

COURSE: APPLIED MECHANICS

STUDIES: INDUSTRIAL ENGINEERING (1st cycle)

CODE: 41012

TYPE: OU

YEAR: 2nd

SEMESTER: 1st

CREDITS (hours/week): 7,5 (4)

ECTS CREDITS: 6,5

PROFESSOR: Dr. Guillermo Reyes Pozo

LANGUAGE: Spanish

PREREQUIREMENTS: Linear Algebra, Calculus I, Differential Calculus, Physical Principles of Engineering.

PREVIOUS KNOWLEDGES: Operations with vectors. Plane and space geometry. Differential equations. Mechanical physics.

COURSES THAT HAVE TO BE STUDIED SIMULTANEOUSLY: none.

COURSE DESCRIPTION:

Physical laws of statics and dynamics of rigid solids are studied, as well as the applications of those laws to problems related with industrial engineering.

COURSE OBJECTIVES:

Graduates of our programme of industrial engineering acquire the knowledges and develop the abilities hereinafter mentioned:

1. Learn to make statics and dynamics calculations to apply them in systems of rigid solids (1)
2. Learn to analyze the patterns that describe the behaviour of rigid solid systems. (2)
3. Give the student the ability to identify, formulate and solve problems of statics and dynamics of rigid solids systems. (3)

CONTENTS:

1. Introduction.
2. Geometrical properties and distributed charges.
3. Statics.
4. Rigid solid cinematics.
5. Rigid solid kinetics.
6. Energy and work.
7. Kinetics of rigid solids in the space.
8. Mechanical vibrations.

METHODOLOGY:

Teaching takes place in master classes, classes of problems and problems solved outside the class

The following practices are carried out:

1. Experimental estimation of the position of the center of gravity of a solid
2. System of coplanar forces
3. Experimental calculation of moments
4. The wheel as “energy accumulator” .
5. Work and efficiency of mechanical systems
6. Friction
7. Simulation of a mass- spring-damper system
8. Experimental measurement of equilibrium in isostatic beams

EVALUATION:

The final qualification of the course consists of 85 % of the exam result and 15 % of the practices qualification.

A.- Exams

L.- Participation in the laboratory

CRITERIA FOR THE RESULTS EVALUATION:

Objective 1:

The student must demonstrate that he knows how to make statics and dynamics calculations of rigid solids systems [A, L].

Objective 2:

The student must be able to analyze the patterns that describe the behaviour of rigid solid systems [A].

Objective 3:

The student must demonstrate that he has the ability to identify, formulate and solve statics and dynamics problems of rigid solid systems [A, L].

ORDINARY BIBLIOGRAPHY:

1. Riley, William F. “Ingeniería mecánica. Estática”. Reverté, 1995
2. Riley, William F. “Ingeniería mecánica. Dinámica”. Reverté, 1996

BIBLIOGRAPHY or COMPLEMENTARY MATERIAL:

1. Beer & Jonhston. “Mecánica vectorial para ingenieros: Estática”. McGraw-Hill, 1998
2. Beer & Jonhston. “Mecánica vectorial para ingenieros: Dinámica”. McGraw-Hill, 1998
3. Belda, E.: “Mecánica Teórica”. Ed.Belda Villena,1968.

4. Thomas R. Kane; David A. Levinson. "Theory and Applications". McGraw-Hill. 1985.
5. Prieto Alberca, M. "Mecánica Racional" Vol.:1y2. Ed. Aula Documental de Investigación. 1993.

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DATE OF THE LAST REVIEW: February 2005