THE UNIVERSITY OF ARIZONA
COLLEGE OF ENGINEERING
Systems & Industrial Engineering

SIE 504 - FEDERATED MODELING AND SIMULATION

COURSE DESCRIPTION

This course covers **integrating diverse models and simulations for system design** and lifecycle management. It explores interoperability standards, digital twins, and federated M&S, preparing students for real-world applications.

EXPECTED LEARNING OUTCOMES

- Master the principles and practices of federated modeling and simulation in systems and digital engineering.
- Apply standards and methodologies for ensuring interoperability and integration of heterogeneous models and simulations.
- Utilize federated modeling and simulation to support system design, analysis, verification, and validation.
- Develop skills in using digital twins and other digital engineering tools for real-time simulation and system monitoring.

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
- Overview of federated M&S and its importance in systems engineering and digital engineering

SESSION ONE

- Introduction to interoperability standards
- Key success drivers for the implementation of federated M&S

SESSION TWO

- Principles of federated M&S
- Best practices in deploying federated M&S across different domains

SESSION THREE

- Detailed exploration of HLA
- Detailed exploration of TENA
- Application of standards to a practical case

SESSION FOUR

- Techniques for integrating diverse models and simulations
- Challenges and solutions in model integration
- Practical application of model integration

SESSION FIVE

- Fundamentals of digital twins and their significance for M&S
- Digital Twin development

SESSION SIX

- Application of federated M&S in system design and analysis
- Verification and validation using federated M&S

SESSION SEVEN

- Advanced applications of federated M&S

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