

Professor James Anderson

Introduction to Structural Dynamics

How well did you learn?				
Not at all → Very Well				
1	2	3	4	5
CIRCLE YOUR RATINGS ↓ BELOW ↓				

Course Objectives and Outcomes

Goals and Topics. Response of single and multiple degree of freedom systems to dynamic excitation; structural modeling and approximate solutions; introduction to earthquake resistant design.

Outcome. How well did this course increase your ability to understand and/or do the following?

1	Basic concepts; equation of motion	1	2	3	4	5
2	Single degree of freedom systems; free vibration, damping	1	2	3	4	5
3	Generalized coordinate systems	1	2	3	4	5
4	Harmonic loading	1	2	3	4	5
5	Applications; resonance, accelerometers, isolation	1	2	3	4	5
6	Impulse loads	1	2	3	4	5
7	Numerical solutions	1	2	3	4	5
8	Computer applications for SDOF systems	1	2	3	4	5
9	Multiple degree of freedom systems	1	2	3	4	5
10	Mode shapes, frequencies, matrix iteration	1	2	3	4	5
11	Earthquake response analysis	1	2	3	4	5

Objective. Students learn to model and analyze civil engineering structures as generalized single degree of freedom systems.

Outcome. How well did this course increase your ability to understand and/or do the following?

12	Building code requirements	1	2	3	4	5
13	Develop the equation of motion for single degree of freedom systems.	1	2	3	4	5
14	Develop models of building structures and transform to generalized single degree of freedom	1	2	3	4	5
15	Evaluate the response due to harmonic and impulse forcing functions.	1	2	3	4	5
16	Evaluate the response due to general loading using numerical methods.	1	2	3	4	5
17	Extend numerical methods to nonlinear building systems.	1	2	3	4	5

Objective. To model and analyze buildings as multiple degree of freedom systems

Outcome. How well did this course increase your ability to understand and/or do the following?

18	The equations of motion in matrix form and determine the mode shapes and frequencies using	1	2	3	4	5
19	Modal analysis procedures to systems subjected to harmonic and impulse loading.	1	2	3	4	5
20	Geometric stiffness and use numerical methods for nonlinear response analysis.	1	2	3	4	5

Objective. To evaluate the response of building structures to earthquake ground motions.

Outcome. How well did this course increase your ability to understand and/or do the following?

21	Understand the basic characteristics of earthquake ground motions.	1	2	3	4	5
22	Determine the response of generalized single degree of freedom systems and multiple degree of	1	2	3	4	5
23	Understand the basic concepts of current building codes and their application to building design .	1	2	3	4	5

Relationship of Civil Engineering Program Course Objectives to Outcomes

Objective. The Civil Engineering program is designed to teach beyond the technical content of the curriculum and prepare the students to utilize what they learn in a professional setting. Engineering projects and research activities enlist skills and demonstrate ability to understand the subject matter and communicate in a proficient manner. This course contributes to the overall program goals in the following ways.

Outcome. How well did this course increase your ability to understand and/or do the following?

(a)	an ability to apply knowledge of mathematics, science, and engineering.	1	2	3	4	5
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	1	2	3	4	5
(e)	an ability to identify, formulate, and solve engineering problems.	1	2	3	4	5
(f)	an understanding of professional and ethical responsibility.	1	2	3	4	5
(i)	a recognition of the need for, and an ability to engage in life-long learning.	1	2	3	4	5
(j)	a knowledge of contemporary issues.	1	2	3	4	5
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	1	2	3	4	5