Course code B.5.3 **Course item** ……

1. INFORMATION ABOUT THE COURSE

A. Basic information

Course title	Strength of materials
Field of study	Computer Aided Engineering
Cycle	*Second*
Study profile	*Academic*
Study mode	*Full-time*
Specialisation	*Not relevant*
Unit responsible for the field of study	*Faculty of Mechanical Engineering*
Lecturer	*Dr inż. Tomasz Janiak*
Introductory courses	*Mathematics and physics*
Prerequisites	*Basic mathematics and physics*

B. Semester/ weekly timetable

Semester	Lectures	Classes	Laboratories	Project classes	Seminars	Field experience	ECTS credits
II	15	-	15	-	-	-	4

LEARNING OUTCOMES (acc. to National Qualifications Framework)

No.	Description of learning outcomes	Reference to learning outcomes for the field of study	Reference to learning outcomes for the area of study
KNOWLEDGE			
K1	They knows the edge problem of the linear theory of elasticity, They have knowledge of defining complex cases of The strength, They knows the problem of stability of a simple rod, They knows the problem of the rod deadweight limit They knows the ways of modeling components and solutions in different cases strength	CAE_W02 CAE_W04	T2A_W03 T2A_W04 T2A_W05 T2A_W07
K2	They have an elementary knowledge of the inelastic characteristics of the materials plasticity and ways of the modeling	CAE_W07 CAE_W10	T2A_W01 T2A_W04 T2A_W05
SKILLS			
S1	They can create static scheme flat and spatial rod systems and create a numerical model	CAE_U01,	T2A_U08,

		CAE_U02, CAE_U12, CAE_U13,	T2A_U09, T2A_U16, T2A_U17
S2	They can using analytical calculations and computer programs define values and distributions of stresses in complex cases strength, they can calculate the displacement of statically determinate beams, they can to perform strength tests construction materials, interpret the results of laboratory tests and computer simulations, is ready to design cross sections of rod using the limit state method	CAE_U01, CAE_U12, CAE_U13, CAE_U14	T2A_U08, T2A_U09, T2A_U11, T2A_U16, T2A_U17
SOCIAL COMPETENCES			
SC1	They are able to interact and work in a group, taking in the different roles	CAE_K04, CAE_K06,	T2A_K04, T2A_K06,

2. TEACHING METHODS

Multimedia lectures, presentations.

2. METHODS OF EXAMINATION

Written exam, colloquium or test.

3. COURSE CONTENT

Specify the content separately for each type of classes in accordance with point I.B.	LECTURES 1. Complex cases the strength: Flexural oblique, eccentric presses stretching, bending with shear forces. 2. Calculation of deflections of beams. 3. Inelastic characteristics of the materials, plasticity. 4. The stability of a simple rod. 5. Bearing capacity of cross sections rod and rod systems. LABORATORIES 1. Analysis of the normal and tangential stresses in the beam laterally bending (bending straight and oblique). 2. Designation of deflection and bending angle in the beam bending laterally. 3. Calculation of the stresses and the core for a simple tension rod (compression) eccentrically. 4. Stability issues, determining the critical force for buckling of elastic and inelastic, designing rods having regard buckling. 5. Design of tension rods (compression) and bending according to various methods dimensioning.

6. VALIDATION OF LEARNING OUTCOMES

(Each learning outcome from the list requires validation methods to ensure that it was achieved by a student.)

Learning outcome	Form of assessment (for example:)					
	Written examination	Colloquium	Test	Report	……	……
K1	x	x				
K2	x	x				

S1		x	x			
S2		x	x			
SC1		x				

7. LITERATURE

Basic literature	S. Timoshenko, D. H. Young: Elements of strength of materials, D. Van Nostrand, 1968. 1968 Bogdan Skalmierski: Mechanics and strength of materials, Elsevier; Państwowe Wydawnictwo Naukowe, 1979. Nicholas Willems, John T. Easley, Stanley T. Rolfe: Strength of materials, McGraw-Hill, 1981 David J. Mcgill, Wilton W. King: Engineering mechanics: statics, PWS Engineering, 1985
Supplementary literature	Adam Podhorecki: Statyka i wytrzymałość ustrojów prętowych, Wydawnictwa Uczelniane Akademii Techniczno-Rolniczej, 2004

6. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity	Student workload– number of hours (for example:)
Participation in classes indicated in point 2.2	30
Preparation for classes	25
Reading assignments	20
Other (preparation for exams, tests, carrying out a project etc)	25
Total student workload	100
Number of ECTS credits allocated by the lecturer	**4**
Final number of **ECTS credits (determined by the Programme Council for the Field of Study)**	4