

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Structural Mechanics		Code 1010115121010110272
Field of study Civil Engineering Extramural Second-cycle	Profile of study (general academic, practical) general academic	Year /Semester 1 / 2
Elective path/specialty Structural Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 20 Classes: - Laboratory: - Project/seminars: 10		No. of credits 4
Status of the course in the study program (Basic, major, other) major		(university-wide, from another field) from field
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 4 100%
Responsible for subject / lecturer: Michał Guminiak, dr inż. email: michal.guminiak@put.poznan.pl tel. +48 61 665 2475 Faculty of Civil and Environmental Engineering Piotrowo 5 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	1. Student knows the analytical method for calculating internal forces and displacements in the statically determinate and indeterminate bars, trusses, beams and frames flat systems. 2. Student has a basic knowledge of strut buckling and loss of stability of beam and frame flat systems. 3. Student has knowledge of the state of stress and strain in the selected point of cross section of structures.
2	Skills	1. Student can calculate internal forces and displacement in the statically determinate and indeterminate bar, beam and frame flat systems. 2. Student can calculate stress and strain in the selected point of cross section of structure.
3	Social competencies	Student is responsible for brought a basic knowledge of general mechanics and strength of materials.
Assumptions and objectives of the course: Getting acquainted with analysis by matrix methods of statics, dynamics and stability of flat bars, trusses, beams and frames and static analysis of string structures and shell.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Foundations of calculating of the steel frames with susceptible nodes. - [K_W03] 2. Foundations of formation of string constructions and their non-linear behavior. - [K_W03] 3. Foundations of formation and work of shells in state of membrane and bending. - [K_W03]		
Skills:		
1. Calculate the internal forces in the frames with susceptible nodes. - [K_U04] 2. Apply Newton - [K_U04] 3. Calculate the internal forces in shells in state of bending using engineering approach. - [K_U04]		
Social competencies:		
1. Student is responsible for the correctness of the calculations undertaken. - [K_K02] 2. Student can describe performed calculations and draw conclusions from their results. - [K_K02] 3. The student is aware of the need to systematically supplement and extend their knowledge. - [K_K10]		

Assessment methods of study outcomes		
1. Written and oral examination (includes two semesters).		
2. Two exercises for individual design solutions.		
Course description		
1. Analysis of bending of steel frames with susceptible nodes.		
2. Analysis of axially symmetrical shells in membrane and bending state using analytical methods and taking into account the beam edge and elastic continuous foundations.		
3. Static analysis of string constructions taking into account the geometric nonlinearity, the problems of shaping and implementation (additionally).		
Basic bibliography:		
1. Wybrane zagadnienia zaawansowanej mechaniki budowli, P. Litewka, R. Sygulski, Wydawnictwo Politechniki Poznańskiej, Poznań, 2012.		
2. Mechanika konstrukcji prętowych w ujęciu macierzowym, M. Guminiak, J. Rakowski, Wydawnictwo Politechniki Poznańskiej, Poznań, 2012.		
Additional bibliography:		
1. Mechanika budowli - ujęcie komputerowe, t. 1, 2 i 3, Z. Waszczyszyn i in., Arkady, Warszawa, 1995.		
2. Dźwigary powierzchniowe, K. Girkmann, Arkady, Warszawa 1957.		
3. Preparation to the exam.		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparation of the first exercise design.	20	
2. Preparation of the second exercise design.	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	37	1
Practical activities	47	2