Content

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMTE/M-PV-5/22	**Course unit title:** Applied Chemistry

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 2 / 2 / 0 **For the whole period of study:** 24 / 24 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 2.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Doctoral students individually elaborate a project focused on certain areas of chemistry, which are objects of research in their dissertation. In elaboration of their project, the students use knowledge based on data from the literature and foreign scientific publications, that reflects the current state of field. The students present their project in the form of a presentation in front of the teacher and other students and answer questions within the discussion.
Final assessment:
Assessment of exam results = 60 points
After completing all course lectures and seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam focused on areas of chemistry that are objects of research in their dissertation.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students master materials research methods from the point of view of applied chemistry at a high level. They have broad knowledge regarding the preparation, structure and properties of industrially important substances and their application in materials. They understand the principle of the methods used for studying of material properties at high level, especially within materials studied in the dissertation. They can independently determine the best research methods for assigned materials and orient themselves in the given issue.

Brief course unit content:
Characteristics and principle of the methods used to investigate the material characteristics studied material within the dissertation. Methods of structural analysis, methods of chemical

analysis, spectral analysis, thermal analysis, image analysis, dynamic mechanical analysis, methods for determining vulcanization characteristics, processing properties of materials, physical and mechanical properties and others.

Recommended Literature:

ROUSSAK, O., GESSER, H.D.: Applied Chemistry A Textbook for Engineers and Technologists, Second Edition, DOI 10.1007/978-1-4614-4262-2 Springer New York Heidelberg Dordrecht London Library of Congress Control Number: 2012947030 # Springer Science +Business Media New York 2013 ISBN 978-1-4614-4261-5 ISBN 978-1-4614-4262-2 (eBook- https://www.pdfdrive.com/applied-chemistry-a-textbook-for-engineers-and-technologists-d174988836.html)
HAGHI, A. K., POGLIANI, L., BALKOSE, D., MUKBANIANI, O.V, MERCADER, A.G: Applied chemistry and chemical engineering, Volume 2 Principles, Methodology, and Evaluation Methods, © 2018 by Apple Academic Press, Inc., International Standard Book Number-13: 978-1-315-20736-0 (eBook - https://www.pdfdrive.com/applied-chemistry-and-chemical-engineering-volume-2-principles-methodology-and-evaluation-methods-d183902370.html)
PAJTÁŠOVÁ, M., JÓNA, E., ONDRUŠOVÁ, D.: Priemyselná anorganická chémia II, Nekovové prvky, 1. vyd., Trenčín, TnUAD, 2016. ISBN 978-80-8075-764-9
KOMAN, M., JAMNICKÝ, M.: Anorganické materiály, STU Bratislava, 2007.
ONDRUŠOVÁ, D., PAJTÁŠOVÁ, M., JÓNA, E., JANÍK, R.: Priemyselná anorganická chémia III, Kovové prvky., 1. vyd., Trenčín, TnUAD, 2016. ISBN 978-80-8075-765-6.
FALHMAN, B.D.: Materials Chemistry. Springer Cham, 2023. e-ISBN: 978-3-031-18784-1.
RAVIN, N.: Polymer Science and Nanotechnology: Fundamentals and Applications. Elsevier, 2020. 978-0-12-816806-6.
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory elective course / Profile course
In-person education (total 48 hours):
Lecture: 24 hours
Seminar: 24 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed
Number of evaluated students: 22

A	B	C	D	E	Fx
77.27	9.09	4.55	9.09	0.0	0.0

Teachers: prof. RNDr. Mgr. Mariana Pajtášová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KNMVM/M-PV-4/22	**Course unit title:** Applied Mathematics

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 2 / 2 / 0 **For the whole period of study:** 24 / 24 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 2.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Each doctoral student submits an independently elaborated project focused on mathematical and statistical analysis. The students present their project in the form of a presentation in front of the teacher and other students and answer questions asked within the discussion.
Final assessment:
Assessment of exam results = 60 points
After completing all course lectures and seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam individually focused on statistical analysis of data and numerical methods of their processing.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students expand their knowledge in the field of statistical data analysis, numerical mathematics and the use of computer science for data processing. They are able to use their knowledge to process their dissertation and to apply mathematical knowledge in research of materials and their properties. They can independently statistically and mathematically analyse and evaluate the problem and formulate logically, mathematically, statistically correct conclusions of their research.

Brief course unit content:
Broaden of knowledge in the areas of experimental theory and statistics.
Special types of distributions of discrete and continuous random variables. Measurement errors. Point parameter estimation. Interval parameter estimation. Measurement uncertainties.
Testing statistical hypotheses. Reliability analysis.

Statistical analysis of multidimensional data.
Special nonlinear regression models.
Correlation - correlation models, correlation coefficients.
Classical interpolation procedures. Approximation of functions.
Approximation of tabular dependencies.
Extension of knowledge in the following areas: Numerical problems and algorithms, their conditionality and stability. Errors. Special methods for solving systems of linear equations.
Errors of solving systems of linear equations.
Numerical integration. Numerical solution of differential equations. Boundary value problems for ordinary differential equations.
Some partial differential equations.
Some types of thermal and chemical analyses.
Stationary and non-stationary analysis. FEM.
Navier-Stokes equations.

Recommended Literature:

RONALD A. FISHER: The Design of Experiments, 1935.
ANDĚL, J.: Matematická statistika, Praha, SNT, 1985.
TÖRÖK, CS.: Úvod do teórie pravdepodobnosti a matematickej štatistiky, Košice, TU, 1991.
HINES, W.W., MONTGOMERY, D.C.: Probability and Statistics in Engineering and Management Science, John Wiley @ Sons, 1980.
BARTKO, R., MILLER, M.: Matlab I. Digital Graphic, Trenčín, 2004.
RIEČANOVÁ, Z.: Numerické metódy a štatistika. Alfa, Bratislava, 1987.
MÍKA, S.: Numerické metódy - lineárna algebra, ZČU, Plzeň, 1996.
PRÁGER, M.: Numerická analýza, ZČU, Plzeň, 1995.
PŘIKRYL, P.: Numerické metódy - aproximácia funkcií a matematická analýza, ZČU, Plzeň,1996.
MÍKA, S., PŘIKRYL, P.: Numerické metódy riešenia obyčajných diferenciálnych rovníc - okrajové úlohy, ZČU, Plzeň, 1994.
KAUKIČ, M.: Numerická analýza I., MC Energy, Žilina, 1998.
BUCHANAN, L., TURNER: Numerical Methods and analysis, McGraw Hill, 1992.
BAČOVÁ, B., KŘÍŽ, F.: Matlab – laboratórne cvičenie, EDIS, Žilina, 1998.
ZIENKIEWICZ, O.C., TAYLOR, R.L: The Finite Element Method, Vol. 1-2, 1989, 1991.
BATHE, K.J.: Finite Element Procedures, Englewood Clifs, 1996.
KASSAB, A., ALIABADI, M.H.: Coupled Field Problems, WITpress, 2001.

Language which is necessary for accomplishment of the course unit:

Slovak, English

Notes:

Compulsory elective course
In-person education (total 48 hours):
Lecture: 24 hours
Seminar: 24 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed
Number of evaluated students: 16

A	B	C	D	E	Fx
75.0	12.5	12.5	0.0	0.0	0.0

Teachers: doc. RNDr. Soňa Pavlíková, CSc.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KNMVM/M-PV-6/22	**Course unit title:** Applied Mechanics

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 2 / 2 / 0 **For the whole period of study:** 24 / 24 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 2.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Doctoral students individually elaborate a project focused on numerical analysis or experimental measurement of the problem within their dissertation. In elaboration of their project, the students use knowledge based on data from the literature and foreign scientific publications, that reflects the current state of field. The students present the project in the form of a presentation in front of the teacher and other students and answer questions within the discussion.
Final assessment:
Assessment of exam results = 60 points
After completing all course lectures and seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam with an individual focus on numerical and experimental analysis of the problem examined in the dissertation and the principles of used methods.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students expand their knowledge in the field of numerical analysis and simulations of the problem as well as in the experimental field. They are able to determine the mechanical, chemical and physical composition of industrially important materials, which are used in the numerical analysis of the problem in their dissertation. They perfectly understand the principle of methods used to study mechanical, physical and chemical properties as well as other important material characteristics of the investigated materials, which are input values of the numerical analysis of the

problem. They can independently analyse and evaluate the problem and design solutions for the development of new types of materials and technological processes of their production.

Brief course unit content:
Experimental determination of input material characteristics and boundary conditions in numerical solution of a problem within the dissertation.
Engineering applications of numerical simulations.
Finite element method (FEM).
Linear statics with basic types of finite elements.
Linear dynamic analysis.
Nonlinear static analysis.

