Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

The sections shown on this interface are based on the templates UG OBTL+ or PG OBTL+
If you are revising/duplicating an existing course and do not see the pre-filled contents you expect in the subsequent sections e.g. Course Aims, Intended Learning Outcomes etc. please refer to Data Transformation Status for more information.

Expected Implementation in Academic Year	
Semester/Trimester/Others (specify approx. Start/End date)	
Course Author * Faculty proposing/revising the course	Lee-Chua Lee Hong
Course Author Email	clhlee@ntu.edu.sg
Course Title	Structural Analysis II
Course Code	CV2012
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	CV2011 Structural Analysis I
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

This course aims to develop in you a deeper understanding and greater proficiency in structural analysis using Influence Lines, Force Method, Slope Deflection Method and Stiffness Matrix Method

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Construct Influence Lines using equilibrium method and Muller-Breslau method for beams and floor girders and apply them to determine effects due to series of moving point loads.
ILO 2	Use Force Method to analyse statically indeterminate structures such as trusses, frames and composite structures, with effects of support settlements / elastic supports.
ILO 3	Use Slope Deflection method to analyse statically indeterminate structures such as continuous beams and frames, without sway and with sway, and with effects of support settlements / elastic supports.
ILO 4	Use Stiffness matrix method to determine the displacements and reactions of statically indeterminate structures such as continuous beams and frames.

Course Content

S/N	Topic
1	Influence line by equilibrium method and Muller-Breslau method. Influence line for beams and floor girders. Applications of influence line.
2	General procedure of force method for trusses, frames and composite structures. Effect of support settlements and beams on elastic supports
3	Application of Slope Deflection method to beams and frames, without sway and with sway, and with effects of support settlements/elastic supports.
4	Application of Stiffness matrix method to determine the displacements and reactions of statically indeterminate structures such as continuous beams and frames.

Reading and References (if applicable)

- ***Textbooks***
  1. **Structural Analysis**, by R.C. Hibbeler, 9th Ed. or 10th Ed., Pearson.

- ***References***
  1. **Fundamentals of Structural Analysis**, by Leet, Uang and Gilbert, 3rd Ed. or 4th Ed., McGraw Hill.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Dead load and live load. Introduction to influence lines. Influence line by equilibrium methods.	1		In-person	Lectures & Tutorial
2	Influence line by Muller-Breslau principle. Influence line for floor girders. Application of influence line.	1		In-person	Lectures & Tutorial
3	Effect due to series of point loads. Revision of virtual work method	1, 2		In-person	Lectures & Tutorial
4	Statically indeterminate structures. General procedure of force method. Worked examples.	2		In-person	Lectures & Tutorial
5	Effect of support settlements. Beams on elastic supports	2		In-person	Lectures & Tutorial
6	Frames, trusses and composite structures Review	2		In-person	Lectures & Tutorial

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
7	Slope-deflection equations. Degree of kinematic indeterminacy. Equilibrium and compatibility condition. Slope-deflection equations. Worked examples.	3		In-person	Lectures & Tutorial
8	Application of slope-deflection method to beam and frame problems without sway.	3		In-person	Lectures & Tutorial
9	Application of slope-deflection method to beam and frame problems with sway. Worked examples.	3		In-person	Lectures & Tutorial
10	Introduction to stiffness matrix method.	4		In-person	Lectures & Tutorial
11	Beam-member stiffness matrix. Assembly of structure stiffness matrix.	4		In-person	Lectures & Tutorial
12	Application of stiffness matrix method for beam analysis. Frame-member stiffness matrix.	4		In-person	Lectures & Tutorial

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
13	Transformation matrix and global stiffness matrix. Application of Stiffness matrix method for plane frame analysis.	4		In-person	Lectures & Tutorial

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lectures	Present the basic theory, problem solving process, and problem based procedure.
Tutorials	Provide examples and discussions, to illustrate detailed problem solving process.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Team/Individual	Rubrics	Level of Understanding
1	Summative Assessment (EXAM): Others([final examination])	1,2,3,4	CEE SLOs a, b	60	Team	Holistic	Relational
2	Continuous Assessment (CA): Others([quiz/test])	1,2	CEE SLOs a, b	20	Team	Analytic	Multistructural
3	Continuous Assessment (CA): Others([quiz/test])	3,4	CEE SLOs a, b	20	Team	Analytic	Multistructural

Description of Assessment Components (if applicable)

Formative Feedback

Feedback will be through the dissemination of the student's performance in quizzes as well as review of the quiz questions in class.
Instructors encourage students to ask questions during the tutorials and lectures.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
Problem Solving	Intermediate
Design Thinking	Intermediate

Course Policy

Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

The standing university policy governing student responsibilities shall apply.
No special policy for this course.

Policy (Absenteeism)

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Policy (Others, if applicable)

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