Doctor of Philosophy with a Major in Industrial Engineering

Doctor of Philosophy with a Major in Industrial Engineering - Applied Statistics Track

The emphasis in this track is on the use of statistics as a science that is employed in a technological environment. Within this context, a student takes fundamental coursework in mathematics, probability and statistics suitable to conduct advanced work and research in a variety of application domains. Among these are quality systems, manufacturing, production, and simulation.

Doctor of Philosophy with a Major in Industrial Engineering - Supply Chain Engineering Track

This program focuses on the design and analysis of manufacturing, distribution, and transportation systems. Students take fundamental coursework in optimization, stochastics, and statistics in order to build a firm base from which to deal with the myriad of issues that arise in settings involving modern supply chain systems modeling and analysis: production and inventory systems, vehicle routing and scheduling, warehousing, and logistics.

Doctor of Philosophy with a Major in Industrial Engineering - Economic Decision Analysis Track

Engineering economic decision analysis is a broad-based area of study that concentrates on both theoretical approaches and the applied methodologies in various decision-making domains within an economic environment. Typical settings that attract students to this program include multicriteria decision-making, capital budgeting, auctions, portfolio analysis and selection, economic forecasting, utility theory, and quantitative finance.

Doctor of Philosophy with a Major in Industrial Engineering - System Informatics & Control Track

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISYE 6810</td>
<td>Systems Monitoring and Prognostics</td>
<td>3</td>
</tr>
<tr>
<td>ISYE 7201</td>
<td>Production and Service Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ISYE 7204</td>
<td>Informatics in Production &amp; Service Systems</td>
<td>3</td>
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Methods Core

Select three of the following:

- ISYE 6661 Optimization I: Linear Programming
- ISYE 6761 Stochastic Processes I
- ISYE 7406 Data Mining and Statistical Learning
- ECE 6550 Linear Systems and Controls

Methods Breadth

Select at least three courses from at least two of the areas:

- Stochastics and Simulation
- ISYE 6644 Simulation
- ISYE 6831 Advanced Simulation
- ISYE 6656 Queuing Theory
- ISYE 6762 Stochastic Processes II

Statistics

- ISYE 6402 Time Series Analysis
- ISYE 6405 Statistical Methods for Manufacturing Design and Improvement
- ISYE 6412 Theoretical Statistics
- ISYE 6413 Design and Analysis of Experiments
- ISYE 6420 Introduction to Theory and Practice of Bayesian Statistics
- ISYE 7401 Advanced Statistical Modeling
- ISYE 7405 Multivariate Data Analysis
- ECE 6555 Optimal Estimation

Computing and Algorithms

- ISYE 6679 Computational Methods in Optimization
- CS 6505 Computability, Algorithms, and Complexity
- ISYE 6416 Computational Statistics

Dynamics and Control

- ECE 6559 Advanced Linear Systems
- ECE 6552 Nonlinear Systems and Control
- ECE 6553 Optimal Control and Optimization
- ECE 6554 Adaptive Control
- ECE 6551 Digital Control
- ECE 6556 Intelligent Control
- ECE 6120 Automata Theory
- ME 6401 Linear Control Systems
- ME 6402 Nonlinear Control Systems
- ME 6443 Variational Methods in Engineering
- ME 6403 Digital Control Systems
- ME 6404 Advanced Control System Design and Implementation

Optimization

- ISYE 6664 Stochastic Optimization
- ISYE 6662 Optimization II: Network Flows and Discrete Optimization
- ISYE 6663 Optimization III: Nonlinear Programming

Elective

- Approved Methodology Course

Seminar

- ISYE 8014 Contemporary Topics in System Informatics and Control

Applications

Select at least one of the following:

- ISYE 6201 Manufacturing Systems
- ISYE 6202 Warehousing Systems
- ISYE 6203 Transportation and Supply Chain Systems
- ECE 6557 Manufacturing Systems Design
- ME 6222 Manufacturing Processes and Systems
- ME 6223 Automated Manufacturing Process Planning
- ME 6225 Metrology and Measurement Systems
ME 6754  Engineering Data Base Management Systems

Total Credit Hours  31

It is recommended that students complete the domain and methods core courses before they sit for the comprehensive examination.

A student is not admitted to candidacy until all of the stated course requirements in the Program of Study have been completed.