public Decision Making  
560.643 Energy Markets and Risk Management  
AS.180.611 Economics of Uncertainty  
570.607 Energy Policy Planning Models  
570.654 Geostatistics: Understanding Spatial Data  
553.600 Mathematical Modeling and Consulting

553.764 Modeling, Simulation, and Monte Carlo  
553.633 Monte Carlo Methods  
560.658 Natural Disaster Risk Modeling  
553.661 Optimization in Finance  
663.670 Project Management  
570.697 Risk and Decision Analysis  
560.646 Smart Cities  
560.657 System Dynamics  
553.639 Time Series Analysis  
570.608 Uncertainty Modeling for Policy & Management Decision Making

### **Theme: Networks and Public Health**

560.653 An Introduction to Network Modeling  
570.616 Data Analytics in Environmental Health and Engineering  
570.695 Environmental Health and Engineering Systems Design  
520.698 Networks Meet Machine Learning  
520.629 Networked Dynamical Systems  
550.690 Neural Networks and Feedback Control Systems  
520.622 Principles of Complex Networked Systems  
553.761 Nonlinear Optimization I  
553.762 Nonlinear Optimization II  
553.763 Stochastic Search and Optimization

### **Advisor**

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