CE 621 **PLASTIC ANALYSIS** Spring 2009

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COURSE OUTLINE

Introduction — why plastic design; Material nonlinearity; Moment-curvature behaviour; Plastic hinge; Axial loading

Elastic-plastic analysis; Unit incremental load method; Upper bound and lower bound theorems; Mechanism method

Plastic design considerations; LRFD; Instability; Combined axial load and bending

Introduction to seismic design concepts; Role of ductility; Lateral load resisting systems; Static pushover analysis; Inelastic time-history analysis and IDA; Performance-based seismic design

BOOKS

No specific textbook for this course. We will rely upon a variety of books and other reading materials. Here are a few books that may be frequently referred to in lectures.

Reference Books

Bruneau, M., Uang, C.-M. & Whittaker, A., *Ductile Design of Steel Structures*, McGraw-Hill, New York, 1997.

Hodge, P.C., *Plastic Analysis and Design of Structures*, McGraw-Hill, New York, 1959.

Neal, B.G., *The Plastic Methods of Structural Analysis*, John Wiley, New York, 1956.

Gioncu, V. & Mazzolani, M., *Ductility of Seismic Resistant Steel Structures*, Spon Press, London, 2002.

Chopra, A.K., *Dynamics of Structures*, 3rd ed., Pearson Prentice Hall, 2007.

Bureau of Indian Standards, *IS 800*, *IS 456* & *IS 1893*

COURSE WEBSITE

www.civil.iitb.ac.in/~sghosh/CE621/

COURSE REQUIREMENTS

Homework Problems

Homework problems will be assigned tentatively in a weekly schedule. Problems will be simple and based on the basics learned in the class. Solutions are due in class on the due date. Permission of the instructor will be needed for a late submission.

Project

Each student will be expected to work on a selected problem involving modal pushover analysis of frames. Students are expected to start working on their projects from mid-February.

Examinations

There will be one mid-term and one final exam. Dates are to be announced later.

Grading

Homework	20%
Project	25%
Midterm exam	25%
Final exam	30%
Total	100%

STRUCTURAL ANALYSIS SOFTWARE

Students are expected to learn using structural analysis software, such as DRAIN-2DX, OpenSEES, etc. for solving homework problems and project work.