CVLE 212 Elementary Structural Analysis

Course Syllabus –- Spring 2015 -2016

Curricular Area		Civil Engineering – Structural Sequence
Type of Course		Mandatory - Major
Catalogue Description		Types of loads, structural elements and supports. Analysis of simple, cantilever and overhanging ended beams. Axial, shear, and bending moment diagrams. Analysis of compound and inclined beams, frames and composite structures. Moving loads, influence lines for statically determinate structures, Muller-Breslau's principle, maximum value of internal function due to moving loads. Applications
Prerequisites by Courses		CVLE210–Engineering Statics and CVLE211-Mechanics of Materials
Prerequisites by Topics		Basic mathematics, vector algebra, equilibrium principles in statics.
Instructors		Oussama BAALBAKI; (obaalbaki@bau.edu.lb) Engineering Building – Department of Civil Engineering Office F113 (Phone Ext 3429)
Office Hours		Lecture time: Monday : 09:00 – 10:30; Wednesday :09:00 – 10:30 ; Room : Office hours : as per schedule
Load		3 credits; 2 Lecture-sessions/week –75 min per session
Textbook		Hibbeler R. C., Structural analysis, 8th Edition, Prentice Hall, 2012
Reference Books		1. J. Kennedy, and M. Madugula, "Elastic Analysis of Structures", Harper & Row. Ed. 1990. 2. J. McCormac, "Structural Analysis", Harper Internat. Edition, 4th Ed. 3. C. Norris, J. Wilbur, and S. Utku, "Elementary Structural Analysis", McGraw-Hill Intern. Editions, 4th Ed.
Topics	**Week [1-2]**	**1. Introduction to Analysis of Statically Determinate Structures** • Type of Structures, Loads, and Supports • Stability and Determinacy of Structural Systems
	Week [3-5]	**2. Internal Forces Developed in Structural Beam Elements** • Internal Forces at a Specified Point in Members • Deriving Relationship Between Shear & Bending Moments • Graphical Method for Constructing Normal, Shear & Bending Moment Diagrams
	Week [6-8]	**3. Analysis of Compound Beams** • Support reactions and internal forces • Triangular loads
	Week [9-10]	**4. Inclined Beams and Cable Supported Composite Structures** • Analysis of Compound Beams • Composite Structures
	Week [11-13]	**5. Analysis of Determinate Frames** • Analysis of Rigid Determinate Frames and Arches • Analysis of Frames with internal pins and Inclined members

	Week [14-15]	**6. Influence lines for determinate structure using the equilibrium condition and the concept of virtual work "Muller-Breslau's principle".** • Simple, cantilever, and overhanging ended beams • Compound beams • Truss structures • Maximum value of internal function due to moving loads

Learning Outcomes Correlation with	**Program Outcomes**	**Program Objectives**
Identify the fundamental structural concepts of beam theory and the basic principles of structural analysis.	a	1
Estimate the state of stability and degree of indeterminacy of structures.	a,e	1
Apply the fundamental principles of structural analysis and to analyze determinate beams subjected to various types of loads; i.e., concentrated, uniform, and triangular by static equilibrium.	a,e	1-2
Apply the fundamental principles of structural analysis to analyze compound beams, and composite (cable-supported) structural systems	a,e	1.2
Apply the fundamental principles of structural analysis to analyze determinate rigid frames as well as hinged frames.	a,e	1.2
Analyze simple and compound beams to draw the influence lines for determinate structures.	a, e	1,2

	Assessment Tools				
Learning Outcomes	**Exams**	**HW s**	**Lab Reports**	**Project Report**	**Course Survey**
Identify the fundamental structural concepts of beam theory and the basic principles of structural analysis.	✓	✓			✓
Estimate the state of stability and degree of indeterminacy of structures.	✓	✓			✓
Apply the fundamental principles of structural analysis and to analyze determinate beams subjected to various types of loads; i.e., concentrated, uniform, and triangular by static equilibrium.	✓	✓			✓
Apply the fundamental principles of structural analysis to analyze compound beams, and composite (cable-supported) structural systems	✓	✓			✓
Apply the fundamental principles of structural analysis to analyze determinate rigid frames as well as hinged frames.	✓	✓			✓
Analyze simple and compound beams to draw the influence lines for determinate structures.	✓	✓			✓

Assessment:

1. Individual bi-weekly homework assignments and quizzes: (30%)
2. Midterm: (30%)
3. Final Exam: (40%)
4. **ZERO-TOLERANCE** policy on cheating and plagiarism.

5. ***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:

Quiz 1: 4th week (3rd of March), 2016
Midterm: 7th week (24th of March) , 2016
Quiz 2: 9th week (14th of April) , 2016
Quiz 3: 12th week (5th of May) , 2016
Final Exam: (Starting 1st of June; to be set later by BAU registrar