Dynamics of Structures

Course Schedule

No.	Lecture	Topics	Reading	Homework
1	8/23 (M)	Introduction, Mass-spring-damper system, Syllabus Review	C1.1-C2.3*	
2	8/25 (W)	SDOF free vibration	C3.11-C3.5*	
3	8/30 (M)	SDOF harmonic response	C4.1-C4.2*****	
4	9/1 (W)	SDOF harmonic response, complex notation	C4.3*****	HW 1
5	9/6 (M)	**NO CLASS (Labor Day)**		
6	9/8 (W)	Viscously damped systems: applications	C4.4-C4.8*	
7	9/13 (M)	SDOF Response to periodic excitation	C7.1-C7.2*****	
8	9/15 (W)	SDOF Response to periodic excitation, Fourier Transform	C7.3-C7.4*****	HW 2
9	9/20 (M)	SDOF Response to non-periodic excitation	C5.1-C5.3*****	
10	9/22 (W)	SDOF General excitation and Laplace transform method	C5.4-C5.6 AC*****	
11	9/27 (M)	Review		
12	9/29 (W)	Review		HW 3
13	10/4 (M)	**EXAM I**		
14	10/6 (W)	Time stepping method, Central Difference Method	5.1, 5.3	
15	10/11 (M)	Nonlinear response: Newmark method	5.4 -5.7	
16	10/13 (W)	2 DOF system, natural frequencies and mode shapes	C9.1-9.6*	HW 4
17	10/18 (M)	Computer methods for structural dynamics	C14*****	
18	10/20 (W)	MDOF free vibration, natural frequencies and mode shapes	10.1-10.5	
19	10/25 (M)	MDOF free vibration response	10.8-10.10	
20	10/27 (W)	Review		HW 5
21	11/1 (M)	**EXAM II**		
22	11/3 (W)	Damping	11.1-11.5	
23	11/8 (M)	MDOF with arbitrary damping, complex modes	C10.4-C10.5*****	
24	11/10 (W)		12.1-12.2	HW 6
25	11/15 (M)	MDOF modal analysis	12.3-12.7	
26	11/17 (W)	MDOF modal analysis	12.3-12.7	
27	11/22 (M)	MDOF modal response contribution	12.8-12.11	
28	11/24 (W)	Experimental modal testing 1	C18.1-C18.6*****	HW 7
29	11/29 (M)	Experimental modal testing 2	C18.1-C18.6*****	
30	12/1 (W)	Experimental modal testing 3	C18.1-C18.6*****	
31	12/3 (M)	Review		
32		**FINAL, TBA**		

* Craig book

4300:604-801 Dynamics of Structures
Spring 2010: 08/23~12/03

Instructor
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Office Hour
Time: Thursday 9:30 AM ~ 11:30 AM
Office: ASEC 209F (Dr. Yun's Office)

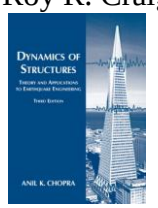
Extra Office Hour
Pre-appointment is required to meet the instructor at other time slots. Email (gy3@uakron.edu) is preferred for appointment.

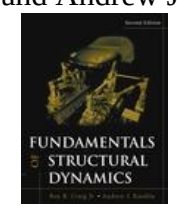
General Information
Class hour: MW 3:20 PM ~ 4:35 PM
Classroom: Ayers Hall 113
Class web site: Springboard ***https://springboard.uakron.edu/index.asp***

Requisites
The prerequisites for this course are Statics, Mechanics of Solids, Theory of Structures, Undergraduate dynamics course, and Math courses (Ordinary Differential Equations and Linear Algebra). Dynamics of Structures will be prerequisite for Experimental Dynamics, Structural Health Monitoring and Earthquake Engineering courses.

Course Objectives
1. Understanding dynamic behavior of structures under various dynamic loading
2. Learning various analysis methods for linear and nonlinear dynamic analysis of structures
3. Computer applications: coding MATLAB programs for dynamic analysis of structures
4. Hands-on experience of experimental vibration testing

Textbooks
Anil K. Chopra, Dynamics of Structures 3rd Edition, Prentice Hall
Roy R. Craig and Andrew J. Kurdila, Fundamentals of Structural Dynamics 2nd Edition, Wiley





Homework (20%)
One week will be given for each homework assignment. No late submission will be accepted. Students are encouraged to work in group on homework assignments in the interest of gaining additional understanding. Exam questions will be used to measure individual student comprehension. In accordance with University policy, however, any evidence of direct copying of homework assignments will result in a zero for that assignment and/or University disciplinary action.

Two Mid-term Exams (40%)
A total of 2 one-hour exams will be given as indicated in the course schedule throughout the semester. All exams are closed book.

Final Exam (20%)
Final exam covering the entire course will be given. Final is also closed book and closed notes. Date and Time: TBA.

Project for Lab Exercise (20%)
Two lab activities will be given for this course. These exercises will be completed by groups during an assigned lab period. Students should attend the lab, conduct experiments, discuss and collaborate with lab partners and turn in separate (his/her own) reports about lab activity and testing results.

Dates for lab exercise are TBA.

1. Computational Project: Implementation of Direct Integration Methods
2. Experimental Project: Experimental Vibration Testing

Grading
90 and above: A
87~89: A-
85~86: B+
80~84: B
75~79: C+
70~74: C
65~69: D+
60~64: D
Below 60: F