

205063 - Dynamic Analysis of Structures

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
 Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering
 Academic year: 2019
 Degree: MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Teaching unit Optional)
 MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Teaching unit Optional)
 MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Teaching unit Optional)
 ECTS credits: 3 Teaching languages: English

Teaching staff

Coordinator: Weyler Perez, Rafael

Others: Hernández Rojas, Suilio Eliud
 Guanchez 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

Total learning time: 75h	Hours large group:	27h	36.00%
	Hours medium group:	0h	0.00%
	Hours small group:	0h	0.00%
	Guided activities:	0h	0.00%
	Self study:	48h	64.00%

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Content

<p>Module 1: Equation of motion of discrete systems</p>	<p>Learning time: 10h Theory classes: 4h Self study : 6h</p>
<p>Description: Definitions and terminology, Mass matrix, stiffness matrix and damping. Movements in the base. Generalized loads. Response.</p> <p>Related activities: Theoretical and practical sessions.</p>	
<p>Module 2: Free Vibration</p>	<p>Learning time: 22h Theory classes: 8h Self study : 14h</p>
<p>Description: Eigenvalues, Eigenvector, Modes of vibration, Orthogonality Relations. Modal analysis. systems of n degrees of freedom</p> <p>Related activities: Theoretical and practical sessions.</p>	
<p>Module 3: Forced Vibration</p>	<p>Learning time: 25h Theory classes: 9h Self study : 16h</p>
<p>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.</p> <p>Related activities: Theoretical and practical sessions.</p>	



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Module 4: Software Applications	Learning time: 18h Theory classes: 6h Self study : 12h
<p>Description: 2d and 3d models, frame element, area element, finit element method applications, materials, sections, system loads, rigid and flexible diaphragms, vibrations functions, spectrum cases, spectral analysis, dynamic response of buildings.</p> <p>Related activities: Theoretical and practical sessions.</p>	

Qualification system

Partial exam 25 %
Final Exam 40 %
Task assignments 20 %
Proposed activity 15 %

Bibliography