uc3m | Universidad Carlos III de Madrid
Vicerrectorado de Estudios
Apoyo a la docencia y gestión del grado

COURSE: AEROSPACE STRUCTURES		
DEGREE: Bachelor's Degree in AEROSPACE ENGINEERING	YEAR: 3	TERM: 1

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	TEACHING (mark X)		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS		DESCRIPTION	CLASS HOURS (1,66=50+50 min)	HOMEWORK HOURS (Max. Estim. 6,5h)
1	1	CHAPTER 1. Structures in the aerospace and aeronautical sector Subject 1 Structural description of the aircraft - Loads on aircraft structures - Function of structural components - Aircraft structure - Helicopter structure	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	2	Exercises related with Subject 1		X		Personal work about Subject 1 Proposed exercises. Discussion	1,66	
2	3	Subject 2. Structures in the aeronautical sector (I) - Definition of frame structure - Non-traslational structure - Stresses in frame structures	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	4	Exercises related with Subject 2		X		Personal work about Subject 2 Proposed exercises. Discussion	1,66	
3	5	Subject 3. Structures in the aeronautical sector (I) - Definition of lattice structure - Stresses in truss structures	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	6	Exercises related with Subject3		X		Personal work about Subject 3 Proposed exercises. Discussion	1,66	

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4	7	CHAPTER 2. Bending, shear and torsion of thinwalled beams Subject 4 Bending and shear of open and closed, thin-walled beams(I) - Kinematic hypothesis - Shear of open section beams	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	8	Exercises related with Subject 4		X		Personal work about Subject 4 Proposed exercises. Discussion	1,66	
5	9	Subject 5. Bending and shear of open and closed, thin-walled beams(II) - Shear of closed section beams - Shear centre	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	10	Exercises related with Subject 5		X		Personal work about Subject 5 Proposed exercises. Discussion	1,66	
6	11	Subject 6. Torsion on thin-walled beams - Torsion of closed section beams - Torsion of open section beams - Torsion of multiple-cell section beams	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	12	Exercises related with Subject 6		X		Personal work about Subject 6 Proposed exercises. Discussion	1,66	
7	13	CHAPTER 3. Plates and Shells Subject 7. Bending of thin plates (I) - Kinematic - Plates subjected to a distributed transverse loads	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	14	Laboratory session 1. INTRODUCTION TO ABAQUS. Applying the knowledge of theoretical concepts, the students will design, using a Finite Element software, a structural element to assure that the stresses and deflections are below de the maximum values. At the end of the semester students will submit, through Aula Global, a report which will include a description of the design and calculus of the structural element. The date of the laboratory session may be changed. Any changes will be communicated via Aula Global		X	computer	- Work in groups -Analysis of data -Report writing The class could be divided in two groups depending of the number of students	1,66	

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8	15	Subject 8. Bending of thin plates (II) - Plates subjected to bending and twisting - Transversal and in-plane loading Continuous assessment test - The date of the continuous assessment test may be changed. Any changes will be communicated via Aula Global	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	16	Laboratory session 2. DESIGN AND ANALYSIS OF THE THIN WALLED BEAM STRUCTURE. Applying the knowledge of the theoretical concepts, the students will study the stresses and strains in elements of simple geometry using a Finite Element software (Abaqus). Additionally the design will be printed in a 3D-printer and tested.The date of the laboratory session may be changed. Any changes will be communicated via Aula Global		X	computer	- Work in groups -Analysis of data -Report writing The class could be divided in two groups depending of the number of students	1,66	
9	17	Subject 9. Shells (I) - Thin shells subjected to bending and in-plane loads	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	18	Exercises related with Subject 7 and 8. Partial exam		X		Personal work about Subject 7 and 8 Proposed exercises. Discussion	1,66	
10	19	Subject 10. Shells (II) - Thin shells subjected to bending and in-plane loads	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	20	Laboratory session 3. DESIGN AND ANALYSIS OF THE SHELL STRUCTURE. Applying the knowledge of the theoretical concepts, the students will study the stresses and strains in elements of simple geometry using a Finite Element software (Abaqus). The date of the laboratory session may be changed. Any changes will be communicated via Aula Global		X	computer	- Work in groups -Analysis of data -Report writing The class could be divided in two groups depending of the number of students	1,66	

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11	21	CHAPTER 4. Laminate and sandwich structures Subject 11. Theory of laminate - Kinematic - Orthotropic constitutive equations - Classical and first-order theories of laminate composites - Failure criteria.Continuous assessment test - The date of the continuous assessment test may be changed. Any changes will be communicated via Aula Global	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	22	Laboratory session 4. EXPERIMENTAL ANALYSIS OF THE SHELL STRUCTURE. Applying the knowledge of the theoretical concepts, and using the Abaqus data, results will be compared in the lab through experimntal tests. The date of the laboratory session may be changed. Any changes will be communicated via Aula Global		X	Lab	- Work in groups -Analysis of data -Report writing The class could be divided in two groups depending of the number of students	1,66	
12	23	Subject 12. Composite beams and plates - Composite beams subjected to bending - Composite thin-walled cross-section beams - Bending of composite plates	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	24	Exercises related with Subject 9		X		Personal work about Subject 9 Proposed exercises. Discussion	1,66	
13	25	Subject 13. Sandwich structures - Basic sandwich theory - Sandwich beams -Sandwich plates	X			Previous reading of proposed themes Personal work about lesson	1,66	6,5
	26	Exercises related with Subject 10		X		Personal work about Subject 10 Proposed exercises. Discussion	1,66	
14	27	Exercises related with Subject 11.Continuous assessment test - The date of the continuous assessment test may be changed. Any changes will be communicated via Aula Global	X			Personal work about Subject 11Proposed exercises. Discussion	1,66	6,5
	28	Exercises related with Subject 12		X		Personal work about Subject 12 Proposed exercises. Discussion	1,66	
	29	Exercises related with Subject 13		X		Personal work about Subject 13 Proposed exercises. Discussion	1,66	3,25

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						Subtotal 1	**48**	**94**
						Total 1 *(Hours of class plus student homework)*	**142**	
15		Tutorials, handing in, etc					3,6	-
16		Assessment					4	10
17								
18								
						Subtotal 2	**8**	**10**
						Total 2 *(Hours of class plus student homework)*	**18**	
TOTAL (*Maximun 160 horas*)							**160**	