CE 305 Structural Analysis I

Second Semester 2011-2012 Term 112

Text: Structural Analysis – R.C.Hibbeler, 7th Edition (2009); **Prerequisite:** CE 203.

Instructor: Dr. Saeid A. Alghamdi **Office**: 16-150 Tel: 860-2570 **e-mail:** saghamdi@kfupm.edu.sa

COURSE OUTLINE: SUBJECTS, HOMEWRKS & SCHEDULE

Lect. #	Subject(s)	Section(s)	Date & HW No .: (Due Date)
1	Introduction: Structures & Structural Classifications.	1-1 & 1-2	**Jan. 28; 1**:1-2; 1-8; 1-14; 2-14 (Feb. 6).
2	Loads; Structural Idealizations; Principle of Superposition; Determinacy and Stability (Beams and Trusses)	1-3; 2-1 & 2-2; 2-4; 3-2	30
3	Internal Forces in Structural Members.	4-1; 4-2	Feb. 01
4	Shear & Moment Diagrams: Beams.	4-3	**04**
5	Shear & Moment Diagrams: Frames.	4-4	06
6	Moment Diagrams by Method of Superposition.	4.5	**2**: 3-26; 3-47; 4-16; 4-54; 4-69 (Feb. 13). 08
7	Concept of Influence Lines (IL); Influence Lines for Beams.	6-1; 6-2	**11**
8	Qualitative Influence Lines.	6-3	13
9	Influence Lines for Trusses.	6-5	**3**: 4-66; 6-5; 6-21; 6-52; 6-74 (Feb. 22) 15
10	Structural Deflections & Elastic Beam Theory.	8-1; 8-2	**18**
11	The Double Integration Method.	8-3	20
12	Moment-Area Method.	8-4	22
13	Conjugate Beam Method.	8-5	**25**
14	Principle of Work & Energy.	9-1; 9-2	27
-	First Major Exam [Tuesday Evening].	1-1 to 8-4	Feb. 28, 2012
15	Principle of Virtual Work.	9-3	March 03
16	Virtual Work for Trusses.	9-4	05
17	Virtual Work for Beams and Frames.	9-5	07
18	Virtual Work for Beams and Frames (cont'd).	9-5	10
19	Castigliano's Theorem for Trusses.	9-7; 9-8	12
20	Castigliano's Theorem for Beams and Frames.	9-9	14
21	Castigliano's Theorem for Beams and Frames (cont'd).	9-9	**17**
22	The Force Method and Statically Indeterminate Structures.	10-1; 10-2	19
23	Maxwell Reciprocal Theorem.	10-3	21
-	**Midterm Vacation**	**–**	**March 24-28, 2012**
24	Force Method for Beams.	10-4	**March 31**
25	Force Method for Frames.	10-5	April 02
26	Force Method for Trusses.	10-6	04
27	The Displacement Method: Slope-Deflection Equations.	11-1	**07**
28	Slope Deflection Equations.	11-2	**April 09**
-	**Second Major Exam [Tuesday Evening].**	**8-5 to 10-6**	**April. 10,'12**
32	Wednesday class is excused	–	**11**

Lect. #	Subject	Section(s)	Date & HW No.: (Due Date)
29	Analysis of Beams.	11-3	14
30	The Displacement Method: Moment Distribution (Principles and Definitions).	12-1	16
31	Moment Distribution for Beams.	12-2	18
33	Moment Distribution for Beams (cont'd).	12-2	**21**
34	Moment Distribution for Beams (cont'd).	12-2; 12-3	23
35	Class Excused/Review of Exam II	-	25
36	Moment Distribution for Frames (No Side-sway Cases).	12-4	**28**
37	Moment Distribution for Frames (cont'd).	12-4	30
38	The Stiffness Method: Method Fundamentals; Review of Matrix Algebra.	14-1; Appendix A(1-4)	May 02
39	Structural Member Stiffness Matrix:; Local and Global Matrices; Geometrical Transformations	14-2; 14-3; 14-4	**05**
40	Geometrical Transformations (cont'd); Truss Member Stiffness Matrix.	14-4; 14-5	07
41	Stiffness Matrix Application: Trusses; Computer Applications.	14-6; 14-7	09
42	Stiffness Matrix Application: Beams; Computer Applications.	15-1; 15-2; STRAN	**12**
43	Stiffness Matrix Application: Beams.	15-3; 15-4	14
44	Stiffness Matrix Method for Frames & Computer Applications	16-1; 16-2	16
45	Stiffness Matrix Method for Frames; Computer Applications	16-3; 16-4; Basics of GT STRUDL	**12**

Course Information:

- ### Grade Distributions:

Class Work [attendance & participation; Home-works; Quizzes]	= 15%
First Exam [Tuesday, Feb. 28, 2012; Time: 7:00 p.m.]	= 20%
Class-Test & Computer Applications	= 10%
Second Exam [Tuesday, April 10, 2012; Time: 7:00 p.m.]	= 20%
Final Exam [Material coverage & schedule are yet to be determined]	= 35%

- ### Guidelines & Remarks:

  1. Selections of **course material** (including: selected notes, homework assignments and solutions; samples of exams and quizzes) **will be made available** on the instructor's homepage. Further information will be provided to students to access course home-page.
  2. Each weekly-assignment **should** be submitted according to a Standard Engineering Format, and with a cover-page, and late submission of assignments is generally **not** accepted without an excuse.
  3. Make-up examinations will **not** be given.
  4. Each student is expected to come to classes regularly, and the University regulations regarding absenteeism [i.e.: **9 unexcused absences → "DN" grade**] will be enforced.