

Course guide

205063 - 205063 - Dynamic Analysis of Structures

Last modified: 02/04/2024

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).
MASTER'S DEGREE IN RESEARCH IN MECHANICAL ENGINEERING (Syllabus 2021). (Optional subject).
MASTER'S DEGREE IN MECHANICAL ENGINEERING RESEARCH (Syllabus 2024). (Optional subject).

Academic year: 2024 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Weyler Perez, Rafael

Others: Hernández Rojas, Suilio Eliud
Guanche Reyes, Edinson

TEACHING METHODOLOGY

Theoretical and practical sessions in which the instructor introduces the theoretical basis of the concepts, methods and results and illustrates them with examples appropriate to facilitate their understanding, and problem-based learning sessions. The instructor will provide the syllabus and monitoring of activities (ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

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STUDY LOAD

Type	Hours	Percentage
Hours large group	27,0	36.00
Self study	48,0	64.00

Total learning time: 75 h

CONTENTS

Module 1: Equation of motion of discrete systems

Description:

Definitions and terminology, Mass matrix, stiffness matrix and damping. Movements in the base. Generalized loads. Response.

Related activities:

Theoretical and practical sessions.

Full-or-part-time: 10h

Theory classes: 4h

Self study : 6h

Module 2: Free Vibration

Description:

Eigenvalues, Eigenvector, Modes of vibration, Orthogonality Relations. Modal analysis. systems of n degrees of freedom

Related activities:

Theoretical and practical sessions.

Full-or-part-time: 22h

Theory classes: 8h

Self study : 14h

Module 3: Forced Vibration

Description:

Principal coordinates, response to harmonic load, resonance, critical damping. response to seismic movements, Modal Analysis, Spectral Analysis, Directional Combination. Systems of n degrees of freedom.

Related activities:

Theoretical and practical sessions.

Full-or-part-time: 25h

Theory classes: 9h

Self study : 16h

Module 4: Software Applications

Description:

2d and 3d models, frame element, area element, finite element method applications, materials, sections, system loads, rigid and flexible diaphragms, vibrations functions, spectrum cases, spectral analysis, dynamic response of buildings.

Related activities:

Theoretical and practical sessions.

Full-or-part-time: 18h

Theory classes: 6h

Self study : 12h



GRADING SYSTEM

Partial exam 25 %

Final Exam 40 %

Task assignments 20 %

Proposed activity 15 %