THE UNIVERSITY OF ARIZONA
COLLEGE OF ENGINEERING
Systems & Industrial Engineering

SIE 519 - ADVANCED SYSTEM ARCHITECTURE

COURSE DESCRIPTION

This course covers **system architecture, from foundational principles to advanced design heuristics.** It explores major frameworks, assessment techniques, and decision-making methods like tradespace exploration, preparing students to tackle complex architectural challenges.

EXPECTED LEARNING OUTCOMES

- Articulate the principles of functional, physical, operational, and contractual architecture and their integration in system development.
- Apply architectural heuristics and creative problem-solving techniques in the development of system architectures.
- Navigate architectural frameworks and standards to guide the design and communication of complex systems.
- Conduct comprehensive architecture assessments and evaluations using
- Tradespace exploration and set-based design.

COURSE FORMAT

The course will use a flipped classroom instructional approach. The student will read the required material and attempt to complete the homework on their own before coming to class.

PROGRAM DIRECTOR
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ENROLLMENT
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COURSE SCHEDULE

SESSION 0.5
- Course introduction and Overview
- Principles of system architecture

SESSION ONE
- Functional architecture
- Physical architecture
- Operational architecture

SESSION TWO
- Contractual architecture
- Integrating functional, physical, operational, and contractual architectures

SESSION THREE
- System complexity
- System architecture heuristics
- Creative problem solving in system architecture

SESSION FOUR
- Architectural frameworks and standards

SESSION FIVE
- Architecture assessment and evaluation

SESSION SIX
- Tradespace exploration
- Set-based design

SESSION SEVEN
- Variant management
- Novel concepts in system architecture

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