Course unit title:	Structural Dynamics		
Course unit code:	CE 400		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	4		
Semester when the unit is delivered:	8 (Spring)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Petros Christou		
Learning outcomes of the course unit:	1. Knowledge of the underlying concepts of structural dynamics such as periods, modes and spectral values. 2. Competence to relate the general arrangement of structural configurations to their dynamic behaviour. 3. Capacity to understand the effects of dynamic loads including earthquakes on civil engineering structures. 4. Ability to implement structural dynamics in the analysis and design of structures and their components. 5. Appreciation of the use and effects of modern mechanical devices on the dynamic behaviour of structures. 6. Evaluation current methods of dynamics, know their advantages and limitations.		
Mode of delivery:	Face-to-face		
Prerequisites:	CE 300	Co-requisites:	None
Recommended optional program components:			
Course contents:	1. Single Degree of Freedom Systems, natural frequency, damping ratio, free response, impulse response, logarithmic decrement for evaluating damping. 2. Response to Harmonic Loading, resonance, frequency response function, dynamic amplification factor, transmissibility, , sensors, beats, Fourier series,. 3. Response to Impulsive Transient Loading, impulse and step response, convolution in time and frequency, shock spectra. 4. Application to SDOF Systems, Base Isolation, and Soil-Structure Interaction, Foundations for Vibrating Machinery. 5. Two Degree of Freedom System, tuned mass dampers; 6. Multiple Degree of Freedom Systems. matrix assembly; general eigen-value problem; mode shapes, orthogonality property, diagonalization, modal superposition 7. Response Spectrum Method for Earthquake Response and application to earthquake Engineering		
Recommended and/or required reading:			
Textbooks:	Anil K. Chopra, **"Dynamics of structures: Theory and Applications to Earthquake Engineering"**, Prentice, 2000.		
References:	"Franklin Y Cheng, **"Matrix Analysis of Structural Dynamics: Applications and Earthquake Engineering"**, Marcel Dekker, 2002.		
Planned learning activities and	The course will be presented through lectures in class. The aim of lectures is to lay down the concepts, explain to students their importance in practical		

teaching methods:	applications, to analyse key theoretical principles and allow for questions related to issues that may come up during the presentation. Part of the material is presented using visual aids (normally in Power Point presentations) which allow the instructor to present related figures and photographs that will assist understanding of principles and methods. The learning process is enhanced through practical design examples. Exercises are given to students to solve as homework assignments. Those will not be necessarily part of their assessment. Although the course material (notes presentations etc are available, students are strongly encouraged to read the subject textbook as well as to perform their own research on particular aspects or practical applications and problems. Interaction with students is achieved through the class website, and during office hours or by appointment in order to provide any necessary tutoring.
Assessment methods and criteria:	• Course work: 50% • Final Exam: 50%
Language of instruction:	English
Work placement(s):	No