The Advanced Analytics in Industrial & Enterprise Systems Engineering Concentration prepares students to relate the application of engineering approaches and methods to the analysis and management of engineering and business processes which are data-oriented. Students will be able to provide companies and organizations with the ability to convert the massive amounts of data received into useful information that can help shape the decisions companies and organizations make.

Students must be enrolled in the Industrial Engineering MS (http://catalog.illinois.edu/graduate/engineering/industrial-engineering-ms/) (thesis or non-thesis) or Financial Engineering MS (http://catalog.illinois.edu/graduate/bus_engineering/financial-engineering-ms/) degree programs. After the first enrolled semester the student notifies the ISE Graduate Programs Office of their intention to enroll in the concentration and file a petition to add the Advanced Analytics Concentration with the Graduate College.

The Advanced Analytics in Industrial & Enterprise Engineering Concentration is available and all 12 hours count towards completion of:

Industrial Engineering MS (http://catalog.illinois.edu/graduate/engineering/industrial-engineering-ms/)
Financial Engineering, MS (http://catalog.illinois.edu/graduate/bus_engineering/financial-engineering-ms/)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 434</td>
<td>Deep Learning: Mathematics and Applications (Deep Learning: Mathematics and Applications)</td>
<td>8</td>
</tr>
<tr>
<td>IE 522</td>
<td>Statistical Methods in Finance</td>
<td></td>
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<tr>
<td>IE 525</td>
<td>Stochastic Calculus &amp; Numerical Models in Finance</td>
<td></td>
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<tr>
<td>IE 529</td>
<td>Stats of Big Data &amp; Clustering</td>
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<tr>
<td>IE 531</td>
<td>Algorithms for Data Analytics</td>
<td></td>
</tr>
<tr>
<td>IE 532</td>
<td>Analysis of Network Data</td>
<td></td>
</tr>
<tr>
<td>IE 533</td>
<td>Big Graphs and Social Networks</td>
<td></td>
</tr>
<tr>
<td>IE 534</td>
<td>Deep Learning</td>
<td></td>
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</tbody>
</table>

Take an additional core course from above, or select one from list below

Advanced Analytics Secondary:

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<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>IE 400</td>
<td>Design &amp; Anlys of Experiments</td>
</tr>
</tbody>
</table>

IE 410 Advanced Topics in Stochastic Processes & Applications
IE 411 Optimization of Large Systems
IE 510 Applied Nonlinear Programming
IE 511 Integer Programming
IE 514 Optimization Methods for Large-Scale, Network-Based Systems
IE 521 Convex Optimization
IE 523 Financial Computing
SE 524 Data-Based Systems Modeling

Total Hours: 12

Other Requirements

Requirement | Description
--- | ---
Students to earn a B or better in each concentration course.

Graduate Programs in Industrial & Enterprise Systems Engineering

Industrial Engineering, M (http://catalog.illinois.edu/graduate/engineering/industrial-engineering-ms/)

optional concentrations:
Advanced Analytics in Industrial & Enterprise Systems Engineering (p. 1)
Computational Science & Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/)

Industrial Engineering, PhD (http://catalog.illinois.edu/graduate/engineering/industrial-engineering-phd/)

optional concentrations:
Computational Science & Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/)

Systems & Entrepreneurial Engineering, MS (http://catalog.illinois.edu/graduate/engineering/systems-entrepreneurial-engineering-ms/)

optional concentrations:
Computational Science & Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/)

Systems & Entrepreneurial Engineering, PhD (http://catalog.illinois.edu/graduate/engineering/systems-entrepreneurial-engineering-phd/)

Financial Engineering, MS (http://catalog.illinois.edu/graduate/bus_engineering/financial-engineering-ms/) (sponsored jointly with Department of Finance)

optional concentrations:
Advanced Analytics in Industrial & Enterprise Systems Engineering (p. 1)
Automated Trading Practices (http://catalog.illinois.edu/graduate/engineering/financial-engineering-ms/automated-trading-practices/)

Information listed in this catalog is current as of 06/2023
Advanced Analytics in Industrial & Enterprise Systems Engineering Concentration

Data Analytics in Finance (http://catalog.illinois.edu/graduate/bus/concentration/finance/data-analytics-finance/)

Health Technology, MS (http://catalog.illinois.edu/graduate/ahs/health-technology-ms/) (sponsored jointly with the College of Applied Health Sciences)

The Department of Industrial and Enterprise Systems Engineering (ISE) offers graduate programs leading to degrees of Master of Science and Doctor of Philosophy in Industrial Engineering (IE) and Systems and Entrepreneurial Engineering (SEE), as well as (jointly with the Department of Finance) Master of Science in Financial Engineering. The ISE programs offers an approach to industrial engineering and systems engineering, engineering design, and entrepreneurial engineering that crosses disciplinary lines. The IE program is based in advanced studies that focus on operations research, optimization, supply chain management, financial engineering, quality and reliability engineering and production management, with the aim to advance modeling, simulation, analysis and decision making for complex engineering and economic systems. The SEE program is founded on the premise of dual competency in both traditional engineering and systems integration. The SEE program offers flexibility by permitting the student to select from a menu of advanced courses and take a wide range of electives to meet individual career goals. Graduates of these programs are prepared to enter academic and professional engineering positions in universities, industry, government, and private practice.

for the concentration of Advanced Analytics in Industrial & Enterprise Systems Engineering (on campus & online)

department head: Jeff Shamma (jshamma@illinois.edu)
department head: Jeff Shamma (jshamma@illinois.edu)
associate head of graduate studies: Ramavarapu S Sreenivas (rsree@illinois.edu)

overview of admissions & requirements: https://ise.illinois.edu/graduate/admissions/
overview of grad college admissions & requirements: https://grad.illinois.edu/admissions/apply (https://grad.illinois.edu/admissions/apply/)

department website: https://ise.illinois.edu/
program website: https://ise.illinois.edu/graduate/degrees-and-programs/advanced-analytics-concentration.html
department faculty: https://ise.illinois.edu/directory/faculty.html

contact:
address: 117 Transportation Building, 104 S Mathews Ave, Urbana, IL 61801
phone: (217) 333-2730
e-mail: ise-grad@illinois.edu

Information listed in this catalog is current as of 06/2023