# ETE 602 - Wave Propagation

## COURSE OUTLINE

### (1) GENERAL

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|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | ETE 602 | **SEMESTER** | 10th |
| **COURSE TITLE** | Wave Propagation | | |

| **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 / Labs / Tutorials | 3 | 3 |
| *Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).* | | |

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| **COURSE TYPE** *general background, special background, specialized general knowledge, skills development* | Specialized general knowledge |
| **PREREQUISITE COURSES:** | NO |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | http://mss-nde.uoi.gr/greek/318%20-%20ETE%20602/index.html |

### (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 course is a compulsory specialized general knowledge course of the mechanics branch. The subject matter of the course aims at introducing the students to the basic concepts of elastic wave propagation.

Upon successful completion of the course, the student will be able to:

- Understand the basic concepts and characteristics of wave propagation, such as phase velocity and group velocity, dispersion, damping and scattering.
- Learn the different types of elastic waves, such as the longitudinal and transverse waves, Rayleigh, Lamb, Love, Stoneley and Scholte waves.
- Be familiar with the laws of reflection and transmission of shear waves in various propagation media as well as in nonlinear media.
- Evaluate the materials' response to elastic stress wave propagation.

**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*
*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 thinking*
*……*
*Others…*
*…….*

- Autonomous Work

## (3) SYLLABUS

Wave propagation on string, Wave equation-solutions, Phase velocity, Dispersion, Group velocity, Attenuation, Wave propagation in unlimited homogeneous medium, Longitudinal and Transverse waves, Reflection and Transmission – Snell's Law, Rayleigh waves, Rayleigh wave propagation in nonlinear media, Lamb waves, Love waves, Interface waves - Stoneley waves, Scholte waves, scattering.

## (4) TEACHING and LEARNING METHODS - EVALUATION

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|---|---|
| **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* | |
| **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 | 39 |
| Self-study | 18 |
| Final exam preparation | 18 |
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| Course total | ***75h*** |

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| **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.* | LANGUAGE OF EVALUATION: Greek<br><br>METHOD OF EVALUATION:<br><br>(i) Final written examination with multiple choice questions and/or problem solving<br>(ii) Comparative evaluation of elements of the theory<br>(iii) Project |

## (5) ATTACHED BIBLIOGRAPHY

*-Suggested bibliography:*

H. J. PAIN, Physics of oscillations and waves, M. ATHANASOPOULOS Publications, 1997.

K. U. INGARD, Waves and oscillations, National Technical University of Athens, 2008.

*-Related academic journals:*