Recommended Literature:
ŽMINDÁK, M., GRAJCIAR, I., NOZDROVICKÝ, J.: Modelovanie a výpočty v metóde konečných prvkov, ŽU v Žiline, 2004. ISBN 80-968823-5-X.
VAVRO,J., KOPECKÝ, M., VAVRO, J., ML.: Nové prostriedky a metódy riešenia sústav telies III, TnUAD, FPT, 2007. ISBN 978-80-8075-256-9.
VAVRO, J., HAJSKÁ, H., VAVRO, J., JR., VAVROVÁ, A.,: Nové metódy a prístupy experimentálnej mechaniky pri identifikácii vád a porúch výrobkov, 1. vyd., Krakow, Spolok Slovákov v Poľsku, 2011. ISBN 978-83-7490-461-2.
VAVRO, J.: Kinematic and Dynamic Analysis of Planar Mechanisms by Means of the SolidWorks Software, Tribun EU s. r. o., 2020. ISBN 978-80-263-1495-0.
Professional literature and foreign scientific publications focused on the topic of the dissertation.
TREBUŇA, F.: Applied Mechanics and Mechatronics I. Trans Tech Publications Ltd, Switzerland, 2014. ISSN1660-9336.
TREBUŇA, F.: Applied Mechanics and Mechatronics II, Trans Tech Publications Ltd, Switzerland, 2015. ISSN1660-9336.
BOWER, A. F.: Applied Mechanics of Solids. 2009, pp. 820. ISBN 9781439802472.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory elective course / Profile course
In-person education (total 48 hours):
Lecture: 24 hours
Seminar: 24 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed
Number of evaluated students: 14

A	B	C	D	E	Fx
78.57	0.0	21.43	0.0	0.0	0.0

Teachers: prof. Ing. Ján Vavro, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMTE/M-PV-2/22	**Course unit title:** Chemistry of Materials

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 2 / 2 / 0 **For the whole period of study:** 24 / 24 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 1.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Doctoral students individually elaborate a project focused on a detailed analysis and characterization of the chemical nature of materials that represent the objects of research in their dissertation. In elaboration of their project, the students use knowledge based on data from the literature and foreign scientific publications, that reflects the current state of field. The doctoral students present their project in the form of a presentation in front of the teacher and other students and answer questions within the discussion.
Final assessment:
Assessment of exam results = 60 points
After completing all course lectures and seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam with an individual focus on the chemical characteristics of the material examined in the dissertation and the principles of methods used to study the properties of the material.
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Students have deep knowledge of the chemical composition of industrially important materials. They have a detailed knowledge of the chemical composition of materials, which they examine in their dissertation and know the connections and relationships between the chemical composition of the studied material and the material characteristics of the final product. They can independently analyse and evaluate the problem, predict the chemical composition and resulting properties of the investigated material and propose solutions for the development of new types of materials and composites of ecological composition.

Brief course unit content:

Characteristics of the chemical composition of the material investigated in the dissertation - characteristic chemical elements - electronic configuration, occurrence, properties of chemical bonds, basic compounds, important chemical reactions, preparation.
Characteristics of the investigated material (composite) - preparation (production), structure, important properties, relationships between chemical composition and properties of a particular material, the possibility of influencing important material characteristics of the final product by changing its chemical composition.

Recommended Literature:

JÓNA, E., ONDRUŠOVÁ, D., PAJTÁŠOVÁ, M.: Priemyselná anorganická chémia I., FPT Púchov TnU AD, 2007. ISBN 978-80-8075-237-8
BRADLEY D. FAHLMAN: Materials Chemistry. Springer 2010, http://www.iqytechnicalcollege.com/Materials%20Chemistry.pdf
ONDRUŠOVÁ, D., PAJTÁŠOVÁ, M.: Rubber Components and their Influence on Rubber Properties and Environmental Aspects of Production, First Edition, Towarzystwo Słowaków w Polsce, Poland, 2011. ISBN 978-83-7490-385-1
JOLLY, W., L.: Modern Inorganic Chemistry, Second Edition, McGraw-Hill, Inc., USA, 1991. ISBN 0-07-032768-8.
RUSSELL, J., B.: General Chemistry, Second Edition, McGraw-Hill, Inc., USA, 1992. ISBN 0-07-054445-X.
WEISSERMEL, K., ARPE H.,J.: Industrial Organic Chemistry ,VCH, Weinheim, 2003. ISBN 3-527-26995-9.
BENVENUTO, M. A.: Materials Chemistry : For Scientists and Engineers. De Gruyter, 2022. ISBN 9783110656770.
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory elective course / Profile course
In-person education (total 48 hours):
Lecture: 24 hours
Seminar: 24 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed
Number of evaluated students: 16

A	B	C	D	E	Fx
75.0	18.75	0.0	0.0	0.0	6.25

Teachers: prof. Ing. Darina Ondrušová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-9/22	**Course unit title:** Defense of Written Work for Dissertation Examination

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 12

Recommended semester/trimester of study: 3., 4..

Degree of study: III.

Prerequisites: KMI/M-P-8/22

Conditions for the accomplishment of the course unit:
Characteristics of the chemical composition of the material investigated in the dissertation - characteristic chemical elements - electronic configuration, occurrence, properties of chemical bonds, basic compounds, important chemical reactions, preparation.
Characteristics of the investigated material (composite) - preparation (production), structure, important properties, relationships between chemical composition and properties of a particular material, the possibility of influencing important material characteristics of the final product by changing its chemical composition.
Basic principles of methods used to investigate the characteristic properties of the studied material (methods of chemical analysis, structural analysis, spectral analysis, thermal analysis, dynamic mechanical analysis, methods of determining physical and mechanical properties, etc.).

Learning outcomes:
The written work of the dissertation examination must contain an analysis of current knowledge in the field of dissertation and a proposal of solution to the topic of the dissertation.
It must contain a clear formulation of the objectives of the dissertation, the characteristics of the objects and research methods that will be used in the implementation of experiments within dissertation. The written work of the dissertation exam is opposed and defended within the dissertation exam.

Brief course unit content:
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 210 hours):
Consultations, elaboration of dissertation thesis, preparation for the defense: 210 hours
Total during the semester: 210 hours

Recommended Literature:
According to dissertation topic

Language which is necessary for accomplishment of the course unit:

Slovak, English

Notes:
Course of the state exam / Profile course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 210 hours):
Consultations, elaboration of dissertation thesis, preparation for the defense: 210 hours
Total during the semester: 210 hours

Course evaluation passed/failed
Number of evaluated students: 24

A	B	C	D	E	Fx
91.67	8.33	0.0	0.0	0.0	0.0

Teachers:

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-17/22	**Course unit title:** Dissertation Defense
Type, scope and method of educational activities: **Types of education:** **Recommended duration of education (in hours):** **Per week: For the whole period of study:** **Study method:** present	
Number of credits: 30	
Recommended semester/trimester of study: 7., 8..	
Degree of study: III.	
Prerequisites: KMI/M-P-16/22	
Conditions for the accomplishment of the course unit: Assessment: The requirements are positive opponent's and supervisor's reviews of the dissertation thesis and successful defense of the dissertation in front of the commission for the defense of the dissertation. Assessment - grading: PV - Passed N - Failed	
Learning outcomes: The doctoral students in the study program materials, perfectly master the scientific methods of research and development of new materials, as well as the technology of their production and processing into semi-finished products. Students master the methods of scientific work and bring their own solutions to problems in the field of materials. They can independently solve problems of a wide range of construction materials and predict their properties based on deep theoretical knowledge.	
Brief course unit content: Topics are focused on technological solutions for specific problems in the field of technically important materials and composites.	
Recommended Literature: According to dissertation topic	
Language which is necessary for accomplishment of the course unit: Slovak, English	
Notes: Course of the state exam / Profile course In-person education (total 0 hours): Lecture: 0 hours Seminar: 0 hours Laboratory tutorial: 0 hours Distance education (total 750 hours): Consultations, elaboration of dissertation thesis, preparation for the defense: 750 hours	

Total during the semester: 750 hours

Course evaluation passed/failed
Number of evaluated students: 9

N	PV
0.0	100.0

Teachers:

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-8/22	**Course unit title:** Dissertation Project I

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 0 / 0 / 4 **For the whole period of study:** 0 / 0 / 48
Study method: present

Number of credits: 6

Recommended semester/trimester of study: 4.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 100 points
Doctoral students individually elaborate a project in the form of at least a 15-page written report, which is evaluated by the teacher supervising their dissertation thesis. Within the project students prepare an overview and analysis of current scientific knowledge in the field of their dissertation, define the main objectives of their dissertation and present research objects and methods necessary for implementation of experiments within their dissertation.
Dissertation project I serves as a basis for the Written work of the dissertation exams, which is opposed and defended within the dissertation exams.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students are capable of independent scientific work, can work with professional and foreign literature, gather and analyse current scientific knowledge in the field of their dissertation. They can define the main objectives of the dissertation, characterize objects and select research methods for the implementation of experiments within their dissertation. They can independently analyse and evaluate the problem in the experimental part of their dissertation. They fully understand the principles of used experimental methods and have laboratory skills in the use of laboratory techniques and equipment. They have the necessary knowledge of professional terminology (also in a foreign language) for a thorough processing of literary research in the field of dissertation and elaboration of Dissertation Project I.

