### DEPARTMENT OF SYSTEMS ENGINEERING

#### Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits:</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSE 501</td>
<td>Foundations of Systems Engineering</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 512</td>
<td>Systems Sensing and Imaging Analysis</td>
<td>3 (3-0-0)</td>
<td>ECE 303 or STAT 303 or STAT 315</td>
</tr>
<tr>
<td>SYSE 530</td>
<td>Overview of Systems Engineering Processes</td>
<td>3 (3-0-0)</td>
<td>ECE 501, may be taken concurrently or ENGR 501, may be taken concurrently or SYSE 501, may be taken concurrently</td>
</tr>
<tr>
<td>SYSE 532</td>
<td>Dynamics of Complex Engineering Systems</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 541</td>
<td>Engineering Data Design and Visualization</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 549</td>
<td>Secure Vehicle and Industrial Networking</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 550</td>
<td>Systems Thinking for the Real World</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 567</td>
<td>Systems Engineering Architecture</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 505</td>
<td>Systems Thinking for the Real World</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 501</td>
<td>Foundations of Systems Engineering</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 512</td>
<td>Systems Sensing and Imaging Analysis</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 530</td>
<td>Overview of Systems Engineering Processes</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 532</td>
<td>Dynamics of Complex Engineering Systems</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 541</td>
<td>Engineering Data Design and Visualization</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 549</td>
<td>Secure Vehicle and Industrial Networking</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 550</td>
<td>Systems Thinking for the Real World</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
<tr>
<td>SYSE 567</td>
<td>Systems Engineering Architecture</td>
<td>3 (3-0-0)</td>
<td></td>
</tr>
</tbody>
</table>

#### Course Description:
- **SYSE 501:** Functional components of systems engineering, application of systems engineering to practical problems, system life-cycle process.
- **SYSE 512:** Sensing, sampling, filtering, transducing, and transmission of information to transform physical data to the digital domain. Subsequent processing of image and digital data, restoration, analysis and classification to problems in inspection, authentication, color science, biometrics, and signal/image characterization.
- **SYSE 530:** Systems engineering life-cycle process and analysis techniques. Reliability and robustness.
- **SYSE 532:** Observation/classification of systems architecture. Systems architecture principles and critical evaluation through design studies.

#### Registration Information:
- **SYSE 501:** Sections may be offered: Online. Credit allowed for only one of the following: ECE 501, ENGR 501, or SYSE 501.
- **SYSE 512:** Sections may be offered: Face-to-Face, Mixed Face-to-Face, or Online. Credit not allowed for both SYSE 512 and ENGR 581A2.
- **SYSE 530:** Sections may be offered: Online. Credit allowed for only one of the following: ECE 530, ENGR 530, or SYSE 530.
- **SYSE 532:** Sections may be offered: Online. Credit allowed for only one of the following: ECE 532, ENGR 532, or SYSE 532.
- **SYSE 541:** Sections may be offered: Face-to-Face, Mixed Face-to-Face, or Online. Credit not allowed for both ENGR 580A5 and SYSE 541.
SYSE 569  Cybersecurity Awareness for Systems Engineers  Credits: 3 (3-0-0)
Course Description: Cybersecurity principles, practices, technologies, design approaches, and terminology needed to incorporate cybersecurity principles into effective systems designs.
Prerequisite: ENGR 501 or SYSE 501.
Registration Information: Bachelor's degree required. Sections may be offered: Online. Credit allowed for only one of the following: ENGR 569, ENGR 580A4, or SYSE 569.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

SYSE 571  Analytics in Systems Engineering  Credits: 3 (3-0-0)
Course Description: Focus on the appropriate application of data mining, knowledge generation, data analytics and data algorithmics to large complex systems. Demystify "big data" for systems engineers as applied to intelligent systems.
Prerequisite: None.
Restriction: Must be a Graduate.
Registration Information: Bachelor's degree required. Sections may be offered: Face-to-Face, Mixed Face-to-Face, or Online. Credit not allowed for both ENGR 571 and SYSE 571.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

SYSE 573  Cost Optimization for Systems Engineers  Credits: 3 (3-0-0)
Course Description: Techniques and strategies to respond to requirements, design, development and manufacturing decisions, while optimizing for cost at the organizational, program, and project level.
Prerequisite: ENGR 502 and ENGR 531.
Restriction: Must be a Graduate.
Registration Information: Sections may be offered: Face-to-Face, Online, or Mixed Face-to-Face. Credit not allowed for both ENGR 581A3 and SYSE 573.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

SYSE 567  Advanced Model-Based Systems Engineering  Credits: 3 (3-0-0)
Course Description: Theory and application of formal systems architecture modeling.
Prerequisite: ENGR 567 or SYSE 567.
Restriction: Must be a Graduate, Professional.
Registration Information: Sections may be offered: Online. Credit not allowed for both ENGR 567 or SYSE 567.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

SYSE 595  Independent Study  Credits: Var[1-18] (0-0-0)
Course Description: Independent study.
Prerequisite: None.
Restriction: Must be a Graduate, Professional.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

SYSE 699  Thesis  Credits: Var[1-18] (0-0-0)
Course Description: Thesis.
Prerequisite: None.
Restriction: Must be a Graduate, Professional.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.
SYSE 710  Leadership/Innovation in Systems Engineering  Credits: 3 (3-0-0)
Course Description: Background in technical leadership skill sets, systems engineering skillsets, and intellectual toolkit to develop a successful applied and translational research project/practicum.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Bachelor's degree required. Sections may be offered: Online. Course is not available for credit toward the PhD in Systems Engineering. Credit not allowed for both ENGR 710 and SYSE 710.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

SYSE 711  Ethics in Systems Engineering  Credit: 1 (0-0-1)
Course Description: Ethical principles and their application to systems engineering.
Prerequisite: ENGR 501 or SYSE 501.
Restriction: Must be a: Graduate, Professional.
Registration Information: Offered as an online course only. Credit not allowed for both ENGR 711 and SYSE 711.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

SYSE 786  Applied Systems Engineering Practicum  Credits: Var[1-9] (0-0-0)
Course Description: Research techniques, critical thinking, evaluation criteria, and methods of technical writing.
Prerequisite: ENGR 710 or SYSE 710.
Restriction: Must be a: Graduate, Professional.
Registration Information: Written consent of advisor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

SYSE 795  Independent Study  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

SYSE 799A  Dissertation: PhD  Credits: Var[1-18] (0-0-0)
Course Description: Dissertation for PhD in System Engineering Program.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Written consent of advisor. Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

SYSE 799B  Dissertation: Professional Doctorate  Credits: Var[1-9] (0-0-0)
Course Description:
Prerequisite: SYSE 786.
Restriction: Must be a: Graduate, Professional.
Registration Information: Written consent of advisor. Admission to Professional Doctorate of Engineering, Systems Engineering.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.