COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	Mechanical Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	MY0500	**SEMESTER**	3rd
COURSE TITLE	Dynamics		

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	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*	Specialized general knowledge
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=17776&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*

Upon successful completion of the course it is expected that the student is able to:

- Understand the fundamentals of dynamics of material points and rigid bodies.
- Apply the appropriate coordinate system (Cartesian, polar, cylindrical and orbital) to describe the motion of material points and rigid bodies.
- Calculate kinematic quantities that determine the position, velocity and acceleration of a material point, as well as kinematic quantities (orientation, angular velocity, angular acceleration) that determine the position and orientation of rigid bodies.
- Understand the relationship between the movement of material points and the forces that cause the motion or are developed during movement.
- Define motion equations and kinematic constraints that describe the dynamics of material points and rigid bodies.
- Solve the system of equations of motion and kinematic constraints to determine kinematic quantities (position, velocity, acceleration, orientation, angular velocity and angular acceleration) and forces / torques that cause the motion of material points and rigid bodies.
- Determine the linear and angular momentum of material points and rigid bodies.
- Apply the linear momentum-impulse equations and angular momentum-impulse equations to material points systems and rigid bodies.
- To solve problems of impact of material points and rigid bodies.
- Determine the dynamic energy of conservative forces and the work of forces applied to material points systems and rigid bodies.

- Formulate and apply the principles of energy conservation.
- Apply the basic principles of dynamics in solving practical problems with a focus on analyzing and identifying movement and the forces that are developed during body movement.

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
- Working independently
- Decision-making
- Criticism and self-criticism
- Production of free, creative and inductive thought

(3) SYLLABUS

Kinematics of material points: Position vector, velocity, acceleration. Relative transport motion.
Kinetics of material points: Newton and Euler's laws of motion, principles of momentum and impulse (linear and angular), principles of work and energy. Applications (impact, space-mechanics)
Rigid body kinematics: Transport and rotational motion, flat motion, rotation around a fixed point/axis, general spatial motion, relative motion.
Rigid body kinetics: Inertia tensor, impulse and kinetic energy, Euler's equations, impulse and momentum principles, work and energy principles. Applications (impact, balance, axisymmetric bodies).

(4) 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*	Parts of the course material are presented using ICT

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	35
Study	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.*	Language of evaluation: Greek Methods of evaluation: -Final Exams (60%) -Mid-term Exams (40%)

(5) ATTACHED BIBLIOGRAPHY

-Suggested bibliography:

- S. Natsiavas, Applied Dynamics, Ziti Publications (in Greek), 1994.
- Ferdinard P.Beer and E.Russell Johnston,Jr., Vector Mechanics for Engineers: Statistics and Dynamics, Fifth Edition, McGraw-Hill, 1988.
- R.C. Hibbeler, Engineering Mechanics: Statistics and Dynamics, Sixth Edition, MacMillan Publishing Company, USA 1992.