Brief course unit content:

Work with professional literature and foreign scientific publications focused on the topic of dissertation, academic and scientific ethics, collection and analysis of current knowledge in the field of dissertation.
Definition of the main objectives of the dissertation, characteristics of objects and the principles of research methods for the implementation of experiments within dissertation.
Elaboration of the project in the form of at least a 15-page written report, which serves as a basis for the Written work of the dissertation exam.

Recommended Literature:
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 48 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 48 hours
Distance education (total 152 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 132 hours
Preparation for the final assessment: 20 hours
Total during the semester: 200 hours

Course evaluation passed/failed
Number of evaluated students: 4

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-16/22	**Course unit title:** Dissertation Project II

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 0 / 0 / 8 **For the whole period of study:** 0 / 0 / 96
Study method: present

Number of credits: 18

Recommended semester/trimester of study: 7.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 100 points
Doctoral students individually elaborate a project in the form of at least a 20-page written report, which is evaluated by the teacher supervising their dissertation thesis. The project must document the doctoral student's capability of independent scientific work.
Within the project students prepare and analyse current scientific knowledge in the field of dissertation, define the main objectives of their dissertation, present research objects and methods necessary for implementation of experiments within their dissertation, describe executed experiments, evaluate and interpret results and propose suggestions for further solutions.
The main results of the experiments summarized in Dissertation Project II are presented by doctoral students at the scientific seminar of the department. Dissertation Project II is the basis for the Dissertation thesis.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students are capable of independent scientific work. They can work with professional and foreign literature, gather and analyse current knowledge in the field of their dissertation. They fully understand the principles of experimental methods used in their dissertation and have laboratory skills in the use of laboratory techniques and equipment. They can independently analyse and evaluate the problem in the experimental part of their dissertation. They can evaluate and correctly interpret the obtained results and make suggestions for further solutions. They have the necessary knowledge of professional terminology and stylistic skills for the elaboration of the Dissertation Project II.

Brief course unit content:

Analysis of current knowledge in the field of dissertation, in terms of defined objectives, characteristics of objects and the principles of research methods used in the implementation of experiments within the dissertation.
Independent scientific work of the doctoral student, implementation of experiments, evaluation and interpretation of obtained results, formulation of partial conclusions, proposals for further solutions.
Elaboration of the project in the form of at least a 20-page written report, which is the basis for the Dissertation thesis.
Presentation of the main results of the experiments summarized in Dissertation Project II at the scientific seminar of the department.

Recommended Literature:
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 96 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 96 hours
Distance education (total 300 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 280 hours
Preparation for the final assessment: 20 hours
Total during the semester: 396 hours

Course evaluation passed/failed
Number of evaluated students: 6

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-5/22	**Course unit title:** English Language

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 0 / 4 / 0 **For the whole period of study:** 0 / 48 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 3.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Summary assessment of work results during the semester = 40 points
Creative work, creative approach to solving tasks, preparation of a presentation related to the topic of the dissertation (explanation of basic concepts, principles, approaches). Other conditions necessary for successful completion of the course include presentation and interpretation of basic English grammatical constructions using a professional text related to the dissertation topic and successful completion of the interview with a focus on the data provided in the submitted structured CV, while the student uses the knowledge characteristic of spoken English.
Final assessment:
Assessment of exam results = 60 points
After completing all course seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam with an individual focus on students' dissertation topics.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Based on the acquired comprehensive language knowledge and communication skills, the students are able to monitor and analyse the latest scientific knowledge, about which they can provide clear and comprehensible information, which means that they are able to express information coherently and systematically. They are able to inform in detail about the methods, principles and knowledge within their dissertation. They are able to respond coherently and promptly to comments and questions that directly relate to their research and educational activities. The students also have acquired and deepened knowledge in academic English and can clearly and unequivocally take a stand and draw conclusions on a selected communication topic. Based on analytical thinking, they

are able to find connections in terms of professional text and can also professionally summarize complex topics, while obtaining the information from various sources

Brief course unit content:

Informing students about the organization, the framework programme of education, the conditions for successful completion of the exam and with the required and recommended literature.
Working with various textual materials, in order to translate, compare and evaluate language resources and individual styles within the English.
Summary of knowledge about rules and usability of individual grammar tenses in academic English – frequently used tenses in technical English. Gerundium, its use and significance in professional translation. Multifunctionality of its use, practice based on textual materials that are related to the dissertation topics.
Parts of speech, practicing their use in a sentence. Modal verbs, sequence of tenses.
Latin and foreign language expressions in professional language. Use of educational material focused on topics of dissertations.
Characteristic features of professional language, academic English, summary of tenses used in professional language, specifics of the passive – use of the selected professional text.
The conditionals, conditional sentences – use of vocabulary, associated with terminological expressions within the assigned topics of dissertations.
Summary characteristics of prepositions, conjunctions and expressions, which help to join simple sentences and are used in professional text in order to clarify professional as well as ordinary text.
Purpose infinitive, practicing modal verbs, conditional form, phrasal verbs. The passive – summary repetition. Modal verbs and their descriptive forms in a professional text. Abstracts, Annotations – translation exercises using professional English.
Curriculum vitae - types of CVs, basic rules for creating individual types of CVs and cover letters.
Compilation of student's own dictionary of important terminological terms in the field of professional English related to the topic of the dissertation
Assessment of student's work activity and all prerequisites necessary for completion of the course.

Recommended Literature:

CHUDÝ, T., CHUDÁ, J.: Practise your English Grammar, Príroda, Bratislava, 2001.
ISBN 80-07-00427-0
Professional articles, abstracts from the Internet, other websites.
MURPHY, M.: English Grammar in Use, University Press, Cambridge, 2004.
ISBN 978-0-521-53289-1
HASHEMI, L., MURPHY, M.: English Grammar in Use, Supplementary Exercises, University Press, Cambridge, 1995. ISBN 978-0-521-44954-5
ŠTĚPÁNEK, L. a kol.: Akademická Angličtina, Grada Publishing, Praha, 2011. ISBN 978-80-247-3577-1
JANATA, P. : Překládáme do angličtiny, Fraus, Plzeň, 1999. ISBN 80-7238-052-4
Prekladový slovník anglicko – slovenský a slovensko – anglický; Výkladový anglický slovník (napr. Oxford Student's Dictionary, Oxford Advanced Learner's Dictionary, Longman Dictionary of Contemporary English, Longman New Junior Dictionary, Cambridge International Dictionary of English, or another suitable dictionary).

Language which is necessary for accomplishment of the course unit:

Slovak, English

Notes:

Compulsory course
In-person education (total 48 hours):

Lecture: 0 hours
Seminar: 48 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed
Number of evaluated students: 27

A	B	C	D	E	Fx
44.44	37.04	14.81	0.0	3.7	0.0

Teachers: Mgr. Silvia Koišová

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-2/22	**Course unit title:** Individual Study of Specialized Literature I

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 6

Recommended semester/trimester of study: 1.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Doctoral students intensively and individually study professional literature and foreign scientific publications in the field of their dissertation. Each student individually develops a project in the form of at least a 10-page written report evaluated by the teacher supervising their dissertation thesis. The project must include an overview and analysis of current knowledge in the field of dissertation, in terms of defined main objectives of their dissertation, focusing on the characteristics of research objects.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students are capable of independent scientific work, can work with professional and foreign literature, gather and analyse current knowledge in the field of dissertation. They have the necessary knowledge of professional terminology (also in a foreign language) for a thorough processing of literary survey in the field of dissertation.

Brief course unit content:
Academic and scientific ethics.
Individual study of professional literature and foreign scientific publications in the field of dissertation.
Articles, journals, utility models, patents, trademarks, company literature, electronic information sources, patent databases.
Lists of bibliographic references, citations.
Literary survey in the field of dissertation.

Recommended Literature:

Professional literature and foreign scientific publications focused on the topic of the dissertation.
OLŠOVSKÝ, M.: Odborná literatúra a informácie, Trenčín, TnUAD, 2012.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 140 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the final assessment: 20 hours
Total during the semester: 140 hours

Course evaluation passed/failed
Number of evaluated students: 2

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-4/22	**Course unit title:** Individual Study of Specialized Literature II

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 6

Recommended semester/trimester of study: 2.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Doctoral students intensively and individually study professional literature and foreign scientific publications in the field of their dissertation. Each student individually develops a project in the form of at least a 10-page written report evaluated by the teacher supervising their dissertation thesis. The project must include an overview and analysis of current knowledge in the field of dissertation, in terms of defined main objectives of their dissertation, focusing on the characteristics of research objects.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students are capable of independent scientific work, can work with professional and foreign literature, gather and analyse current knowledge in the field of dissertation. They have the necessary knowledge of professional terminology (also in a foreign language) for a thorough processing of literary survey in the field of dissertation.

