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

COURSE: Linear Algebra		
DEGREE: Physics Engineering	YEAR: 2020-21	TERM: 1

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	TEACHING (mark X) LECTURES	TEACHING (mark X) SEMINARS	SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	WEEKLY PROGRAMMING FOR STUDENT DESCRIPTION	CLASS HOURS (1,66=50+50 min)	HOMEWORK HOURS (Max. Estim. 6,5h)
1	1	Complex numbers: definition, basic operations, conjugation, modulus, cartesian and polar representations, the complex plane, exponential fo				Study and understanding of the topics covered in th lecture	1,66	6,5
	2	Roots of complex numbers, exercises on complex numbers				Solution of selected exercises	1,66	
2	3	Vector spaces. Bases. Linear transformations and matrix vector product.				Study and understanding of the topics covered in th lecture (Treil 1.1-1.4)	1,66	6,5
	4	Exercises on vector spaces and linear transformations				Solution of selected exercises	1,66	
3	5	Composition of linear transformations. Matrix product. Invertibility. Subspaces.				Study and understanding of the topics covered in th lecture (Treil 1.5-1.7)	1,66	6,5
	6	Exercises on linear transformations and invertibility				Solution of selected exercises	1,66	
4	7	Linear systems. Solution. Echelon forms. Pivots. Row reduction and invertibility.				Study and understanding of the topics covered in th lecture (Treil 2.1-2.4)	1,66	6,5
	8	Exercises on systems of linear equations				Solution of selected exercises	1,66	
5	9	Dimension. General solution of a linear system and fundamental subspaces. Changes of coordinates.				Study and understanding of the topics covered in th lecture (Treil 2.5-2.8)	1,66	6,5
	10	Exercises on dimension, linear systems and changes of coordinates				Solution of selected exercises	1,66	
6	11	Determinants. Required properties, construction, minors and rank.				Study and understanding of the topics covered in th lecture (Treil 3.1-3.3,3.5-3.6)	1,66	6,5
	12	Partial test: topics covered on weeks 1-5				Test	1,66	
7	13	Spectral theory and diagonalization				Study and understanding of the topics covered in th lecture (Treil 4.1-4.2)	1,66	6,5
	14	Exercises on spectral theory and diagonalization				Solution of selected exercises	1,66	
8	15	Norms, inner products, orthogonal basis, orthogonal projections, Gram Schmidt				Study and understanding of the topics covered in th lecture (Treil 5.1-5.3)	1,66	6,5
	16	Exercises on orthogonality				Solution of selected exercises	1,66	
9	17	Least squares, adjoint of a linear transformation, isometries, unitary matrices				Study and understanding of the topics covered in th lecture (Treil 5.4-5.6)	1,66	6,5
	18	Exercises on least squares, matrices and orthogonality				Solution of selected exercises	1,66	
10	19	Matrices and orthogonality: Schur form, spectral theory for normal matrices				Study and understanding of the topics covered in th lecture (Treil 6.1-6.2)	1,66	6,5
	20	Exercises on Schur form and normal matrices				Solution of selected exercises	1,66	
11	21	Polar and singular value decompositions				Study and understanding of the topics covered in th lecture (Treil 6.3-6.5)	1,66	6,5
	22	Partial test: topics covered on weeks 6-10				Test	1,66	
12	23	Bilinear and quadratic forms				Study and understanding of the topics covered in th lecture (Treil 7.1-7.3)	1,66	6,5
	24	Exercises on singular value decomposition and bilinear forms				Solution of selected exercises	1,66	
13	25	Positive definite forms				Study and understanding of the topics covered in th lecture (Treil 7.4-7.5)	1,66	6,5
	26	Exercises on bilinear and positive definite forms				Solution of selected exercises	1,66	
14	27	Advanced topics				Study and understanding of the topics covered in th lecture (Treil, selected sections of Ch. 8 and 9)	1,66	6,5
	28	Exercises on advanced topics				Solution of selected exercises	1,66	
	29	General review				Final exam preparation	1,66	3,25
						Subtotal 1	**48**	**94**
						Total 1 *(Hours of class plus student homework)*	**142**	
15		Tutorials, handing in, etc	X				3,6	-
16								
17		Assessment					4	10
18								
						Subtotal 2	**8**	**10**
						Total 2 *(Hours of class plus student homework)*	**18**	
TOTAL (*Maximun 160 horas*)							**160**	