CVLE 312 Structural Structural II

Course Syllabus – Spring 2015-2016

Curricular Area		Civil Engineering –Structural Engineering	
Type of Course		Mandatory - Major	
Catalogue Description		Flexibility method for analysis of indeterminate structures (Beams. Trusses and frames) utilizing concept of Virtual Work. Matrix analysis of structures. Effect of temperature change and yielding of supports. Three Moment Equations and applications. Slope-deflection method for analysis of beams and rigid frames. Concept of Moment distribution methods and applications on continuous beams, and frames with and without side-sway. Influence lines of indeterminate structure - Qualitative influence lines. Computer applications.	
Prerequisites by Courses		CVLE 311 – Structural Analysis I	
Prerequisites by Topics		Stability and determinacy of structures. Elastic deformation (slope and deflection) of beams by double-integration method; Moment-area theorems; and Conjugate Beam Method. Strain energy theorems – Slopes and deflection of beams, frames and trusses utilizing principle of virtual work. Introduction to indeterminate structures: Compatibility conditions and analysis of indeterminate structures by consistent deformation method	
Instructors		Dr. Ayman Trad (a.trad@bau.edu.lb) Block B Building Office 302 (Phone Ext 4307)	Dr. Hassan Ghanem (h.ghanem@bau.edu.lb) Block D Building Office XX (Phone Ext 4308)
Course schedule/rooms		Section T1 Tuesday 14:00 – 15:30 pm (BT112) Thursday 14:00 - 15:30 pm (BT110)	Section T2 Monday 12:00 – 14:00 pm (BT112) Friday 10:00 - 11:00 am (BT112)
Office Hours		Monday 08:00 – 10:00 am Wednesday: 12:00 – 14:00 pm Friday 14:0 - 16:00 Pm By appointment.	Monday 11:00 – 12:00 pm Tuesday: 08:30 - 09:30 am Wednesday: 09:00 – 11:00 am Thursday: 08-09:30 am & 12:30 – 13:30 By appointment.
Load		3 credits; 2 Lecture-sessions/week – 75 min per session	
Textbook		Hibbeler R. C., 2002, *Structural analysis*, 7th Edition	
Reference Books		1 - Ghali A, and Neville A. M.,1989, *Structural analysis, A unified classical and matrix approach*, 3th Edition 2 - Periodicals, Web sites, … etc	
Topics	**Week [1-3]**	1. Review of basic concepts of structural analysis □ Review Principles of Virtual Work □ Composite Structures- Cable supported Indeterminate systems □ Elastic supports	
	Week [4-5]	2. Analysis by the Three-Moment Equation Method □ Developing the Three-Moment Equation □ Analysis of Indeterminate Beams by Three-Moment Equation – Settlement of Supports	
	Week [6-9]	3. Slope-Deflection Method for Analysis of Indeterminate Structures □ Concept – Slope deflection equations □ Analysis of Indeterminate Beams by the Slope-Deflection Method □ Analysis of Indeterminate Frames by the Slope-Deflection Method	
	Week [10-13]	4. Moment Distribution Method for Beams and Frames □ Concept. □ Indeterminate Beam Analysis by MDM- Successive Carryover Method. □ Analysis of Indeterminate Frames by MDM- with and without Sidesway. □ Moment Distribution Method for Frames	

		□ Yielding of Supports and Effects of Temperature Change. □ SAP analysis software
	Week [14-15]	5. Influence Lines of Indeterminate Systems □ Review- Influence Lines of Determinate Systems □ Quantitative I.L for Indeterminate Systems □ Qualitative I.L for Indeterminate Systems

Learning Outcomes	**Correlation with**	
	Program Outcomes	**Program Objectives**
Students will demonstrate the ability to know the fundamental concepts of different approaches in analysis of indeterminate structures, and the use of Force Method (Virtual Work Method) for analysis of indeterminate systems	**a**	**1**
Students will demonstrate the ability to apply the fundamental principles of structural analysis to analyze indeterminate beams by the Three Moment Equation Method	**a, e**	**1**
Students will demonstrate the ability to apply the fundamental principles of structural analysis to analyze indeterminate beams, and frames by the Displacement approach, namely the Slope-Deflection Method	**a, e**	**1, 2**
Students will demonstrate the ability to apply the fundamental principles of structural analysis to analyze indeterminate multi-story, multi-bay frames by the Moment Distribution Method	**a, e**	**1, 2**
Students will demonstrate the ability to apply the fundamental principles of structural analysis to compute and sketch the Influence lines of indeterminate structures (Qualitative and Quantitative).	**a, c**	**1, 2**
Students are familiar with available structural analysis computer programs and will demonstrate the ability to practice their use while working in teams.	**d, e, h**	**1, 2**

Learning Outcomes	**Assessment Tools**				
	Exams	**HW s**	**Lab Reports**	**Project Report**	**Course Survey**
Students will demonstrate the ability to know the fundamental concepts of different approaches in analysis of indeterminate structures, and the use of Force Method (Virtual Work Method) for analysis of indeterminate systems	✓	✓			✓
Students will demonstrate the ability to apply the fundamental principles of structural analysis to analyze indeterminate beams by the Three Moment Equation Method	✓	✓			✓
Students will demonstrate the ability to apply the fundamental principles of structural analysis to analyze indeterminate beams, and frames by the Displacement approach, namely the Slope-Deflection Method	✓	✓			✓
Students will demonstrate the ability to apply the fundamental principles of structural analysis to analyze indeterminate multi-story, multi-bay frames by the Moment Distribution Method	✓	✓			✓

Students will demonstrate the ability to apply the fundamental principles of structural analysis to compute and sketch the Influence lines of indeterminate structures (Qualitative and Quantitative).	✓	✓			✓
Students are familiar with available structural analysis computer programs and will demonstrate the ability to practice their use while working in teams.	✓	✓		✓	✓

Assessment:

1. Homework assignments and/or quizzes **(05%)**
2. Two 1.0-hour tests **(55%)**
3. 2-hours final exam. **(40%)**
4. **ZERO-TOLERANCE** policy on cheating and plagiarism.

Attendance: Attendance is **mandatory**. Class attendance will be taken and students will be penalized for absences according to the rules set by BAU regulations, and specified in the CE Student Manual; i.e. students who miss more than one-fifth of the sessions of any course in the first ten weeks of the semester will be required to withdraw from the course with a grade of "W".

Assessment Dates:

Exam	Section T1 **Test 1: March** X, 2016 (BT 112) **Test 2: April X**, 2016 (BT 112) **Final Exam: May X**, 2016 (Block B)	Section T2 **Test 1: March** X, 2016 (BT 112) **Test 2: April X**, 2016 (BT 112) **Final Exam: May X**, 2016 (Block B)

Course Coordinator	**Dr. Zaher Abu Saleh**
Date	**January, 2016**