

2010



Civil and Construction Engineering

CCE 6440 – Advanced Structural Analysis

COURSE DESCRIPTION

The course focuses on special applications of matrix method, plastic analysis and stability analysis of structures, analysis of thin shell structures, introduction to finite element method, and nonlinear analysis of structures.

COURSE OBJECTIVES

The primary objective of this course is to introduce advanced structural analysis techniques to graduate students. The particular objectives are to:

1. Introduce special applications of matrix analysis techniques (shear wall structural systems and substructure techniques).
2. Develop understanding of plastic analysis of structures.
3. Develop understanding of analysis of thin shell structures.
4. Introduce basic concepts of finite element method.
5. Develop understanding of nonlinear analysis and stability analysis of structures.

COURSE LEARNING OUTCOMES

The course prepares students who:

- are able to develop analysis models using relevant element types, loads, and boundary conditions by using given physical problem descriptions.
- apply knowledge of traditional mathematics, science, and engineering skills in addition to advanced analysis methods such as matrix analysis, plastic analysis, and stability analysis to develop solutions for a given problem.
- can work in teams.
- are able to communicate effectively.
- can use the techniques, skills, and modern tools necessary for engineering.

INSTRUCTOR

Dr. Upul Attanayake, P.E.
G242 – Parkview Campus
Office Hours: By an appointment
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TEXT BOOK

There is no assigned text book for this course.

REFERENCE

Theory of Matrix Structural Analysis – J. S. Prezemieniecki, McGraw-Hill
Structural Analysis: A unified classical and matrix approach - A. Ghali and A.M. Neville
The Plastic Methods of Structural Analysis - B.G. Neal
Plastic Design of Steel Frames - Lynn S. Beedle
Matrix Structural Analysis - William McGuire, Richard H. Gallagher, and Ronald D. Ziemian
Stresses in Plates and Shells - Ansel C. Ugural
Finite Element Procedures - Klaus-Jürgen Bathe

TOPICS FOR DISCUSSION

1. Matrix structural analysis – special applications (shear wall systems and substructure techniques)
2. Plastic analysis of continuous beams and frames
3. Analysis of thin shells
4. Introduction to finite element method
5. Stability and nonlinear analysis

CLASS TIME AND LOCATION:

Thursday from 6:30 p.m. to 9:00 p.m. from September 9 through December 17. Room # D 206.

OFFICE HOURS:

By appointment.

GRADING SCHEME

FINAL GRADE

		GRADE	PERCENT
Homework	20 %		
Project	20%	A	90 - 100
Test I	25 %	BA	85 - 89
Final	35 %	B	80 - 84
		CB	75 - 79
Total	100 %	C	70 - 74
		DC	65 - 69
		D	60 - 64
		F	< 60

NOTES

1. **Attendance:** Regular attendance will help understanding subject matters effectively.
2. **Homework and Team Paper/Reports:** All homework and papers/reports should be done in an organized and neat manner. Use one side of the sheet. Start each new problem on a new sheet. Provide a cover sheet with your name and homework number or paper/report title clearly indicated. **Staple** all sheets.
Homework and papers/reports are due at the **beginning of class on the dates specified**. Absolutely no late homework.
Use of available tools for producing reports, graphs, charts, tables, etc., are encouraged.
3. **Exams:** Absolutely no Makeup Exam except for medical reasons verified by WMU Health Center Physicians.

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STUDENT CONDUCT:

You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate and Graduate Catalogs that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. [The policies can be found at <http://catalog.wmich.edu> under Academic Policies, Student Rights and Responsibilities.] If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with your instructor if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.