

	HTWK Leipzig, Leipzig University of Applied Sciences			
	Module Course code	Structural Mechanics sMe (BIM 4221/4222)		
	Semester	Summer semester		
	ECTS, level	5 points, Master's (graduate)		
	Language of instruction	English		
	Teaching staff	Prof. Dr.-Ing. Volker Slowik		
Prerequisites	Basics of structural analysis			
Learning outcomes	<p>The students have advanced knowledge of shell structures and energy methods in structural engineering and are able to apply technical terminology correctly in the English language. This improves their technical and linguistic abilities to follow a degree programme in an English-speaking country.</p> <p>The course on Energy Methods covers energy-based concepts of structural analysis like virtual work principles and variational methods. In the course on Shell Structures, both the membrane theory and the bending theory are utilised for determining internal forces in thin-walled shells.</p>			
Course contents	<p>Energy Methods</p> <ul style="list-style-type: none"> - Real and virtual work - Virtual strain energy - Principle of virtual displacements - Principle of virtual forces - Energy theorems - Variational methods - Weighted residual methods - Virtual work principles in matrix structural analysis <p>Shell Structures</p> <ul style="list-style-type: none"> - Introduction to thin-walled shells - Membrane theory of shells of revolution - Membrane theory of shells of translation - Selected solutions of membrane theory for general shells - Bending theory of axi-symmetric shells 			
Workload	150 hours, of which 56 hours attendance (14 weeks x 4 hours)			
Pre-examination requirements	None			
Mode of instruction and assessment	Lecture	Seminar	Laboratory Course	Assessment
	4 hours per week			Written examination
Recommended reading	<p>J. N. REDDY: <i>Energy Principles and Variational Methods in Applied Mechanics</i>, John Wiley & Sons, 2002</p> <p>W. MCGUIRE; R. H. GALLAGHER; R.D. ZIEMIAN: <i>Matrix Structural Analysis</i>, John Wiley & Sons, 1999</p> <p>A. ZINGOSI: <i>Shell Structures in Civil and Mechanical Engineering</i>, Thomas Telford, London 1997</p> <p>C.R. CALLADINE: <i>Theory of Shell Structures</i>, Cambridge University Press, 2007</p>			