COURSE OUTLINE

1. GENERAL

FACULTY	AGRICULTURAL PRODUCTION, INFRASTRUCTURE AND ENVIRONMENT		
SECTION	UTILIZATION OF NATURAL RESOURCES & AGRICULTURAL ENGINEERING		
LEVEL OF STUDY			
COURSE CODE	**14**	**SEMESTER OF STUDY**	5Th
COURSE TITLE	TECHNICAL ENGINEERING (MECHANICS-STATICS-BASIC PRINCIPLES STRENGTH MATERIALS)		

INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded in distinct parts of the course e.g. Lectures, Laboratory Exercises etc. If the Credits are awarded uniformly for the entire course indicate the weekly teaching hours and the total of credits*	**WEEKLY HOURS TEACHING**	**CREDITS**
LECTURES	5	5
TUTORIAL EXERCISES	Built-in in lectures	
Add rows if needed. Teaching organization and didactics Methods used are described in detail in 4.		

COURSE TYPE *background, general knowledge, scientific area, development Skill*	BACKGROUND
PREREQUISITE COURSES:	• MATHEMATICS I, II, III • NATURAL
LANGUAGE OF INSTRUCTION and EXAMINATION:	GREEK
THE COURSE IS OFFERED IN ERASMUS STUDENTS	YES USING A TEXTBOOK IN ENGLISH
WEBSITE COURSE (URL)	

2. LEARNING OUTCOMES

Learning Outcomes

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

Consult Appendix A

- *Description of the Level of Learning Outcomes for each cycle of study according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning*

and Appendix B

- *Learning Outcomes Writing Summary Guide*

Students, upon successful completion of the course, will be able to:

- Understand the vector concepts of concentrated and distributed forces and moments of forces with respect to point and axis in space.
- Understand the concepts of force transfer with respect to point/axis, equivalent force-moment systems
- Understand the concepts of center of mass, center of gravity and geometric center of gravity and static moment with respect to axis and calculate the geometric center of gravity of simple and complex bodies and surfaces
- They simplify systems of concentrated and distributed forces and moments, and calculate the resultant force and torque of a system of forces and moments at a random point in space
- Understand the concept of balance of power and the different carrier support systems in 2 and 3 dimensions
- Design complete free-body diagrams of a vector – mechanical system/ subsystem and formulate the balance equations of the body based on the

Free body diagram, including support reactions.

- Understand the distinction of isostatic, hyper-static carriers and mechanisms and solve isostatic vectors to calculate the reactions of supports.
- Understand the characteristics and function of lattices as carriers and apply equilibrium concepts and different methods of analysis to calculate support reactions and internal forces on lattice rods
- Understand the characteristics and function of beams and frames as carriers and apply the concepts of equilibrium and different methods of analysis to calculate support reactions and construct axial and cutting force and bending moment diagrams
- Understand the characteristics and function of arcs and cables as carriers and apply the concepts of equilibrium and different methods of analysis to calculate support reactions and construct axial and cutting force and bending moment diagrams
- Understand basic concepts of Material Strength: Mechanical behavior of materials and assumptions, elastic and plastic behavior, the concepts of stress and deformation..

General Competencies

Taking into account the general competences that the graduate must have acquired (as listed in the Annex) Diploma and listed below) which of them is the course aimed at?.

Search, analyze and synthesize data and information, using the necessary technologies
Adapting to new situations Decision making
Autonomous work
Teamwork
Working in an international environment
Working in an interdisciplinary environment
Generating new research ideas
Project planning and management
Respect for diversity and multiculturalism Respect for the natural environment
Demonstrate social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Promoting free, creative and inductive thinking

Search, analysis and synthesis of bibliographic data and information from the internet, using the necessary technologies
Solving autonomous tasks for home
Problem-solving teamwork in the room
Promotion of free, creative and inductive thinking through the successive stages of analysis and resolution of static vectors

3. COURSE CONTENT

1. Introduction (Introduction to the basic concepts of Mechanics. Basic assumptions. Vector concepts of concentrated and distributed forces and moments with respect to point/axis).
2. Point/axis force transfer, force-moment systems, equivalent force-moment systems
3. Center of mass, center of gravity, geometric center of gravity, static moment relative to axis. Calculation of geometric center of gravity of simple and complex bodies and surfaces
4. Calculation of resultant force of distributed forces, simplification of systems concentrated and distributed forces and moments, calculation of resultant force and moment of a system of forces and moments with respect to a random point or axis in space
5. Sublimation of vectors. Linear, surface and spatial static vectors. Otherwise carrier support systems in 2 and 3 dimensions, Charging conditions. Regulations in general. Wind and snow loads, seismic and thermal loads. Special loads of agricultural structures.
6. Classification of vectors in terms of degree of static vagueness: isostatic and hyperstatic carriers and mechanisms
7. Free body diagrams of a vector – mechanical system / subsystem. Equations of balance of forces and moments. based on the free body diagram,

including support reactions.

8. External and internal conditions for statically defined and stable carriers. Linearity and superposition. Solution of isostatic vectors for calculating the reactions of supports, energy methods.
9. Planar trusses (Basic assumptions of mesh analysis. Methods of analysis: methods of nodes and method of sections. Calculation of reactions and internal forces.
   Verified).
10. Beams (Basic assumptions of beam analysis. Methods of analysis of beams. Calculation of reactions and internal forces. Diagrams of shear and axial forces and bending moments. Maximum and minimum bending moments. Continuous modular full beam).
11. Chassis – arcs – cables (Basic assumptions of frame and arc analysis. Static analysis of certain frames and arcs. Calculation of reactions and internal forces. Diagrams of cutting and axial forces and bending moments. Maximum and minimum bending moments.
    Cable analysis).
12. Introduction to Strength of Materials (The mechanical behavior of materials. Basic assumptions, elastic and plastic behavior. The concepts of stress and deformation)

4. TEACHING AND LEARNING METHODS - ASSESSMENT

DELIVERY METHOD *Face-to-face, Remote education, etc.*	Face to face
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in Teaching, Laboratory Training, Communication with students*	✓ Use of ICT in Teaching and Communication with students
TEACHING ORGANIZATION *The method and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliography Study & Analysis, Tutorial, Internship (Placement), Clinical Practicing, Art Workshop, Interactive Teaching, Educational visits, Project Writing, Writing a project / assignments, Artistic creation, etc.* *The student's study hours for each learning activity are listed as well as the hours of unguided study so that the total workload at semester level corresponds to its standards ECTS*	
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Summative, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay/ Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Examination of a Patient, Artistic Interpretation, Other / Others* *Explicitly defined criteria are mentioned assessment and whether and where they are accessible by students.*	• Course attendance - Class participation • Weekly assignments, problems to solve at home • Progress (30%) • Final exam of the entire syllabus (70-100%) that will be used for the overall evaluation of students in combination with the results of progress and participation

Activity	***Semester Workload***
Lectures	85
Tutorial – integrated exercise solutions in lectures	50
TOTAL	***125***

5. RECOMMENDED-BIBLIOGRAPHY

-Suggested Bibliography :
-Related scientific journals:

- "Technical mechanics, principles of statics and introduction to the theory of deformable Body Matsikoudi - Iliopoulou. Maria, ZYGOS, ISBN 9608065259, THESSALONIKI, 1753
- Statics, Gdoutos Emmanouil "SYMMETRY, ISBN: 960-266-104-6", ATHENS, 45257