DEPARTMENT OF CIVIL ENGINEERING

Course Details				
Code	**Academic Year**			**Semester**
BAU354				
Title	**T**	**A**	**L**	**ECTS**
Structural Analysis III	3	1	1	

Language	German					
Level	**Undergraduate**	*	**Graduate**		**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	*		
Objectives	The aim of the qualification is to acquire competence in the non-linear methods for the static calculation of structures. Basics in theory and application are taught in detail in order to calculate beam structures according to second order theory and plastic hinge theory and to determine the load capacity in the failure state. Students learn to correctly interpret the geometrically and physically non-linear load-bearing behavior, including stability behavior, and to critically evaluate the results of non-linear static calculations.					
Content	Failure states of beam structures are discussed and the formulation of stress and stability problems of the statics derived from them. The basic equations of the second-order theory of rods are derived and the manual calculations in the course of the path size method for geometrically nonlinear problems are learned, in particular the determination of buckling loads and buckling shapes for rod structures using the angle of rotation method. With the flexible hinge theory, the influence of the inelastic material behavior on the load-bearing capacity of rod structures is recorded and the non-linear calculation of load capacities is learned manually by using the load capacity sets and the process of successively increasing the load. The determination of the moment-curvature relationship for rectangular cross-sections of reinforced concrete beams is explained and their application for the load capacity calculation is learned. Subsequently, the basics of the computer-oriented path variable method are explained using the example of the direct stiffness method for beam structures and applied as an example.					
Prerequisites	Structural Analysis I and Structural Analysis II					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	„Baustatik - einfach und anschaulich“, Eddy Widjaja
Other Sources	

Additional Course Material

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Documents		
Assignments		
Exams		
Course Composition		
Mathematics und Basic Sciences		%
Engineering		%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	6	84
Self-Study	14	2	28
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	2	10
Recitations			
Laboratory			
Projects			
Final Exam	1	2	15
		Total Work Load	
		ECTS Points (Total Work Load / Hour)	

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Learning Outcomes	
1	Students learn to correctly interpret the geometrically and physically non-linear load-bearing behavior, including stability behavior, and to critically evaluate the results of non-linear static calculations.
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Weekly Content	
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14	
15	

Contribution of Learning Outcomes to Program Objectives (1-5)							
	P1	P2	P3	P4	P5	P6	P7
1							

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9							
10							
11							
12							

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