North South University
Department of Civil and Environmental Engineering (DCEE)
CEE 330L: Structural Analysis and Design Lab.

Course Outline

1 BASIC INFORMATION

1.1 COURSE CONTENTS

1. Algorithms for implementing direct stiffness method in computer

2. Various finite elements, viz. beam, plate, solid elements etc.

3. Cross-sections and steel shapes

4. Hands-in practice on truss (roof and bridge) and frame analyses by professional software

1.2 COURSE INFORMATION

1. Undergraduate sessional course
2. 1 Credit hour: Lecture - 1 Hour/week; Lab tutorial – 2 hours/week.
3. One class per week having 3 hours of duration
4. The course requires background knowledge on approximate analysis of structures

1.3 PREREQUISITE COURSES:

1. CEE330: Structural analysis I

1.4 FACULTY

1. Name: Md. Tareq Hossain Khondoker, MSc, Lecturer, DCEE, Initial: THK
2. Room No: SAC 738,
3. Phone: Office Ph: +880-2-55668200 Ext: 6233, Mobile: 01854257405
4. E-mail: tareq.khondoker@northsouth.edu
5. Office hours: Every weekday 12:00 pm – 2:00 pm. except Thursday.

1.5 CLASS HOURS:

- Section 1: M 8:00 pm – 11:10 pm (Room# LIB 603)

1.6 COURSE MATERIALS:

- *Staad-Pro-Getting Started &Tutorial*
- *Materials provided in the class*

2 COURSE OBJECTIVES AND OUTCOMES

2.1 COURSE OBJECTIVES:

1. To develop skills in analyzing portal frames, building frames, roof truss and bridge truss by STAAD

2. To familiarize the students with the concepts on various finite elements and cross-sectional shapes

2.2 COURSE OUTCOMES (COs):

2.2.1   CO 1. Analyze portal frames, building frames, roof truss and bridge truss by STAAD

2.2.2   CO 2. Select cross-sectional shapes for steel buildings and bridges and identify appropriate finite elements for analysis.

2.3 MAPPING OF COURSE OUTCOMES TO BSCEE PROGRAM OUTCOMES

L: Slightly maps (low); M: Moderately maps (medium); H: Substantially maps (high)

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PO - 13
CO1					H								
CO2			M										

2.4 CO DELIVERY AND ASSESSMENT

Course outcomes	Bloom's taxonomy, domain/level *(C: Cognitive, P: Psychomotor A: Affective)*	Delivery methods and activities	Assessment tools
CO1	P5	Tutorial, Lab work	Skill test, exam
CO2	C5	Lecture, real structures	Exam, Assignment

2.4.1   Cognitive domain (knowledge-based): C

1: Knowledge, 2: Comprehension, 3 Application, 4 Analysis, 5: Synthesis, 6: Evaluation

2.4.2   The affective domain (emotion-based): A

1: Receiving, .2: Responding, 3: Valuing, 4: Organizing, 5: Characterizing

2.4.3   The psychomotor domain (action-based): P

1: Perception, 2: Set, 3: Guided response, 4: Mechanism, 5: Complex overt response, 6: Adaptation, 7: Origination

3 BSCEE PROGRAM OUTCOMES (PO)

3.1.1 PO – 1: Engineering Knowledge

Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex civil engineering problems.

3.1.2 PO – 2: Problem analysis

Identify, formulate, research the literature and analyze complex civil engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences.

3.1.3 PO – 3: Design/development of solutions

Design solutions for complex civil engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.

3.1.4 PO – 4: Investigation

Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

3.1.5 PO – 5: Modern tool usage

Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex civil engineering activities with an understanding of the limitations.

3.1.6 PO – 6: The engineer and society

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional civil engineering practice.

3.1.7 PO – 7: Environment and sustainability

Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

3.1.8 PO – 8: Ethics

Apply ethical principles and commit to professional ethics, responsibilities and the norms of the civil engineering practice.

3.1.9 PO – 9: Individual work and teamwork

Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.

3.1.10 PO – 10: Communication

Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.

3.1.11 PO – 11: Project management and finance

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.

3.1.12 PO – 12: Life-long learning

Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.

3.1.13 PO – 13: Contemporary Issues

Demonstrate sound knowledge on global and local contemporary civil engineering issues.

4 COURSE ASSESSMENT

4.1 TEACHING/LEARNING STRATEGIES

4.1.1 Lectures

- Attend all classes punctually
- Follow worked examples taught in the class and provided in the course materials
- Practice similar problems taught in the class

4.1.2 Tutorials & Group work

- Contact lab officer whenever required
- Be guided by course notes from the previous semesters
- Work with peers, discuss with friends

4.1.3 Private study

- Review lecture material
- Practice similar problems by yourself

4.2 ASSESSMENT

- Frequent quizzes will be taken to check if you are following the lectures attentively to check the basic knowledge
- In-class exams will be taken to check your ability to use STAAD in structural analysis and design
- Midterm exam and final exam will contain comprehensive structural analysis and design by STAAD to assess complete understanding

4.3 EVALUATION:

Class attendance & Class performance	20%
Quizzes	20%
Midterm exam	25%
Final Exam	35%

4.4 GRADING POLICY:

Generally, NSU grading policy will be followed. However, minor deviation is still possible depending on the situation.

4.5 EXAM POLICY:

No makeup for quiz and in-class exam is possible. MAKE UP for MID-TERM OR FINAL EXAM WILL BE ARRANGED UNLESS AN ABSOLUTELY UNAVOIDABLE VALID REASON FOR ABSENCE IS FOUND. For such unavoidable circumstances, written explanation of the situation must be submitted before the exam. If any class test or mid-term exam cannot be held on the due date, the exam will be automatically shifted to the very next available class, unless otherwise announced.

5   LECTURE SCHEDULE

Day	Materials covered
Day – 1	• Introduction of **STAAD Pro.** Environment: Geometries; Beam, Plate, Surface and Solid, Cross Section Properties, Specifications & supports, Load definitions, Load case details and Load envelops, Materials etc. • STAAD.Pro Workflow Process
Day – 2	To familiarize with the concepts on various finite elements and cross-sectional shapes
	Modeling and Analyzing 2D Portals under vertical and Horizontal loads
Day – 3	Modeling and Analyzing 2D Portals under vertical and Horizontal loads
	Quiz (20%)
Day – 4	Analysis of a roof truss (Fink)
	Analysis of a bridge truss (Pratt)
Day - 5	Practice on new one Truss
Day - 6	Midterm (25%)
Day – 7	Analysis of multi-storied building frame under all loads • Creating Grid for frame of the given building. • Define & Assign: Material properties, Frame section (beam, column) etc. • Draw veranda
Day – 8	Analysis of multi-storied building frame – continued • Define: Seismic load , Wind load, (According to BNBC). • Load cases Details: Dead Load, Live Load define and Assign • Analyze, Find out support reaction, Column & beam reactions.
Day – 9	Practice on Analysis of multi-storied building frame - continued
Day - 10	Practice on Analysis of multi-storied building frame
Day - 11	Final (35%)

6   CODE OF CONDUCT

- It is highly requested to maintain discipline in the class like not to be late, refrain from making noise during lecture time, not to leave the class early.
- Adopting unfair means in the exams will be considered as a serious crime and the student shall be placed to the university disciplinary committee.
- All materials should be neat and clear, and demonstrate professionalism
- Direct duplication of the work of another is a big offense
- Paraphrasing another person's work with very minor changes keeping the meaning is also plagiarism