DEPARTMENT OF MOLECULAR BIOTECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
MAT112	1			Spring
Title	**T**	**A**	**L**	**ECTS**
Analysis II and Linear Algebra	3	2	0	6

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Molecular Biotechnology					
Forms of Teaching and Learning	Face to Face					
Course Type	**Compulsory**	**X**	**Elective**			
Objectives	To make students use matrices, partial derivative and integral concepts in multivariable functions, to gain ability to use mathematics knowledge to solve scientific problems					
Content	Vectors, Real Matrices, Determinants, Linear Equation Systems, Gauss Algorithm, Linear Functions, Complex Matrices, Fourier Series, Multidimensional Derivatives and Integrals, Ordinary and Multidimensional Integrals, Laplace Transformation					
Prerequisites						
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement	No					

Recommended or Required Reading	
Books / Lecture Notes	Şanal Ziya, Mathematik für Ingenieure, Vieweg+Teubner, Wiesbaden 2009. Papula Lothar, Mathematik für Ingenieure und Naturwissenschaftler, Band 1+2, Wiesbaden 2011. Skriptum „Analysis I für Ingenieure“, Prof. Dr. Dirk Ferus - Skriptum „Analysis II für Ingenieure“, Prof. Dr. Dirk Ferus.
Other Sources	

Additional Course Material	
Documents	
Assignments	
Exams	

Course Composition		
Mathematics und Basic Sciences	100	%
Engineering		%
Engineering Design		%
Social Sciences		%

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Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	30
Quiz		
Assignments		
Attendance		
Recitations		
Projects	1	10
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	30
Self-Study	14	4	75
Assignments	14	3	40
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	4	2
		Total Work Load	**178**
		ECTS Points (Total Work Load / Hours)	**6**

Learning Outcomes

1	Solve the systems of linear equations. Provide arithmetic operations with matrices. Compute the inverse of matrix.
2	Determine the value of determinant of a matrix. Use Cramer rule to solve the systems.
3	.Learn the importance of the concepts of vector space, basis and dimension.
4	Compute the matrix representation of a linear transformation.
5	Find an orthonormal basis using the Gram-Schmidt process.
6	Evaluate the eigenvalues and the corresponding eigenvectors of the matrix.

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12	
Weekly Content	
1	Matrices and Systems of Equations
2	Matrices and Systems of Equations
3	Matrices and Systems of Equations
4	Determinants
5	Determinants / Vector Space
6	Vector Space
7	Vector Space
8	Midterm
9	Vector Space / Linear Transformations
10	Linear Transformations
11	Eigenvalues
12	Eigenvalues / Orthogonality
13	Orthogonality
14	Orthogonality
15	

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	5	5	5	5	5	5
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

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Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
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