Information sheet for the course
Computer Modelling in Materials Engineering I

University: *Alexander Dubček University of Trenčín*

Faculty: *Faculty of Industrial Technologies in Púchov*

Course unit code: *MI-I-P-2*	**Course unit title:** *Computer Modelling in Materials Engineering I*

Type of course unit: *compulsory*

Planned types, learning activities and teaching methods:
Lecture: 1 hours weekly/13 hours per semester of study; face to face
Seminar: 0
Laboratory tutorial: 3 hours weekly/39hours per semester of study; face to face

Number of credits: *5*

Recommended semester:
the 1st semester in the 1st year of the full-time form of study,
the 1st semester in the 1st year of the part-time form of study.

Degree of study: *the 2nd degree of study (Engineering degree)*

Course prerequisites: *none*

Assessment methods:
To accomplish the given subject, student is obliged to be present at the lessons with the reference to specifications introduced in the study rules for the given study programme. He/she is also obliged to prepare and defend his/her semestral or terminal work which involves the solution of one numerical task based on modelling of material structure by help of finite element program.

Learning outcomes of the course unit:
Student has acquired and is familiar with practical aspects of modelling based on finite element method while the given modelling is focused on linear statics and dynamics of constructions as well as structures of materials.

Course contents:
Computer modelling by help of finite element method and general principles, hypotheses.
General post-processing. Types of finite elements (biaxial state of stress, biaxial deformation or strain, axially symmetric solid bodies). 3-D finite elements. Flat plates, shells and solid bodies. Materials properties: isotropic, orthotropic, and anisotropic. Static and geometric boundary or critical conditions. Symmetry and asymmetry. Creation of the model. Volume modelling and direct generation. Boolean modelling operations. Attributes of individual elements. Import of the volume models in relation to the CAD systems.
Input data. Pos-processing. Analyses of 2-D and 3-D constructions. Special features and elements. Features and elements of fracture mechanics. Concentration of stresses. Dynamic analysis of constructions. Harmonic analysis and transient analysis. Analysis of constructions with bumped or absorbed vibrations.

Recommended or required literature:

1. *Spyrakos, C.C.: Finite Element Modeling Engineering Practice. Algor, Inc., 1994.*
2. *Kolář, V.- Němec, V.- Kanický, V.: FEM Princípy a praxe Metódy konečných prvků. Computer Press Brno 1997.*
3. *Žmindák, M. - Grajciar, I., Nozdrovický, J.: Modelovanie a výpočty v metóde konečných prvkov. Žilina, 2004, ISBN 80-968823-5-X.*

Language: *Slovak*

Remarks: —

Evaluation history: /Grading system/

A	B	C	D	E	FX

Excellent	*Laudable*	*Good*	*Accepted results*	*Pass*	*Fail*
Lecturers: *prof. Ing. Ján Vavro, PhD., doc. Ing. Ján Vavro, PhD.*					
Last modification: *31.03.2014*					
Supervisor: *prof. Ing. Darina Ondrušová, PhD.*					