

AE 597A – Research Methods in Architectural Engineering**Course Syllabus****Syllabus:**

This is a graduate-level course for students in M.Sc. or Ph.D. program in Architectural Engineering (AE). The course covers different research methods such as literature review, experiment design and use of laboratory instrumentation. In addition, writing and presentation skills would be systematically built through lectures and term project. All of the topics to be covered will be studied from the general engineering perspective applied to AE. The students from different AE options will get an opportunity not only to learn about each other research work, but also to provide and receive feedback. The course will foster an environment of academic exchange in the multi-disciplinary field of AE.

Teaching Goal:

The overall teaching goals are to build a strong basis for successful thesis research.

Teaching Objectives:

The main teaching objectives are to:

- help development of analytical and critical evaluation skills of published literature,
- introduce basic concepts of experiment design, data analysis and use of measurement instrumentation
- provide a framework for successful development of written and oral thesis presentations or similar academic materials

Web Page:

<http://www.arche.psu.edu/courses/ae597>

Class Meetings:

Lectures:	M W	2:30 p.m. - 3:45 p.m.
Office Hours:	W	3:45 p.m. - 4:30 p.m.

Instructor:

Instructor:	Jelena Srebric
Office:	222 Engineering Unit A
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Texts:

- On Being a Scientist: Responsible Conduct in Research. 1995. by Institute of Medicine, National Academy of Engineering, National Academy of Science
- McCuen, R. H. 1996. The Elements of Academic Research, American Society of Civil Engineers.
- Blake G. & Bly R.W. 1993. The elements of technical writing, Longman, NY.
- Strunk, W.Jr. and White, E.B. 2000. The Elements of Style, Longman, NY.
- Lecture notes to be handed out in class or posted on our web page.

References:

- Fowler, F.J. 2001. Survey Research Methods. Sage Publications, Inc.
- Markel, M. 1998. St. Technical Communication. Martin's Press, Inc.
- McMurrey, D.A. 2002. Power Tools for Technical Communication. Earl McPeck.

Assignments & Evaluation:

The final grade in the course will be based upon homework assignments and two projects weighted as follows:

- 50% Exercises
- 30% Written part of the Thesis Proposal (or similar term project)
- 20% Oral Presentation of the Thesis Proposal

The term project will be defined for each student individually. A typical project will be a thesis proposal or a literature review. Exercise will be take home assignments and peer critique exercises during the class.

Outline:

AE 597A – Research Methods in Architectural Engineering
Tentative Schedule of Course Topics

Chapter 1. Introduction (3 classes)

- 1.1 Introduction to the course
- 1.2 Ethical and Moral Issues in Research
- 1.3 Time management

Chapter 2. AE Research Topics (3 classes)

- 2.1 Introduction to Research Topics in Architectural Engineering
- 2.1 Computer Simulations in Architectural Engineering
- 2.3 Option Specific and Multi-disciplinary Research

2.2 Building as an Integrated System

Chapter 3. Literature Review (4 classes)

3.1 Critical Thinking

3.2 Concept Mapping Methods and Software

3.3 Online Data Base Search Tools and Use of Web Materials

3.4 Referencing and End Note Software

Chapter 4. Academic Writing (4 classes)

4.1 Elements of Style

4.2 Thesis/Proposal Organization

4.3 Journal and Conference Papers

4.4 Proposals, Research Reports and Sponsoring Agencies

Chapter 5. Presentations and Oral Communication (4 classes)

5.1 Elements of an Excellent Presentation (Preparation, Visuals and Delivery)

5.2 Oral Communication and Question Handling

Chapter 6. Statistics and Experimental Design (4 classes)

6.1 An Introduction to Design, Data Analysis, and Model Building

6.2 Statistical Design and Analysis of Experiments in Engineering

6.3 Survey Methods

Chapter 7. Measurement Instrumentation (4 classes)

7.1 Measurement, Validity and Reliability

7.2 Hand Held Instruments for On-Site Experimentation

7.3 Laboratory Rated Instrumentation