Brief course unit content:
Individual study of professional literature and foreign scientific publications in the field of dissertation.
Articles, journals, utility models, patents, trademarks, company literature, electronic information sources, patent databases.
Lists of bibliographic references, citations.
Literary survey in the field of dissertation.

Recommended Literature:
Professional literature and foreign scientific publications focused on the topic of the dissertation.

OLŠOVSKÝ, M.: Odborná literatúra a informácie, Trenčín, TnUAD, 2012.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 140 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the final assessment: 20 hours
Total during the semester: 140 hours

Course evaluation passed/failed
Number of evaluated students: 2

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-PV-3/22	**Course unit title:** Material Diagnostics

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 2 / 2 / 0 **For the whole period of study:** 24 / 24 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 1.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Doctoral students individually elaborate a project focused on the detailed analysis and characteristics of testing and diagnostic methods that are applicable for examining of the properties of materials and technical objects of research in their dissertation.
In elaboration of their project, the students use knowledge based on data from the literature and foreign scientific publications, that reflects the current state of field. The students present the project in the form of a presentation in front of the teacher and other students and answer questions within the discussion.
Final assessment:
Assessment of exam results = 60 points
After completing all course lectures and seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam with an individual focus on diagnostic methods used for examining the properties of the material within their dissertation, and principles of these methods.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students have deep knowledge in the field of diagnostics of material properties of industrially important materials. They have detailed knowledge of a wide range of experimental methods and applications of suitable and available test methods for determining the properties of materials, which their investigate within their dissertation. They know the connections and relationships between material composition and subsequent processing by various technological processes and the properties of the studied material and material characteristics of the final product. They perfectly understand the principles of methods for determining the properties and material characteristics

of the investigated materials. They are able to independently analyse and evaluate problems, can predict the resulting properties of the investigated material based on changes in structural properties and propose solutions for the development of new materials, including technologies for their processing. They acquire detailed knowledge about the options of specific software to simulate the effect of material composition on the resulting properties of specific products.

Brief course unit content:

Characteristics of the composition of materials investigated in the dissertation, methods used to determine the chemical composition of material, crystalline structure of materials, influencing the structure by thermal and mechanical processing, X-ray, microscopic and microfractographic examination of material properties.
Diagnostic methods used for evaluating the quality of materials and final products (machinery components).
Characteristics of the investigated material, composition, structure, important physical and mechanical properties and relations between them.
Basic principles of methods used to investigate the characteristic properties of the studied material (thermal analysis, dynamic-mechanical analysis, methods for determining physical and mechanical properties, etc.).
Focus on new and composite materials.
Options of application of specific computer software.

Recommended Literature:

JANDOŠ, F., ŘÍMAN, R., GEMPERLE, A.: Využití moderních laboratórnych metód v metalografii, SNTL, Praha, 1985.
HRIVŇÁK, I.: Elektrónová mikroskopia ocelí, VEDA, Bratislava, 1986.
KOPEC, B.: Nedestruktivní zkoušení, CERM, Brno, 2008.
PTÁČEK, L. a kol.: Náuka o materiálu I, II, Akademické nakladatelství CERM, Brno,2002.
BEZECNÝ, J.: Vznik trhlín a lomov pri tepelnom spracovaní ocelí, TnUAD, Trenčín, 2007.
BEZECNÝ, J.: Diagnostické metódy v materiálovom inžinierstve, Digitalizácia TnUAD: Rozvoj inovatívnych foriem vzdelávania a skvalitnenie študijných programov TnUAD, Trenčín, 2013.
Professional literature and foreign scientific publications focused on the topic of the dissertation.
HORATH, L.: Fundamentals of Materials Science for Technologists: Properties, Testing, and Laboratory Exercises, Third Edition. 2019. ISBN 978-1478637691.

Language which is necessary for accomplishment of the course unit:

Slovak, English

Notes:

Compulsory elective course / Profile course
In-person education (total 48 hours):
Lecture: 24 hours
Seminar: 24 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed Number of evaluated students: 25					
A	B	C	D	E	Fx
80.0	16.0	0.0	0.0	0.0	4.0
Teachers: prof. Ing. Jan Krmela, PhD., doc. Ing. Dana Bakošová, PhD.					
Last modification date: 17.06.2024					
Approved by: prof. Ing. Darina Ondrušová, PhD.					

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-1/22	**Course unit title:** Materials Science

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 2 / 2 / 0 **For the whole period of study:** 24 / 24 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 1.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Doctoral students individually elaborate a project focused on detailed analysis and characterization of materials researched within their dissertation. In elaboration of their project, the students use knowledge based on data from the literature and foreign scientific publications, that reflects the current state of field. The students present the project in the form of a presentation in front of the teacher and other students and answer questions within the discussion.
Final assessment:
Assessment of exam results = 60 points
After completing all course lectures and seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam with an individual focus on the characteristics of a particular material, examined in their dissertation and the principles of methods used to study selected properties of the material.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students have deep knowledge about the field of materials engineering and industrially important materials. They acquire detailed knowledge of the influence of material composition on complex responses of material properties, which they examine within their dissertation and know the connections between essential and non-essential variables in a given research. They perfectly understand the principles of methods used for the examination of important material characteristics of the investigated materials. They can independently analyse and evaluate the problem. They can predict the resulting behaviour of materials under operating conditions based on the obtained parameters. Furthermore, they know how to design solutions for the development of new materials

for specific structures or structural elements based on the obtained properties of the investigated material.

Brief course unit content:

Summary characteristics of construction materials in terms of material and utility properties.
Prediction of material lifespan of given structures.
Static and dynamic loading of materials.
Influence of environment (external conditions) on material properties.
Limit states of materials of technical objects.
Characteristics of materials according to their production (casting, welded material, material obtained by plastic deformation, machined, etc.).
Influence of plastic deformation on the structure of materials.
Definition of defects in the material and their identification.
Design of surface treatments (coating, heat treatment, etc.).
Fracture behaviour of materials at different loads.
Fractography.
Mechanical properties of materials.
Physical properties of materials.
Chemical properties of materials.
Structural properties of metallic and non-metallic materials.
Non-metallic materials and their material properties.
Progressive types of materials (materials used in power engineering, transport and engineering, biomaterials).
Progressive composites and nanocomposites and their application.

Recommended Literature:

Professional literature and foreign scientific publications focused on the topic of the dissertation.
PUŠKÁR, A., HAZLINGER, M.: Porušovanie a lomy súčastí. EDIS Žilina, 2000. ISBN 80-7100-654-8
HAZLINGER, M., MORAVČÍK, R.: Degradačné procesy a predikcia životnosti, AlumniPress, 2007. ISBN 978-80-8096-031-5.
PTÁČEK,L. a kol.: Nauka o materiálu I,II,III, Brno, CERM, 2001. ISBN 80-7204-193-2.
BEHERA, A.. Advanced Materials: An Introduction to Modern Materials Science. 2021. ISBN 978-3030803582.

Language which is necessary for accomplishment of the course unit:

Slovak, English

Notes:

Compulsory course / Profile course
In-person education (total 48 hours):
Lecture: 24 hours
Seminar: 24 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed
Number of evaluated students: 30

A	B	C	D	E	Fx
76.67	10.0	6.67	0.0	0.0	6.67

Teachers: prof. Ing. Jan Krmela, PhD., doc. Ing. Vladimíra Krmelová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-3/22	**Course unit title:** Physics of Solid Substances

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 2 / 2 / 0 **For the whole period of study:** 24 / 24 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 2.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Each doctoral student, based on a search of world literature, independently elaborates a semester project on the structure and physical properties of materials, which they will research in their dissertation, with emphasis on experimental methods used for studying these properties. The students present their project in the form of a presentation in front of the teacher and other students and answer questions within the discussion.
Final assessment:
Assessment of exam results = 60 points
After completing all course lectures and seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam with an individual focus on the characteristics of the structure and physical properties of materials studied within the dissertation, with emphasis on experimental methods used for studying these properties.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students have extensive, deeper and more comprehensive knowledge of physics of solid substances in the context of the current physical understanding of the world. They know the connections and relationships between the structure of the material and its physical properties under different boundary conditions, as well as the relationships between the individual physical properties of solids. They can design a physics experiment, analyse, statistically evaluate and model the obtained experimental data. They know the basic tools of artificial intelligence suitable for solving physical problems of materials engineering.

