1.1.1 Dynamics of Structures I

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ015	**SEMESTER**	6th
COURSE TITLE	Dynamics of Structures I		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Understand how structures respond to dynamic loads. Evaluate the critical parameters that affect the structural dynamic response. Construct and solve (analytically and/or computationally) the equation of motions for sdof and mdof systems. Interpret and use earthquake response and design spectra.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*

…….
-Search for, analysis and synthesis of data and information, with the use of the necessary technology -Adapting to new situations -Decision-making -Working independently -Team work -Working in an interdisciplinary environment -Project planning and management -Criticism and self-criticism -Production of free, creative and inductive thinking

SYLLABUS

Differences between static and dynamic response of structures. Dynamic loads. Degrees of freedom. Formulation of equation of motion.
Systems with one degree of freedom (sdof):
Free undamped and damped vibrations. Forced vibrations under harmonic and impulsive forces. Forced undamped and damped vibrations for any external load. Duhamel integral.
Response under ground motion. Numerical calculation of dynamic response.Response spectra.
Systems with many degrees of freedom (mdof):
Formulation of mass and stiffness matrices. Free vibration. Eigenfrequencieses and modeal shapes. Orthogonality properties.
Forced vibations. Generalized mass, stiffness, external force. Decoupling techniques for the evaluation of dynamic response.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication via e-mail and Zoom platform. Additional material is provided via a dedicated e-learning website.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	***Semester workload***
Lectures	40
Practice/exercises	12
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*	Formative evaluation consisted of: 1.Non-compulsory intermediate tests (2 to 3 in total) focused on solving problems (30% of final mark) 2. Final written exams that includes: a. Theoretical questions of knowledge and critical thinking and b .Solving of problems-exercises (70% of final mark)

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	

ATTACHED BIBLIOGRAPHY

A.Chopra (2016), Dynamics of Structures, Prentice-hall International Series