SE540 Systems Architecture
Credits: 3

Systems engineering best practices prescribe a set of methodologies for architecting and designing complex systems. This course will cover requirements analysis, functional analysis and allocation, and synthesis and their interaction with systems analysis and control functions including system trades, management of risk, configuration, interfaces and data, and development of performance measures. The lectures will be complemented by a class design project to architect a complex system leading to development of a functional and physical architecture and associated functional and allocated baselines.

Level of the Course:
Anticipated Percentage of Undergraduate Student Enrollment: 10%
Anticipated Percentage of Graduate Student Enrollment: 90%

Prerequisites: (If none, please explain reasons for absence)
SE510 Systems Engineering or equivalent

Course Outline:

Classes are 2.5 hours long and will be held once a week. The first half of each class will be theory and second half will be project engineering

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<td>The Art of Architecting / Project Introduction</td>
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<td>2</td>
<td>Heuristics and Systems Engineering / Project Scope</td>
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<td>3</td>
<td>Managing Uncertainties / Project Plans and Requirements</td>
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<td>Manufacturing / Requirement Analysis</td>
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<td>Social Systems / Interface Definitions</td>
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<td>6</td>
<td>Software and Info. Technology / Functional Analysis 1</td>
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<td>Collaborative Systems / Functional Analysis and Allocation 2</td>
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<td>9</td>
<td>Mid Term Exam / Risk ID and Assessment</td>
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<td>10</td>
<td>System Representation and Models / Performance Measures</td>
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<td>11</td>
<td>Design Progression / Trade Studies 1</td>
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<td>12</td>
<td>Integrated Modeling / Trade Studies 1 / Functional Architecture</td>
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<td>Architectural Frameworks / Project Synthesis</td>
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<td>Decision Making in the Real world / Project Synthesis</td>
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<td>The System Architect / Project Summation</td>
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Method of Evaluation or Assessment:
25% Homework
25% Class Project
20% MidTerm
30 % Final Exam
Course Outcomes

A student who successfully completes the course will have demonstrated:

1. An advanced capability to generate a work breakdown structure that defines scope
   (ABET codes: c, e, g, k, 3, 4, 5, 8)
2. A capability to work with stakeholders to identify, derive and allocate system requirements.
   (ABET codes: c, e, g, k, 3, 4, 5, 8)
3. An ability to generate comprehensive Interface Control Documents (ICDs)
   (ABET codes: b, c, e, g2, 3, 4, 5, 8)
4. The ability to apply functional analysis techniques to real world problems
   (ABET codes: b, c, e, k, 2, 3, 4, 8)
5. An understanding of how to design and perform complex system trades.
   (ABET codes: b, c, e, k, 2, 3, 4, 5)
6. The ability to construct both functional and physical architecture.
   (ABET codes: b, c, e, g, k, 2, 3, 4, 8)
10. An understanding of how to incorporate specialty engineering into system architectures
    (ABET codes: c, d, g, 2, 3, 4, 8)

ABET Classification:  
Engineering Science: 40%  
Engineering Design: 60%

Reading List:

Textbook  

Readings will also be assigned from:

2. INCOSE Systems Engineering Handbook V2a, June 1, 2004