CAS MA 242 **Linear Algebra** **SEMESTER II / 2005**

Lecture and Discussions:	Antje Noack
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Class time: Lectures: Mondays and Thursdays 9:20 p.m. - 10:50 p.m. in WIL/A120/H
Discussion section: Fridays 1.00 p.m. - 2.00 p.m. in PHY/C118/U

Text: David C. Lay, Linear Algebra and its Applications
(updated second edition), Addison-Wesley-Longman, 1999.

Course Description: The course gives an introduction to linear algebra and its applications. This mathematical field is fundamental for a lot of other mathematical branches and is highly important in practice. The main topics include matrix algebra, solution of linear equations, geometrical interpretations, vector spaces, determinants, eigenvalues and eigenvectors, inner products and orthogonality.

Exams and grading: There will be two in-class exams during the semester, both during normal class time. They will be held on May 2th and June 6th. The final exam will take place on July 7th. University policy states that you must take the final at the scheduled time. The attendance at lectures, discussion sessions and at all three exams is required. Excuses for missing a class are only acceptable if a written medical certificate or a comparable document is provided. In addition to the in-class exams, you will be required to submit home work once a week during the semester. This work will partially determine your "discussion section grade". Each student has to give at least one presentation of an exercise in one of the discussion sections during the semester.
Grades for the course will be determined by applying the most favorable of the following two weighting schemes to your curved exam grades:

Scheme 1		**Scheme 2**	
Your best in-class exam :	25%	Each in-class exam:	25%
Your other in-class exam:	10%	The final exam:	35%
The final exam:	50%	Homework and discussion sections:	15%
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Homework: At the end of thursday's lecture you will get exercises related to the subjects discussed in the classes of that week. You will be expected to submit your homework until monday next week.

Summary of the subjects of the lecture:

1. Matrix Algebra
2. Solving Linear Equations
3. Geometric Description of $\Re^2, \Re^3$
4. Vector Spaces
5. Orthogonality
6. Eigenvalues and Eigenvectors
7. Minimization Problems, Constraint Optimization

Time schedule and correlation of the subjects to the sections of the book:

	Time	Lecture	Section	Discussion
1	04/04/05	Introduction,examples, Matrix-Vector operations	I.3-4	
	07/04/05	Matrix operations	II.1	08/04/05
2	11/04/05	Specific Matrices, The Inverse matrix	II.2	13/04/05
o	14/04/05	Procedure for solving linear equations, Echelon forms	I.1-2	
3	18/04/05	Solution sets, Computing the inverse, an example	I.5, II.2	20/04/05
	21/04/05	LU-Factorization	II.5	
4	25/04/05	Iterative solving, Partitioned matrices	II.6. II.4	27/04/05
	28/04/05	Geometric description of $\Re^2, \Re^n$, Linear transformations	I.3, I.7	
5	02/05/05	**In class Exam I**		04/05/05
	05/05/05	*Holiday: Himmelfahrt*		
6	09/05/05	Vector spaces: basic notations and examples	IV.1, 3-6	11/05/05
	12/05/05	*Dies Academicus*		
7	16/05/05	*Holiday*		
	19/05/05	*Holiday*		
8	23/05/05	Inner product,Orthogonality	VI.1,VI.7	25/05/05
	26/05/05	Orthogonal projections, The Gram-Schmidt Process	VI.2-3	
9	30/05/05	Matrix notation in vector spaces	IV.2	01/06/05
	02/06/05	The Determinant	III.1-3	
10	06/06/05	Applications	IV.6-9	8/06/05
	09/06/05	Eigenvalues and Eigenvectors	V.1	
11	13/06/05	**In class Exam II**		15/06/05
	16/06/05	The characteristic equation, Diagonalization	V.2-3	
12	20/06/05	Jordan normal form, Singular value decomposition	V.3, VII.4	22/06/05
	23/06/05	Applications		
13	27/06/05	Symmetric matrices	VII.1	29/06/05
	30/06/05	Minimization problems, Least Squares method	VI.5	
14	04/07/05	Applications to practical problems	VI.6	06/07/05
	07/07/05	**Final Exam**		
15	11/07/05	Some aspects of constrained optimization	VII.2-3	13/07/05
	14/07/05	Some resume & Conclusions		