Systems Engineering and Design

SE 598  **Special Topics**  credit: 1 TO 4 hours.
Subject offerings of new and developing areas of knowledge in general engineering intended to augment the existing curriculum. See Class Schedule or departmental course information for topics and prerequisites. 1 to 4 graduate hours. No professional credit. May be repeated in the same or separate terms if topics vary to a maximum of 12 hours.

<table>
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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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<tbody>
<tr>
<td>68323</td>
<td>Lecture-Discussion</td>
<td>PW</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
<td>203 - Transportation Building</td>
<td>Wang, P</td>
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Credit Hours: 4 hours  
Prognostics & Health Mgmt  
Restricted to Graduate - Urbana-Champaign.  
Prerequisites: Math 241 and IE 300. Prognostics and health management (PHM) techniques play an increasingly important role in the operation of complex engineered systems, by enabling a proactive approach to address system failures through detecting, diagnosing, and predicting the system-wide effects of adverse events, and providing valuable information for early awareness of system health condition changes and making proactive maintenance decisions to mitigate and recover system failures. This course introduces PHM techniques and advanced methods for degradation forecasting and remaining useful life (RUL) prediction of engineering systems, thus determining appropriate failure mitigation/recovery (M/R) plans such as optimal maintenance schedules. Physics-based, data-driven, and hybrid PHM techniques will be introduced, and practical engineering applications (e.g. PHM for wind turbines, jet engines, power transformers, turbine blades, etc.) will be studied as term projects of the course.

| 68187 | Lecture | YL | 02:00 PM - 03:20 PM | TR   | 204 - Transportation Building | Li, Y |

Credit Hours: 4 hours  
Multiscale Simulation  
Restricted to Graduate - Urbana-Champaign.  
In this course, students will learn important concepts and techniques in multiscale simulation and modeling for the successful design of complex mechanical systems. The topics under consideration in this course include: underlining and finite element method; the connections of cross-scale information; uncertainty quantification and propagation in multiscale simulation framework; engineering applications in lightweight structure materials and energy storage materials. This course will have 11 weeks of lectures followed by 4 weeks of hands-on projects.