



<b>COURSE: LINEAR ALGEBRA</b>		
<b>DEGREE: COMPUTER SCIENCE AND ENGINEERING</b>	<b>YEAR: FIRST</b>	<b>TERM: FIRST</b>

WEEKLY PLANNING								
WEEK	SESSION	DESCRIPTION	GROUP (mark X)		SPECIAL ROOM FOR SESSION (Computer Classroom, audiovisual classroom)	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURE	SEMINAR		DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h per week)
1	1	<b>Theory. Unit 1.</b> Matrices	X			Review of definitions and concepts related to matrices. Matrix operations. Transpose of a matrix. Inverse of a matrix. Determinant. Sets induced by a matrix.	1,66	5.68
1	2	Exercises. Unit 1		X		Exercises. Unit 1	1,66	
2	3	<b>Theory. Unit 2.</b> Systems of Linear Equations.	X			Geometric interpretation of linear systems in $R^n$ . Direct methods for solving linear systems. Existence and unicity of solutions. Matrix methods.	1,66	5.68
2	4	Exercises. Unit 2		X		Exercises. Unit 2	1,66	
3	5	<b>Theory. Unit 3.</b> Vector Spaces	X			Vector spaces. Linear dependence. Vector subspaces. Operations between vectors subspaces.	1,66	5.68
3	6	Exercises. Unit 3		X		Exercises. Unit 3	1,66	
4	7	<b>Theory. Unit 4:</b> Basis and dimension	X			Spanning sets. Basis. Dimension. Coordinates.	1,66	5.68
4	8	Exercises. Unit 4		X		Exercises. Unit 4	1,66	
5	9	<b>Theory. Unit 5:</b> Linear transformations	X			Definition and properties. Operations between linear transformations.	1,66	5.68
5	10	Exercises. Unit 5		X		Exercises. Unit 5	1,66	
6	11	<b>Theory. Unit 6:</b> Linear transformations and Matrices	X			Representation of linear transformations using matrices.	1,66	5.68
6	12	Exercises. Unit 6		X		Exercises. Unit 6	1,66	

7	13	<b>Theory. Unit 7:</b> Change of basis	X			Change of basis. Normal form of a linear transformation.	1,66	5.68
7	14	Exercises. Unit 7		X		Exercises. Unit 7	1,66	
8	15	<b>Theory. Unit 8:</b> Eigenvalues and eigenvectors	X			Definitions. The characteristic polynomial and the characteristic equation. Diagonalization.	1,66	5.68
8	16	Exercises. Unit 8		X		Exercises. Unit 8	1,66	
9	17	<b>Theory. Unit 9:</b> Inner product. Orthogonality	X			Inner product. Length and angles. Orthogonal projection. Orthogonal complement.	1,66	6.02
9	18	Exercises. Unit 9		X		Exercises. Unit 9	1,66	
10	19	<b>Theory. Unit 10:</b> Orthogonal bases	X			Orthogonal sets and bases. Gram-Schmidt process. QR factorization.	1,66	
10	20	Exercises. Unit 10		X		Exercises. Unit 10	1,66	5.68
10	21	<b>Assessment test</b>	X			Assessment test (units 1-8)	1,66	
11	22	<b>Theory. Unit 11:</b> The spectral theorem	X			Diagonalization of symmetric matrices. Spectral decomposition.	1,66	5.68
11	23	Exercises. Unit 11		X		Exercises. Unit 11	1,66	
12	24	<b>Theory. Unit 12:</b> Geometry of linear transformations	X			Reflections. Contractions and Dilations. Rotations. Projections.	1,66	5.68
12	25	Exercises. Unit 12		X		Exercises. Unit 12	1,66	
13	26	<b>Theory. Unit 13:</b> Least squares	X			The least squares problema. Geometric interpretation. Approximation of functions.	1,66	5.68
13	27	Exercises. Unit 13		X		Exercises. Unit 13	1,66	
14	28	<b>Theory. Unit 14:</b> Pseudoinverse and singular value decomposition	X			Pseudoinverse. Singular value decomposition	1,66	5.68
14	29	Exercises. Unit 14		X		Exercises. Unit 14	1,66	
<b>Subtotal 1</b>							<b>48.14</b>	<b>79.86</b>

<b>Total 1</b> ( <i>Hours of class plus student homework hours between weeks 1-14</i> )	<b>128</b>
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15		Tutorials, handing in, etc.						4
16		Assessment						5
17			3	5				
18			5					

<b>Subtotal 2</b>	<b>3</b>	<b>15</b>
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<b>Total 2</b> ( <i>Hours of class plus student homework hours between weeks 15-18</i> )	<b>22</b>
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<b>TOTAL</b> ( <i>Total 1 + Total 2</i> )	<b>150</b>
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