COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	Mechanical Engineering		
LEVEL OF STUDIES	*Undergraduate*		
COURSE CODE	MY1800	**SEMESTER**	7th
COURSE TITLE	Vibrations and Dynamics of Machines		

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**
Lectures, Practical Exercises	5	6
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, specialized general knowledge, skills development*	Core
PREREQUISITE COURSES:	-
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://www.mie.uth.gr/?page_id=18371&lang=en

(2) 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*

The aim of the course is to present the most important methodologies applied to predict the dynamic and oscillatory behavior of mechanical systems with linear characteristics.

Upon completion of the course, the student must be able to develop simplified models of mechanical systems, predict the dynamics and oscillatory behavior of systems based on the analysis of the models, understand the key dynamic characteristics that influence the dynamics of mechanical systems, and apply methodologies in the design of mechanical oscillation isolation devices.

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

• Retrieving, analyzing and synthesizing data and information, with the use of necessary technologies.

- Autonomous work.
- Decision making.
- Exercising judgment and self-evaluation.
- Promotion of free, innovative and inductive thinking.

(3) SYLLABUS

Vibrations of single-degree-of-freedom linear systems, mathematical models, equations of motion, free and forced vibrations, response to different excitations (impulse, pulse, harmonic, periodic, non-periodic, general), Fourier transform, transfer function – Applications (vibration isolation from and to the environment, selection of machine foundation characteristics, principles of operation of vibration measurement devices) – Vibration of multi-dimensional linear discrete systems, modal frequencies and mode shapes, free and forced vibrations, modal analysis – Vibrations of one-dimensional continuous bodies (vibrations of strings, bars, beams, shafts) – Virtual Work, Lagrange Equations - Vibration measurements for machines and structures, methods of experimental estimation of modal characteristics – Approximate analysis methods (methods Rayleigh, Rayleigh-Ritz, Galerkin) – Machine dynamics (critical speeds, balancing).

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY ***Face-to-face, Distance learning, etc.***	In class lectures.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of class web page
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	70
Homework	35
Autonomous work	45
Course Total	***150***

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* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	I. Written final exam (65%) II. Midterm (25%) III. Homework (10%)

(5) **ATTACHED BIBLIOGRAPHY**

- Suggested bibliography:

• Σ. ΝΑΤΣΙΑΒΑΣ, Ταλαντώσεις Μηχανικών Συστημάτων, Εκδόσεις ΖΗΤΗ 2001.

• A.D. Dimarogonas and S. Haddad, Vibration for Engineers, Prentice Hall, Englewood Cliffs, NJ, 1992.

• A.K. Chopra, Dynamics of Structures, Theory and Applications to Earthquake Engineering, Second Edition, Prentice Hall, 2001.

• Ι.Θ. Κατσικαδέλης, Δυναμική των Κατασκευών, Τόμος Ι, Εκδόσεις Συμμετρία, 2002.

• Ι.Θ. Κατσικαδέλης, Δυναμική των Κατασκευών, Τόμος ΙΙ, Εκδόσεις Συμμετρία, 2004.

- Related scientific journals: