



SYS 710 Systems and Enterprise Engineering Research Methods

Overview: This class is an introduction to research methods used in systems and enterprise engineering at the graduate level. It is a hands-on class: students develop a research proposal on a topic of their choice (preferably doctoral research area) and progress each session to complete a foundational conference paper that can be potentially be integrated in their doctoral research proposal.

Course Content:

The course provides an introduction to research methods, including research paradigms and methodologies across different systems and enterprise fields, research question formulation, design of research approach, literature search and presentation of related work, analysis of results, verbal and written presentation skills, and research ethics. Students prepare and present a conference paper/research proposal by the end of the course.

Text/References

- Practical Research Methods – Catherine Dawson (provided as PDF to students)
- Writing and Presenting Your Thesis or Dissertation, S. Joseph Levine (provided as PDF)
- A Guide to Writing the Dissertation Literature Review, Justus J. Randolph (provided as PDF)

Knowledge and Comprehension Goals

- * Know how to find literature relevant to a problem
- * Know how to read and explain a research paper
- * Know methods for finding and formulating research questions
- * Know when to use the principal research methods common in systems and enterprise engineering, such as conceptual modeling, statistical analysis, agent-based and systems dynamics simulation, optimization processes and grounded theory.
- * Be aware of common ethical issues in research
- * Know when to submit a research protocol for human subjects
- * Know simple approaches to good writing for research papers, theses and dissertations
- * Know how to use a style guide for theses and dissertations
- * Know how present a research talk

Application and Analysis Goals

- * Think critically about research questions and methods
- * Be able to review and provide feedback on a research paper
- * Find and formulate research questions

Synthesis and Evaluation

- * Write a conference paper including introduction, literature review, and methodology sections
- * Critique research papers

Assignments

Reading and homework assignments will be handed out or announced in class. If you miss a class, it is your responsibility to find out what you missed. You should expect to spend at least seven hours per week outside of class on reading and homework.

Grading

Your semester grade will be based on a combination of homework and final conference paper/research proposal submission and presentation:

40% Weekly Assignments

20% Discussion

40% Final Research Paper (motivation statement, literature review, research question and subquestions, hypothesis, research method outline, discussion)

Session Outlines

- Session 1 Getting Started, Course Overview and Basic Research Concepts
- Session 2 Using Stevens Library and Other Research Resources
- Session 3 Finding and Reviewing the Literature
- Session 4 Finding and formulating research questions
- Session 5 Formulating Hypotheses and Experimental Design
- Session 6 Submitting and Reviewing Papers
- Session 7 Social Science Research Methods– Questionnaires, Surveys and Focus Groups
- Session 8 Systems and Enterprise Engineering Methods: Soft Systems Methodologies
- Session 9 Systems and Enterprise Engineering Quantitative Methodologies I
- Session 10 Systems and Enterprise Engineering Quantitative Methodologies II
- Session 11 Grounded Theory
- Session 12 Ethical Issues in Research
- Session 13 Research Presentations and Critique