STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Computer Aided Structural Design		**1010101161010110660**
Field of study	Profile of study (general academic, practical)	Year /Semester
Civil Engineering First-cycle Studies	**general academic**	**3 / 6**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies	**full-time**	
No. of hours		No. of credits
Lecture: **30** Classes: **-** Laboratory: **45** Project/seminars: **-**		**4**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
major	**from field**	
Education areas and fields of science and art		ECTS distribution (number and %)
technical sciences		**4 100%**
Technical sciences		**4 100%**

Responsible for subject / lecturer:

dr inż. Wojciech Sumelka
email: wojciech.sumelka@put.poznan.pl
tel. (0-48) 61 647-5923
Wydział Budownictwa i Inżynierii Środowiska
ul. Piotrowo 5 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Mathematics: basic calculus and matrix algebra; Structural Mechanics: rod systems, Strength of Materials: elastic material, statics and dynamics, problems of 1D and 2D (plane stress / plane strain); Fundamentals of computational methods;
2	**Skills**	The student can independently analyze the static structure of the rod; He can use a classic method of displacements to solve systems of rod; Able to use selected tools of computer analysis and design of structures;
3	**Social competencies**	The student is aware of the desirability of continuous training in disciplines related to the field of study and disciplines;

Assumptions and objectives of the course:

Familiarize students with contemporary methods and tools of computer analysis of the structures. Acquisition of the basic tasks of modeling and efficient design calculations supporting the design process. Education personal responsibility for the results of the designer computer analysis - a critical assessment of the quality of the results.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Knows selected computer programs to support the calculation and design of the structure and organization of works - [K_W11]

Skills:

1. Unable to correctly define computational models used for computer analysis of structures - [K_U03]

Social competencies:

1. Is responsible for the accuracy of the results of their work and their interpretations - [K_K02]
2. Comply with the rules of ethics. - [K_K10]

Assessment methods of study outcomes

The pass mark for the laboratory is active participation in class. Evaluation of the laboratory will be determined on the basis of the total number of points obtained with exercise, two tests and evaluation activities in the classroom. In order to obtain credit must accumulate 60% of the possible points.

The pass of the lectures is the final sentence test (min. 60%).

Course description

Ordinary differential equations (using the weighted residua, finite difference method, finite element method).

Local and global formulations of in mechanics.

Numerical aspects of the tasks of the linear theory of elasticity and thermoelasticity (statics and dynamics, problems of 1D and 2D (plane stress, plane strain, fixed and transient heat flow))

Basic bibliography:

1. T.Łodygowski, W.Kąkol, Metoda elementów skończonych w wybranych zagadnieniach mechaniki konstrukcji inżynierskich, Skrypt PP, 1994 - Nr 1779
2. D.Kincaid, W. Cheney, Analiza numeryczna, WNT Warszawa 2006.
3. J.C. Butcher, Numerical Methods for Ordinary Differential Equations, John Wiley & Sons, Ltd., 2003
4. A.P.Boresi, K.P.Chong, S.Saigal, Approximate Solution Methods in Engineering Mechanics, John Wiley & Sons, Inc., 2003
5. Maria Radwańska, Metody komputerowe w wybranych zagadnieniach mechaniki konstrukcji, Kraków 2000.
6. Czesław Cichoń, Metody Obliczeniowe - wybrane zagadnienia, Kielce 2005
7. J.Povstenko, Wprowadzenie do metod numerycznych, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2005.
8. D.Kincaid, W.Cheney, Analiza numeryczna, WNT 2006.
9. A. Brozi, Scilab w przykładach, Nakom, Poznań 2007.
10. Notatki z wykładów opracowane przez studentów w latach ubiegłych.
11. "A First Course in the Finite Element Method?, Daryl L. Logan, Thomson 2007

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	30
2. Participation in laboratory	45
3. Preparation for laboratory exercises	30
4. Preparation for tests of credits from the lectures	30
5. Part in the consultation on the content of the lecture and / or completion of exercise	10

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	85	3
Practical activities	75	3