Industrial Engineering

IE 598  **Special Topics**  credit: 1 TO 4 hours.
Subject offerings of new and developing areas of knowledge in industrial engineering intended to augment the existing curriculum. See Class Schedule or departmental course information for topics and prerequisites. Approved for letter and S/U grading. May be repeated in the same or separate terms if topics vary.

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<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>67121</td>
<td>Lecture</td>
<td>JS2</td>
<td>09:30 AM - 10:50 AM</td>
<td>TR</td>
<td>106B3 - Engineering Hall</td>
<td>Sirignano, J</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Deep Learning II
Instructor Approval Required
Prerequisites: IE 598 Deep Learning or equivalent. Students should contact the instructor, Justin Sirignano (jasirign@illinois.edu), if interested in enrolling in this course. This is a project course. Students will work in small teams on deep learning applications in (1) reinforcement learning, (2) image recognition, or (3) high-frequency models of financial markets. The course will provide an introduction to distributed training of neural networks and Distributed TensorFlow. GPU hours will be provided to the class.

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<tr>
<td>67120</td>
<td>Lecture</td>
<td>KC</td>
<td>11:00 AM - 12:20 PM</td>
<td>TR</td>
<td>105 - Talbot Laboratory</td>
<td>Chandrasekaran, K</td>
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</tbody>
</table>

Credit Hours: 4 hours
Combinatorial Optimization
Prerequisites: Working knowledge in Linear Programming, Graph Theory, Linear Algebra. This course will cover a series of topics in combinatorial optimization. The emphasis will be on polyhedral theory and structural results. Specific topics to be covered include: Matchings, b-matchings, T-joins, Branchings, Matroids, Matroid Intersections, Polymatroids, Submodular Functions, Directed Cuts, Multi-flows.

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<tr>
<td>67114</td>
<td>Lecture</td>
<td>NH</td>
<td>04:00 PM - 05:20 PM</td>
<td>MW</td>
<td>203 - Transportation Building</td>
<td>He, N</td>
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</tbody>
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Credit Hours: 4 hours
Big Data Optimization
Restricted to students in the Industrial&Enterprise Sys Eng department.
Students are expected to have strong working knowledge of linear algebra, real analysis, and probability theory. Some prior exposure to optimization and algorithms at a graduate level is preferred. The course will cover a variety of advanced topics in optimization theory, algorithms and applications in machine learning. The key aim of this course is to expose students to modern algorithmic developments in convex optimization (smooth, non-smooth, deterministic, stochastic, and online) and bring them near the frontier of current research in large-scale optimization and machine learning.

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<tbody>
<tr>
<td>64238</td>
<td>Lecture-Discussion</td>
<td>XCD</td>
<td>05:00 PM - 06:20 PM</td>
<td>TR</td>
<td>204 - Transportation Building</td>
<td>Chen, X</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Dynamic Optimization
Prerequisites: IE 411, IE 410 or equivalent courses on stochastic processes and deterministic optimization. The course covers the basic modeling and solution techniques for sequential decision making problems under uncertainty including dynamic programming and stochastic programming modeling, theory, algorithms and approximations. Applications are drawn from economics, finance, operations management and engineering.