Brief course unit content:

Current conceptions of the structure of matter, quantum nature of the microworld, standard model of elementary particles and interactions, string theory of the structure of matter, atomic theory, quantum condensates.
Macroscopic structure and physical properties of solids, polymeric materials and polymer matrices composites, polymer nanocomposites, fullerenes.
Thermal, electrical, mechanical, viscoelastic and rheological properties of solids and physical methods of their determination.
Phonon theory of heat transport in solids, the relationship between thermal, electrical, mechanical, rheological and viscoelastic properties of solids.
Modelling of physical properties of solids under different boundary conditions based on parametric fitting of experimental data.
Advanced tools for analysis and statistical evaluation of experimental data, linear and nonlinear least squares method.
Analysis of experimental data by artificial intelligence tools, artificial neural networks and genetic algorithms in materials engineering.
Design of a physics experiment, main and secondary factors influencing experimental results and their interactions.

Recommended Literature:

ORENDÁČ, M.: Základy experimentálnych metód vo fyzike kondenzovaných látok, Prírodovedecká fakulta, Univerzita Pavla Jozefa Šafárika v Košiciach, 2011. ISBN978-80-7097-871-9.
WENNMOHS, F. ORCA. Max-Planc-Institut, 2024 (dostupné na https://www.kofo.mpg.de/en/research/services/orca).
FEYNMAN, R.: The Feynman Lectures on Physics. Caltech, 2022. (dostupné na https://www.feynmanlectures.caltech.edu/).
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:

Slovak, English

Notes:

Compulsory course / Profile course
In-person education (total 48 hours):
Lecture: 24 hours
Seminar: 24 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed

Number of evaluated students: 32

A	B	C	D	E	Fx
93.75	0.0	3.13	0.0	3.13	0.0

Teachers: doc. Mgr. Ivan Kopal, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-6/22	**Course unit title:** Scientific Activity I
Type, scope and method of educational activities: **Types of education:** **Recommended duration of education (in hours):** **Per week: For the whole period of study:** **Study method:** present	
Number of credits: 10	
Recommended semester/trimester of study: 3.	
Degree of study: III.	
Prerequisites:	
Conditions for the accomplishment of the course unit: Assessment: Summary assessment of work results during the semester = 100 points The doctoral students elaborate the partial results of their research achieved within the dissertation in the form of a paper in English at a scientific international conference. A necessary condition for obtaining credits is the submission of the published scientific paper in the proceedings of the international conference. Grading scale: Grade A: 91 – 100 points Grade B: 81 – 90 points Grade C: 71 – 80 points Grade D: 61 – 70 points Grade E: 55 – 60 points Grade FX: less than 55 points	
Learning outcomes: The students are capable of independent scientific work, they can independently analyse and evaluate the problem within the experimental part of their dissertation. They fully understand the principles of used experimental methods and they have laboratory skills in the use of laboratory techniques and equipment. They can consistently and correctly evaluate the measured parameters, express results in graphical form and interpret the results correctly. They can correctly formulate partial conclusions from the solution of a specific scientific problem. They have knowledge of professional terminology in English for writing the original scientific paper in the proceedings of the international conference.	
Brief course unit content: Independent scientific work of the doctoral student, evaluation and interpretation of research results, elaboration of the paper for the scientific international conference in English according to specific instructions.	
Recommended Literature: Professional literature and foreign scientific publications focused on the topic of the dissertation.	

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 250 hours):
Consultations, study of literature, research, elaboration of publication: 250 hours
Total during the semester: 250 hours

Course evaluation passed/failed
Number of evaluated students: 4

A	B	C	D	E	Fx
75.0	25.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-7/22	**Course unit title:** Scientific Activity II
Type, scope and method of educational activities: **Types of education:** **Recommended duration of education (in hours):** **Per week: For the whole period of study:** **Study method:** present	
Number of credits: 12	
Recommended semester/trimester of study: 3.	
Degree of study: III.	
Prerequisites:	
Conditions for the accomplishment of the course unit: Assessment: Summary assessment of work results during the semester = 100 points The doctoral students elaborate the partial results of their research achieved within the dissertation in the form of a paper in English at a scientific international conference. A necessary condition for obtaining credits is the submission of the published scientific paper in the proceedings of the international conference. Grading scale: Grade A: 91 – 100 points Grade B: 81 – 90 points Grade C: 71 – 80 points Grade D: 61 – 70 points Grade E: 55 – 60 points Grade FX: less than 55 points	
Learning outcomes: The students are capable of independent scientific work, they can independently analyse and evaluate the problem within the experimental part of their dissertation. They fully understand the principles of used experimental methods and they have laboratory skills in the use of laboratory techniques and equipment. They can consistently and correctly evaluate the measured parameters, express results in graphical form and interpret the results correctly. They can correctly formulate partial conclusions from the solution of a specific scientific problem. They have knowledge of professional terminology in English for writing the original scientific paper in the proceedings of the international conference.	
Brief course unit content: Independent scientific work of the doctoral student, evaluation and interpretation of research results, elaboration of the paper for the scientific international conference in English according to specific instructions.	
Recommended Literature: Professional literature and foreign scientific publications focused on the topic of the dissertation.	

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 300 hours):
Consultations, study of literature, research, elaboration of publication: 300 hours
Total during the semester: 300 hours

Course evaluation passed/failed
Number of evaluated students: 4

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-11/22	**Course unit title:** Scientific Activity III
Type, scope and method of educational activities: **Types of education:** **Recommended duration of education (in hours):** **Per week: For the whole period of study:** **Study method:** present	
Number of credits: 16	
Recommended semester/trimester of study: 5.	
Degree of study: III.	
Prerequisites:	
Conditions for the accomplishment of the course unit: Assessment: Summary assessment of work results during the semester = 100 points The doctoral students elaborate the partial results of their research achieved within the dissertation in the form of an original paper in English in a foreign peer-reviewed journal. A necessary condition for obtaining credits is the submission of the published scientific paper in the foreign peer-reviewed journal. Grading scale: Grade A: 91 – 100 points Grade B: 81 – 90 points Grade C: 71 – 80 points Grade D: 61 – 70 points Grade E: 55 – 60 points Grade FX: less than 55 points	
Learning outcomes: The students are capable of independent scientific work, they can independently analyse and evaluate the problem within the experimental part of their dissertation. They fully understand the principles of used experimental methods and they have laboratory skills in the use of laboratory techniques and equipment. They can consistently and correctly evaluate the measured parameters, express results in graphical form and interpret the results correctly. They can correctly formulate partial conclusions from the solution of a specific scientific problem. They have knowledge of professional terminology in English for writing the original scientific paper in the foreign peer-reviewed journal.	
Brief course unit content: Independent scientific work of the doctoral student, evaluation and interpretation of research results, elaboration of the paper for publication in the foreign peer-reviewed journal in English according to specific instructions.	
Recommended Literature: Professional literature and foreign scientific publications focused on the topic of the dissertation.	

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 400 hours):
Consultations, study of literature, research, elaboration of publication: 250 hours
Total during the semester: 400 hours

Course evaluation passed/failed
Number of evaluated students: 8

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-12/22	**Course unit title:** Scientific Activity IV
Type, scope and method of educational activities: **Types of education:** **Recommended duration of education (in hours):** **Per week: For the whole period of study:** **Study method:** present	
Number of credits: 14	
Recommended semester/trimester of study: 5.	
Degree of study: III.	
Prerequisites:	
Conditions for the accomplishment of the course unit: Assessment: Summary assessment of work results during the semester = 100 points The doctoral students elaborate the partial results of their research achieved within the dissertation in the form of an original paper in English in a foreign peer-reviewed journal. A necessary condition for obtaining credits is the submission of the published scientific paper in the foreign peer-reviewed journal. Grading scale: Grade A: 91 – 100 points Grade B: 81 – 90 points Grade C: 71 – 80 points Grade D: 61 – 70 points Grade E: 55 – 60 points Grade FX: less than 55 points	
Learning outcomes: The students are capable of independent scientific work, they can independently analyse and evaluate the problem within the experimental part of their dissertation. They fully understand the principles of used experimental methods and they have laboratory skills in the use of laboratory techniques and equipment. They can consistently and correctly evaluate the measured parameters, express results in graphical form and interpret the results correctly. They can correctly formulate partial conclusions from the solution of a specific scientific problem. They have knowledge of professional terminology in English for writing the original scientific paper in the foreign peer-reviewed journal.	
Brief course unit content: Independent scientific work of the doctoral student, evaluation and interpretation of research results, elaboration of the paper for publication in the foreign peer-reviewed journal in English according to specific instructions.	
Recommended Literature: Professional literature and foreign scientific publications focused on the topic of the dissertation.	

