# COURSE OUTLINE

## (1) GENERAL

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| **SCHOOL** | ENGINEERING |
| **ACADEMIC UNIT** | MECHANICAL ENGINEERING |
| **LEVEL OF STUDIES** | UNDERGRADUATE |
| **COURSE CODE** | MY0900     **SEMESTER** 6<sup>TH</sup> |
| **COURSE TITLE** | MACHINE ELEMENTS |

| **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 and Exercises* | 5 | 6 |
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| *Add rows if necessary. The organisation 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:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes (tutoring) (notes and exercises in English) |
| **COURSE WEBSITE (URL)** | https://www.mie.uth.gr/?page_id=18332 |

## (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 ''Machine Elements'' is a basic course for understanding/applying the fundamental design principles through the analysis of simple engineering elements.

The purpose of the course is to analyze machine elements through basic strength calculations and the correct selection of parameters for each application. The analysis of each element includes the analysis of its geometry, its material, the usual stresses to be subjected, modes of calculation and design, modes of manufacture and modes of operation in an engineering set.

Upon successful completion of the course the student should be able to:

- Recognize the usual basic machine elements that consist engineering sets and their subcategories.
- Have the ability to select and dimension the appropriate mechanical component for each application.
- Analyze the working stresses of each item.

• Calculate endurance/strength for each loading.

• Choose materials and manufacture process of non-standard elements.

• Design and calculate multi-component mechanical sets.

• Predict possible failures.

• To do damage assessment and schedule maintenance.

-Search for, analysis and synthesis of data and information, with the use of the necessary technology

-Working independently

-Decision-making

-Criticism and self-criticism

-Production of free, creative and inductive thought

## (3) SYLLABUS

This course aims to present the basic principles employed in the design of standard mechanical components subjected to operating force and moment fields. The course will highlight the adaptation of theoretical stress relationships to practical design problems.

-Fundamental Topics from Mechanics of Materials
-Static Failure Theories
-Fatigue Failure Theories
-Screws and Fasteners
-Design of Shafts
-Belts (flexible mechanical elements)
-Spur Gears
-Review.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| DELIVERY<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
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| USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students* | Parts of the course material are presented using ICT | |
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| 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 |
| | Laboratory Exercises | 30 |
| | Study | 50 |
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| | 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.* | Language of evaluation: Greek Methods of evaluation: -Final Exams (60%) -Mid-term Exams (40%) |
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## (5) ATTACHED BIBLIOGRAPHY

-**Suggested bibliography:**
- Machine Elements, Papadopoulos Christos, Tziola Publications (in Greek)
- Shigley's Mechanical Engineering Design (McGraw-Hill Series in Mechanical Engineering)
- Fundamentals of Machine Component Design by Robert C. Juvinall and Kurt M. Marshek