Information sheet for the course
Material Science

University: *Alexander Dubček University of Trenčín*

Faculty: *Faculty of Industrial Technologies in Púchov*

Course unit code: *TTN-P-1* | **Course unit title:** *Material Science*

Type of course unit: *compulsory*

Planned types, learning activities and teaching methods:
Lecture: 2 hours weekly/26 hours per semester of study; face to face
Seminar: 2 hours weekly/26 hours per semester of study; face to face
Laboratory tutorial: 2 hours weekly/26 hours per semester of study; face to face

Number of credits: *6*

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

Degree of study: *the 1st degree of study (Bachelor's degree)*

Course prerequisites:

Assessment methods:
active participation in laboratory exercises under study rules, processing laboratory protocols and examination of the subject.

Learning outcomes of the course unit:
The student is informed of basic theoretical knowledge on the evaluation of textile materials, their properties and uses. Can work with optical instruments, measure the length, fineness and fiber diameter. Obtained knowledge of the use of statistical methods in the textile laboratory.

Course contents:
Yarn of synthetic polymers - PAD, PES, POP .... The basic structure of materials and their properties. Typology of all basic types of natural and chemical materials. Fiber-forming polymers and their characteristics. Geometric properties of materials - length, cross-sectional, grade. Mechanical and time dependent mechanical properties - strength, ductility, flexibility. Heat - insulating properties, LOI, humidity hysteresis materials, bicomponent fibers, stretching and shaping fiber degradation by UV and bacteria.

1. *The history of textile fibers,*
2. *Types of fibers and their distribution.*
3. *Definition of fiber - structure, anisotropy properties. The distribution of fibers and methods of labeling - the shape modification*
4. *Production of chemical fibers in general. Melt spinning and of the solutions. Stretching the fibers coming cold and heat, the effect of stretching the fiber properties. Thermal stabilization (fixation)*
5. *The characteristics of the fibers. Geometrical properties of fibers. Density, bulk density, porosity fibers.*
6. *Mechanical properties. Elastic deformation parameters. The dependence of mechanical properties on the temperature and humidity. The shape of the working curves, stiffness fibers (examples). Time-dependent deformation processes.*
7. *Sorption characteristics. Sorption, thermal phenomena during the sorption, swelling. Sorption isotherm, hysteresis.*
8. *Thermal and thermomechanical properties. Pilling, flammability, LOI.*
9. *Electrical and surface characteristics.*
10. *Vegetable fibers - cotton. The structure, properties, use. Convolution, accessibility zones. Composition Cotton*

11. *Animal fibers. - Common features, differences in the structure of wool and silk right.*
12. *The fibers of natural polymers - Copper silk. Manufacture, structure, properties, use. Viscose fibers. Manufacture, structure, properties, use*

Recommended of required reading:

1. *Lizák, P., Militký, J.: Technické textílie, ISBN: 80-968674-0-7, Ružomberok, 2002.*
2. *Lizák, P., Legerská, J.: Náuka o materiali, ISBN: 978-80-969610-2-3, Ružomberok, 2009.*
3. *Lizák, P., Legerská, J.: Textilné materiály: Laboratórne cvičenia, TnU AD, 2004. – 52 s., ISBN: 80-8075-036-X*

Language: *Slovak*

Remarks: *the subject is provided only in the winter semester*

Evaluation history:

A	B	C	D	E	FX
9.9	38.61	24.75	13.86	6.93	5.94

Lecturers: *doc. Ing. Pavol Lizák, PhD.*

Last modification: *16.03.2015*

Supervisor: *doc. Ing. Pavol Lizák, PhD.*