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 350 hours):
Consultations, study of literature, research, elaboration of publication: 250 hours
Total during the semester: 350 hours

Course evaluation passed/failed
Number of evaluated students: 8

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-13/22	**Course unit title:** Scientific Activity V

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 18

Recommended semester/trimester of study: 6.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment:
Summary assessment of work results during the semester = 100 points
The doctoral students elaborate the partial results of their research achieved within the dissertation in the form of an original paper in English for publication in a foreign peer-reviewed journal registered in the database SCOPUS or WOS with IF ≥ 0,39. A necessary condition for obtaining credits is the submission of the published scientific paper in the foreign peer-reviewed journal registered in the database SCOPUS or WOS with IF ≥ 0,39.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students are capable of independent scientific work, they can independently analyse and evaluate the problem within the experimental part of their dissertation. They fully understand the principles of used experimental methods and they have laboratory skills in the use of laboratory techniques and equipment. They can consistently and correctly evaluate the measured parameters, express results in graphical form and interpret the results correctly. They can correctly formulate partial conclusions from the solution of a specific scientific problem. They have knowledge of professional terminology in English for writing the original scientific paper in the peer-reviewed journal registered in the database SCOPUS or WOS with IF ≥ 0,39.

Brief course unit content:
Independent scientific work of the doctoral student, evaluation and interpretation of research results, elaboration of the paper for publication in the peer-reviewed journal registered in the database SCOPUS or WOS with IF ≥ 0,39 in English according to specific instructions.

Recommended Literature:
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 450 hours):
Consultations, study of literature, research, elaboration of publication: 450 hours
Total during the semester: 450 hours

Course evaluation passed/failed
Number of evaluated students: 10

A	B	C	D	E	Fx
50.0	0.0	0.0	0.0	0.0	50.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-14/22	**Course unit title:** Scientific Activity VI
Type, scope and method of educational activities: **Types of education:** **Recommended duration of education (in hours):** **Per week: For the whole period of study:** **Study method:** present	
Number of credits: 12	
Recommended semester/trimester of study: 6.	
Degree of study: III.	
Prerequisites:	
Conditions for the accomplishment of the course unit: Assessment: Summary assessment of work results during the semester = 100 points The doctoral students elaborate the partial results of their research achieved within the dissertation in the form of a paper in English at a scientific international conference. A necessary condition for obtaining credits is the submission of the published scientific paper in the proceedings of the international conference. Grading scale: Grade A: 91 – 100 points Grade B: 81 – 90 points Grade C: 71 – 80 points Grade D: 61 – 70 points Grade E: 55 – 60 points Grade FX: less than 55 points	
Learning outcomes: Študent je schopný samostatnej vedeckej práce, dokáže samostatne analyzovať a vyhodnocovať riešený problém v rámci experimentálnej časti svojej dizertačnej práce. Dokonale rozumie princípu používaných experimentálnych metód a disponuje laboratórnymi zručnosťami pri používaní laboratórnej techniky a zariadení. Dokáže dôsledne a správne vyhodnotiť namerané parametre, vyjadriť ich graficky a výsledky správne interpretovať. Vie správne sformulovať čiastkové závery z riešenia konkrétneho vedeckého problému. Disponuje znalosťou odbornej terminológie v anglickom jazyku pre spracovanie pôvodnej vedeckej práce v zborníku z medzinárodnej konferencie.	
Brief course unit content: Independent scientific work of the doctoral student, evaluation and interpretation of research results, elaboration of the paper for a scientific international conference in English according to specific instructions.	
Recommended Literature: Professional literature and foreign scientific publications focused on the topic of the dissertation.	

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 300 hours):
Consultations, study of literature, research, elaboration of publication: 300 hours
Total during the semester: 300 hours

Course evaluation passed/failed
Number of evaluated students: 8

A	B	C	D	E	Fx
87.5	12.5	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-15/22	**Course unit title:** Scientific Activity VII

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 12

Recommended semester/trimester of study: 7.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment:
Summary assessment of work results during the semester = 100 points
The doctoral students elaborate the partial results of their research achieved within the dissertation in the form of a paper in English at a scientific international conference. A necessary condition for obtaining credits is the submission of the published scientific paper in the proceedings of the international conference.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students are capable of independent scientific work, they can independently analyse and evaluate the problem within the experimental part of their dissertation. They fully understand the principles of used experimental methods and they have laboratory skills in the use of laboratory techniques and equipment. They can consistently and correctly evaluate the measured parameters, express results in graphical form and interpret the results correctly. They can correctly formulate partial conclusions from the solution of a specific scientific problem. They have knowledge of professional terminology in English for writing the original scientific paper in the proceedings of the international conference.

Brief course unit content:

Recommended Literature:
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:

Compulsory course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 300 hours):
Consultations, study of literature, research, elaboration of publication: 300 hours
Total during the semester: 300 hours

Course evaluation passed/failed
Number of evaluated students: 6

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: doc. Ing. Ján Vavro, PhD., doc. Mgr. Ivan Kopal, PhD., prof. Ing. Jan Krmela, PhD., prof. Ing. Ján Vavro, PhD., doc. Ing. Vladimíra Krmelová, PhD., prof. Ing. Darina Ondrušová, PhD., prof. RNDr. Mgr. Mariana Pajtášová, PhD., doc. Ing. Petra Skalková, PhD., doc. Ing. Jela Legerská, PhD., doc. Ing. Katarína Moricová, PhD., doc. Mgr. Jana Šulcová, PhD., doc. Ing. Dana Bakošová, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMTE/M-PV-11/22	**Course unit title:** Selected Chapters from Applied Chemistry

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 4

Recommended semester/trimester of study: 3., 4..

Degree of study: III.

Prerequisites: KMTE/M-PV-5/22

Conditions for the accomplishment of the course unit:
Final assessment by commission = 100 points
Successful completion of a course of the dissertation exam.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Demonstration of the ability to use and apply knowledge and skills acquired during the study in the field of applied chemistry.

Brief course unit content:
Electronic structure of materials.
Chemical bonds of materials.
Crystal structure of materials.
Electrical, magnetic, optical and thermal properties of materials.
Laws of chemical reactions of materials.
Properties of non-metallic elements and their application in materials.
Properties of metal elements and their applications in materials.
Chemical-technological processing of iron, alloys, binary compounds and their applications in materials.
Oxide and non-oxide ceramics.
Multielement compounds and their application in materials.
Silicate materials (alkali silicates, zeolites, asbestos fibers), building materials (cement), fillers, silicates.

Recommended Literature:
JÓNA, E., ONDRUŠOVÁ, D., PAJTÁŠOVÁ M.: Priemyselná anorganická chémia I., FPT Púchov, TnU AD, 2007.

ONDREJOVIČ, G., BOČA, R., JÓNA, E., LANGFELLDEROVÁ, H., VALIGURA, D.: Anorganická chémia 2, STU Bratislava, 1995.
KOMAN, M., JAMNICKÝ, M.: Anorganické materiály, STU Bratislava, 2007.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Course of the state exam / Profile course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 120 hours):
Consultations, preparation for the exam: 120 hours
Total during the semester: 120 hours

Course evaluation passed/failed
Number of evaluated students: 14

A	B	C	D	E	Fx
85.71	14.29	0.0	0.0	0.0	0.0

Teachers:

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KNMVM/M-PV-10/22	**Course unit title:** Selected Chapters from Applied Mathematics

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 4

Recommended semester/trimester of study: 3., 4..

Degree of study: III.

Prerequisites: KNMVM/M-PV-4/22

Conditions for the accomplishment of the course unit:
Final assessment by commission = 100 points
Successful completion of a course of the dissertation exam.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Demonstration of the ability to use and apply knowledge and skills acquired during the study in the field of applied mathematics.

Brief course unit content:
Broaden of knowledge in the areas of experimental theory and statistics.
Special types of distributions of discrete and continuous random variables.
Measurement errors.
Point parameter estimation.
Interval parameter estimation.
Measurement uncertainties.
Testing statistical hypotheses.
Reliability analysis.
Statistical analysis of multidimensional data.
Special nonlinear regression models.
Correlation - correlation models, correlation coefficients.
Classical interpolation procedures.
Approximation of functions.
Approximation of tabular dependencies.

Extension of knowledge in the following areas: Numerical problems and algorithms, their conditionality and stability.
Errors.
Special methods for solving systems of linear equations.
Errors of solving systems of linear equations.
Numerical integration.
Numerical solution of differential equations.
Boundary value problems for ordinary differential equations.
Some partial differential equations.
Some types of thermal and chemical analyses.
Stationary and non-stationary analysis. FEM.
Navier-Stokes equations.

