ADVANCED ANALYTICS IN INDUSTRIAL & ENTERPRISE SYSTEMS ENGINEERING CONCENTRATION

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

department head: Deborah L Thurston (thurston@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
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
college website: https://grainger.illinois.edu/
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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.

Graduate Programs in Industrial & Enterprise Systems Engineering

degrees:

Industrial Engineering, MS (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)
  Advanced Analytics in Industrial & Enterprise Systems Engineering (p. 1) | Data Analytics in Finance (http://catalog.illinois.edu/graduate/bus/concentration/finance/data-analytics-finance)
  Computational Science & Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering)

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) | Data Analytics in Finance (http://catalog.illinois.edu/graduate/bus/concentration/finance/data-analytics-finance)
  Computational Science & Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering)
  Advanced Analytics in Industrial & Enterprise Systems Engineering (p. 1) | Data Analytics in Finance (http://catalog.illinois.edu/graduate/bus/concentration/finance/data-analytics-finance)

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 offer 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.

Opportunity also exists for specializing in energy and sustainability engineering via the

Energy and Sustainability Engineering (EaSE) Graduate Certificate Option (http://ease.illinois.edu)

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

Information listed in this catalog is current as of 07/2020
The Advanced Analytics in Industrial & Enterprise Engineering Concentration is available for:

**Industrial Engineering MS** ([http://catalog.illinois.edu/graduate/engineering/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](http://catalog.illinois.edu/graduate/bus_engineering/financial-engineering-ms))

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td><strong>Advanced Analytics Core:</strong></td>
<td></td>
<td>8</td>
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<tr>
<td>IE 528</td>
<td>Computing for Data Analytics</td>
<td></td>
</tr>
<tr>
<td>IE 529</td>
<td>Stats of Big Data &amp; Clustering</td>
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<tr>
<td>IE 530</td>
<td>Optimization for Data Analytics</td>
<td></td>
</tr>
<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><strong>Advanced Analytics Secondary:</strong></td>
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</tr>
<tr>
<td>IE 400</td>
<td>Design &amp; Analysis of Experiments</td>
<td></td>
</tr>
<tr>
<td>IE 410</td>
<td>Advanced Topics in Stochastic Processes &amp; Applications</td>
<td></td>
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<tr>
<td>IE 411</td>
<td>Optimization of Large Systems</td>
<td></td>
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<tr>
<td>IE 510</td>
<td>Applied Nonlinear Programming</td>
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<tr>
<td>IE 511</td>
<td>Integer Programming</td>
<td></td>
</tr>
<tr>
<td>IE 521</td>
<td>Convex Optimization</td>
<td></td>
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<tr>
<td><strong>Total Hours</strong></td>
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<td>12</td>
</tr>
</tbody>
</table>

1. Complete 4 hours from the Advanced Analytics Secondary Course List or choose an additional 4 hours from the Advanced Analytics Core Course List.
2. Students to earn a B or better in each concentration course.
3. These 12 hours may be used toward the major degree requirements.