Recommended Literature:

RONALD A. FISHER: The Design of Experiments, 1935.
ANDĚL, J.: Matematická statistika, Praha, SNTL, 1985.
TÖRÖK, Cs.: Úvod do teórie pravdepodobnosti a matematickej štatistiky, Košice, TU, 1991.
HINES, W., W., MONTGOMERY, D.C.: Probability and Statistics in Engineering and Management Science, John Wiley @ Sons, 1980.
BARTKO, R., MILLER, M.: Matlab I. Digital Graphic, Trenčín, 2004.
RIEČANOVÁ, Z.: Numerické metódy a štatistika, Alfa, Bratislava, 1987.
MÍKA, S.: Numerické metódy - lineárna algebra, ZČU, Plzeň, 1996.
PRÁGER, M.: Numerická analýza, ZČU, Plzeň, 1995.
PŘIKRYL, P.: Numerické metódy - aproximácia funkcií a matematická analýza, ZČU, Plzeň, 1996.
MÍKA, S., PŘIKRYL, P.: Numerické metódy riešenia obyčajných diferenciálnych rovníc - okrajové úlohy, ZČU, Plzeň, 1994.
KAUKIČ, M.: Numerická analýza I., MC Energy, Žilina, 1998.
BUCHANAN, L., TURNER: Numerical Methods and analysis, McGraw Hill, 1992.
BAČOVÁ, B., KŘÍŽ, F.: Matlab – laboratórne cvičenie, EDIS, Žilina 1998.
ZIENKIEWICZ, O.C., TAYLOR, R.L: The Finite Element Method, Vol. 1-2, 1989, 1991.
BATHE, K.J.: Finite Element Procedures, Englewood Clifs, 1996.
KASSAB, A., ALIABADI, M.H.: Coupled Field Problems, WITpress, 2001.

Language which is necessary for accomplishment of the course unit:

Slovak, English

Notes:

Course of the state exam
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 120 hours):
Consultations, preparation for the exam: 120 hours
Total during the semester: 120 hours

Course evaluation passed/failed Number of evaluated students: 0					
A	B	C	D	E	Fx
0.0	0.0	0.0	0.0	0.0	0.0
Teachers:					
Last modification date: 17.06.2024					
Approved by: prof. Ing. Darina Ondrušová, PhD.					

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KNMVM/M-PV-12/22	**Course unit title:** Selected Chapters from Applied Mechanics

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 4

Recommended semester/trimester of study: 3., 4..

Degree of study: III.

Prerequisites: KNMVM/M-PV-6/22

Conditions for the accomplishment of the course unit:
Final assessment by commission = 100 points
Successful completion of a course of the dissertation exam.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Demonstration of the ability to use and apply knowledge and skills acquired during the study in the field of applied mechanics

Brief course unit content:
Course contents:
Engineering applications of numerical simulations. Basic types of analyses in the programme ADINA. Basic FEM equations.
Finite element method (FEM).
Selection of suitable elements.
Boundary conditions.
Solution errors.
Modelling procedures.
Mesh size for first analyses.
Stress calculation.
Linear statics with basic types of finite elements.
Truss structures.
Beam structures.
Shell structures.
Postprocessing of 3D models.

Linear dynamic analysis.
Natural oscillation and modal analysis.
Damping of system.
Nonlinear static analysis.
Sources of nonlinearities.
Geometric nonlinearities.
Material nonlinearities.

Recommended Literature:

ŽMINDÁK, M., GRAJCIAR, I., NOZDROVICKÝ J.: Modelovanie a výpočty v metóde konečných prvkov, ŽU v Žiline, 2004. ISBN 80-968823-5-X
VAVRO, J., KOPECKÝ, M., VAVRO J., ml.: Nové prostriedky a metódy riešenia sústav telies III, TnUAD, FPT, 2007. ISBN 978-80-8075-256-9
VAVRO J., HAJSKÁ, H., VAVRO J. JR., VAVROVÁ A.: Nové metódy a prístupy experimentálnej mechaniky pri identifikácii vád a porúch výrobkov,1. vyd., Krakow, Spolok Slovákov v Poľsku, 2011. ISBN 978-83-7490-461-2
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Course of the state exam / Profile course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 120 hours):
Consultations, preparation for the exam: 120 hours
Total during the semester: 120 hours

Course evaluation passed/failed
Number of evaluated students: 1

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers:

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMTE/M-PV-8/22	**Course unit title:** Selected Chapters from Chemistry of Materials

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 4

Recommended semester/trimester of study: 3., 4..

Degree of study: III.

Prerequisites: KMTE/M-PV-2/22

Conditions for the accomplishment of the course unit:
Final assessment by commission = 100 points
Successful completion of a course of the dissertation exam.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Demonstration of the ability to use and apply knowledge and skills acquired during the study in the field of chemistry of materials

Brief course unit content:
Characteristics of the chemical composition of the material investigated in the dissertation - characteristic chemical elements - electronic configuration, occurrence, properties of chemical bonds, basic compounds, important chemical reactions, preparation.
Characteristics of the investigated material (composite) - preparation (production), structure, important properties, relationships between chemical composition and properties of a particular material, the possibility of influencing important material characteristics of the final product by changing its chemical composition.
Basic principles of methods used to investigate the characteristic properties of the studied material (methods of chemical analysis, structural analysis, spectral analysis, thermal analysis, dynamic mechanical analysis, methods of determining physical and mechanical properties, etc.).

Recommended Literature:
JÓNA, E., ONDRUŠOVÁ, D., PAJTÁŠOVÁ, M.: Priemyselná anorganická chémia I., FPT Púchov, TnU AD, 2007. ISBN 978-80-8075-237-8
ONDRUŠOVÁ, D., PAJTÁŠOVÁ, M.: Rubber Components and their Influence on Rubber Properties and Environmental Aspects of Production, First Edition, Towarzystwo Słowaków w Polsce, Poland, 2011. ISBN 978-83-7490-385-1

KOMAN, M. JAMNICKÝ, M.: Anorganické materiály, STU Bratislava, 2007.
JOLLY W., L.: Modern Inorganic Chemistry, Second Edition, McGraw-Hill, Inc., USA, 1991. ISBN 0-07-032768-8
RUSSELL J., B.: General Chemistry, Second Edition, McGraw-Hill, Inc., USA, 1992. ISBN 0-07-054445-X
WEISSERMEL, K., H., J. ARPE: Industrial Organic Chemistry ,VCH, Weinheim,2003. ISBN 3-527-26995-9
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Course of the state exam / Profile course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 120 hours):
Consultations, preparation for the exam: 120 hours
Total during the semester: 120 hours

Course evaluation passed/failed
Number of evaluated students: 14

A	B	C	D	E	Fx
92.86	7.14	0.0	0.0	0.0	0.0

Teachers:

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-PV-9/22	**Course unit title:** Selected Chapters from Material Diagnostics

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 4

Recommended semester/trimester of study: 3., 4..

Degree of study: III.

Prerequisites: KMI/M-PV-3/22

Conditions for the accomplishment of the course unit:
Final assessment by commission = 100 points
Successful completion of a course of the dissertation exam.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Demonstration of the ability to use and apply knowledge and skills acquired during the study in the field of material diagnostics

Brief course unit content:
Characteristics of the composition of materials investigated in the dissertation, methods used to determine the chemical composition of material, crystalline structure of materials, influencing the structure by thermal and mechanical processing, X-ray, microscopic and microfractographic examination of material properties.
Diagnostic methods used for evaluating the quality of materials and final products (machinery components).
Characteristics of the investigated material, composition, structure, important physical and mechanical properties and relations between them.
Basic principles of methods used to investigate the characteristic properties of the studied material (methods of chemical analysis, structural analysis, spectral analysis, thermal analysis, dynamic-mechanical analysis, methods for determining physical and mechanical properties, etc.).

Recommended Literature:
JANDOŠ, F, ŘÍMAN, R., GEMPERLE, A.: Využití moderních laboratórnych metód v metalografii, SNTL, Praha, 1985.
HRIVŇÁK, I.: Elektrónová mikroskopia ocelí, VEDA, Bratislava, 1986.
KOPEC, B.: Nedestruktivní zkoušení, CERM, Brno,2008.

PTÁČEK, L.. a kol.: Náuka o materiálu I, II, Akademické nakladatelství CERM, Brno, 2002.
BEZECNÝ, J. : Vznik trhlín a lomov pri tepelnom spracovaní ocelí, TnU AD, Trenčín, 2007.
BEZECNÝ, J.: Diagnostické metódy v materiálovom inžinierstve, Digitalizácia TnUAD, Rozvoj inovatívnych foriem vzdelávania a skvalitnenie študijných programov TnU AD, Trenčín, 2013.
Professional literature and foreign scientific publications focused on the topic of the dissertation.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Course of the state exam / Profile course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 120 hours):
Consultations, preparation for the exam: 120 hours
Total during the semester: 120 hours

Course evaluation passed/failed
Number of evaluated students: 7

A	B	C	D	E	Fx
85.71	14.29	0.0	0.0	0.0	0.0

Teachers:

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-P-10/22	**Course unit title:** Selected Chapters from Materials Science

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 4

Recommended semester/trimester of study: 3., 4..

Degree of study: III.

Prerequisites: KMI/M-P-1/22

Conditions for the accomplishment of the course unit:
Final assessment by commission = 100 points
Successful completion of a course of the dissertation exam.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Demonstration of the ability to use and apply knowledge and skills acquired during the study in the field of materials science

Brief course unit content:
Summary characteristics of construction materials in terms of material and utility properties.
Prediction of material lifespan of given structures.
Static and dynamic loading of materials.
Influence of environment (external conditions) on material properties.
Limit states of materials of technical objects.
Characteristics of materials according to their production (casting, welded material, material obtained by plastic deformation, machined, etc.).
Influence of plastic deformation on the structure of materials.
Definition of defects in the material and their identification.
Design of surface treatments (coating, heat treatment, etc.).
Fracture behaviour of materials at different loads.
Fractography.
Mechanical properties of materials.
Physical properties of materials.
Chemical properties of materials.
Structural properties of metallic and non-metallic materials.

Non-metallic materials and their material properties.
Progressive types of materials (materials used in power engineering, transport and engineering, biomaterials).
Progressive composites and nanocomposites and their application.

Recommended Literature:

Professional literature and foreign scientific publications focused on the topic of the dissertation.
PUŠKÁR, A., HAZLINGER, M.: Porušovanie a lomy súčastí, EDIS Žilina, 2000. ISBN 80-7100-654-8
HAZLINGER, M., MORAVČÍK, R: Degradačné procesy a predikcia životnosti, AlumniPress, 2007. ISBN 978-80-8096-031-5
PTÁČEK, L. a kol,: Nauka o materiálu I,II,III, Brno, CERM, 2001. ISBN 80-7204-193-2

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Course of the state exam / Profile course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 120 hours):
Consultations, preparation for the exam: 120 hours
Total during the semester: 120 hours

Course evaluation passed/failed
Number of evaluated students: 24

A	B	C	D	E	Fx
79.17	16.67	4.17	0.0	0.0	0.0

Teachers:

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-PV-7/22	**Course unit title:** Selected Chapters from Technology of Production of Thin Films and Coatings

Type, scope and method of educational activities:
Types of education:
Recommended duration of education (in hours):
Per week: For the whole period of study:
Study method: present

Number of credits: 4

Recommended semester/trimester of study: 3., 4..

Degree of study: III.

Prerequisites: KMI/M-PV-1/22

Conditions for the accomplishment of the course unit:
Final assessment by commission = 100 points
Successful completion of a course of the dissertation exam.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
Demonstration of the ability to use and apply knowledge and skills acquired during the study in the field of technology of production of thin films and coatings

Brief course unit content:
Surface treatment of materials and thin films and their function. Influence of surface roughness on quality of surface treatment.
Diffusion mechanisms in crystalline substances.
Fick's laws.
Surface treatment before coating.
Thermochemical surface treatment.
Thermomechnical surface treatment PVD, CVD, CVD-PACVD, PVD-PAPVD coatings.
One-component, two-component, multicomponent coatings, mono and multilayer coatings, mono and multiphase coatings, nanocomposite and functionally graded material (FGM) coatings
Magnetron sputtering, thermodiffusion and diffusion coating.
Wear tests.

Recommended Literature:
MACEK, K., ZUNA, P., JANOVEC, J.: Tepelné úpravy kovových materiálů, Vydavatelství ČVUT, Praha, 2001.
ASM Handbook, Vol. 8, 1973, ASM International, Materials Park, OH 44073.
MUSIL, J., VYSKOČIL, J.: Tenké vrstvy nitridu titanu, Academia, Praha,1989.

Zborníky „Vrstvy a povlaky“. Bratislava: Slovenská elektrotechnická spoločnosť, ISBN 80-968711-7-X, ČasopisY „Tribotechnika“.
Anders, A., A.: Handbook of Plasma Immersion Ion Implantation and Deposition, Wiley-VCH, 2000.
AFONIN, B.K. and ERMAKOV, V.S.: Metals and Alloys, Handbook NPO Professional, 2003.
GEORGES, J., CLEUGH, D.: Active Screen Plasma Nitriding, Stainless Steel 2000, ed. T.Bell, K.Akamatsu.
REECE, J., ROTH: Industrial Plasma Engineering, IoP, 2001.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Course of the state exam / Profile course
In-person education (total 0 hours):
Lecture: 0 hours
Seminar: 0 hours
Laboratory tutorial: 0 hours
Distance education (total 120 hours):
Consultations, preparation for the exam: 120 hours
Total during the semester: 120 hours

Course evaluation passed/failed
Number of evaluated students: 5

A	B	C	D	E	Fx
20.0	80.0	0.0	0.0	0.0	0.0

Teachers:

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.

Subject information sheet

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: KMI/M-PV-1/22	**Course unit title:** Technology of Production of Thin Films and Coatings

Type, scope and method of educational activities:
Types of education: Lecture / Practical / Laboratory practical
Recommended duration of education (in hours):
Per week: 2 / 2 / 0 **For the whole period of study:** 24 / 24 / 0
Study method: present

Number of credits: 8

Recommended semester/trimester of study: 1.

Degree of study: III.

Prerequisites:

Conditions for the accomplishment of the course unit:
Assessment during the semester:
Summary assessment of work results during the semester = 40 points
Doctoral students individually elaborate a project focused on detailed analysis and characteristics of the researched materials, which represent the objects of research in their dissertation. In elaboration of their project, the students use knowledge based on data from the literature and foreign scientific publications, that reflects the current state of field. The students present the project in the form of a presentation in front of the teacher and other students and answer questions within the discussion.
Final assessment:
Assessment of exam results = 60 points
After completing all course lectures and seminars, which are conducted in the form of a discussion between the teacher and the students, the doctoral students take an exam with an individual focus on the characteristics of a particular material, examined in their dissertation and the principles of methods used to study selected properties of the material.
Grading scale:
Grade A: 91 – 100 points
Grade B: 81 – 90 points
Grade C: 71 – 80 points
Grade D: 61 – 70 points
Grade E: 55 – 60 points
Grade FX: less than 55 points

Learning outcomes:
The students have deepened their knowledge of the use of industrially important materials. They have detailed knowledge of the structural properties of materials, which they examine in their dissertation and they know the connections and relationships between the chemical composition of the studied material and the material characteristics of the final product. They perfectly understand the principle of methods used to study material properties and other important aspects with a focus on thin films and coatings that affect the use of materials in operating conditions. They can independently analyse and comprehensively evaluate the problem, predict the resulting properties of the investigated material based on change in the material properties of coatings and propose

solutions for the development of new materials and composites with respect to the ecological and economic aspects.

Brief course unit content:
Surface treatment of materials and thin films and their function. Influence of surface roughness on quality of surface treatment.
Surface treatment before coating. Chemical-thermal surface treatment. Thermomechanical surface treatment of PVD coatings and others. Coating forms.
Wear tests. Evaluation of properties of thin films and coatings.
Design of surface treatment in relation to practical application.

Recommended Literature:
MACEK, K., ZUNA, P., JANOVEC, J.: Tepelné úpravy kovových materiálů, Vydavatelství ČVUT, Praha, 2001.
ASM Handbook, Vol. 8, 1973, ASM International, Materials Park, OH 44073.
MUSIL, J., VYSKOČIL, J.: Tenké vrstvy nitridu titanu, Academia, Praha,1989.
Zborníky „Vrstvy a povlaky“. Bratislava: Slovenská elektrotechnická spoločnosť. ISBN 80-968711-7-X, ČasopisY „Tribotechnika“.
A. ANDERS, A.: Handbook of Plasma Immersion Ion Implantation and Deposition, Wiley-VCH, 2000.
AFONIN, B. K. and ERMAKOV, V.S.: Metals and Alloys, Handbook NPO Professional, 2003.
GEORGES, J., CLEUGH, D.: Active Screen Plasma Nitriding, Stainless Steel 2000, ed. T.Bell, K. Akamatsu.
REECE ROTH, J.: Industrial Plasma Engineering, IoP, 2001.
YANGUAS-GIL, A.: Growth and Transport in Nanostructured Materials: Reactive Transport in PVD, CVD, and ALD (SpringerBriefs in Materials). 2014. ISBN 978-3319246703.

Language which is necessary for accomplishment of the course unit:
Slovak, English

Notes:
Compulsory elective course / Profile course
In-person education (total 48 hours):
Lecture: 24 hours
Seminar: 24 hours
Laboratory tutorial: 0 hours
Distance education (total 160 hours):
Preparation for the lessons, study of literature, elaboration of assigned works and projects: 120 hours
Preparation for the exam: 40 hours
Total during the semester: 208 hours

Course evaluation passed/failed
Number of evaluated students: 13

A	B	C	D	E	Fx
100.0	0.0	0.0	0.0	0.0	0.0

Teachers: prof. Ing. Jan Krmela, PhD.

Last modification date: 17.06.2024

Approved by: prof. Ing. Darina Ondrušová, PhD.