ЗАПОРІЗЬКА ПОЛІТЕХНІКА
НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ

Faculty of Civil Engineering, Architecture and Design
Department of Composite Materials, Chemistry and Technology

SILABUS

of the discipline (compulsory)

SPECIAL SECTIONS OF THE THEORY AND TECHNOLOGY OF POWDER AND COMPOSITE MATERIALS

Volume of the educational component (credits - 5/hours - 150)

Educational programme «Composite and powder materials, coatings»
of the second level of higher education
Speciality - 132 Materials science

INFORMATION ABOUT THE LECTURER

Shyrokobokova Nataliia, Associate Professor, Candidate of Technical Sciences
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- III educational building, auditorium 15.
Time and place of consultations:
III educational building, auditorium 15 and online according to the department's consultation schedule

COURSE DESCRIPTION

The discipline contributes to the expansion of professional knowledge and practical skills of the future specialist in the study of composite and powder materials and their application, which can be useful in employment..

PURPOSE, COMPETENCIES AND LEARNING OUTCOMES

1. The purpose of the course is to get acquainted with the types, composition, properties, technologies of production and protection, appropriate areas of application of modern composite materials, taking into account their environmental friendliness, economy.

2. Competences and learning outcomes, the formation of which is ensured by studying the discipline.

General competences:

КЗ.01. Ability to think abstractly, analyse and synthesise.

КЗ.02. Ability to apply knowledge in practical situations.

КЗ.04 Ability to communicate in a foreign language.

Specialist competences:

СК.01 Ability to identify and pose problems in the field of materials science, to make effective decisions to solve them..

СК.02 Ability to plan and conduct research in the field of materials science in laboratory and production conditions at the appropriate level using modern methods and techniques of experimentation.

СК.03 Ability to develop new research methods and techniques based on knowledge of the methodology of scientific research and the specifics of the problem to be solved

СК.06 Ability to understand and use mathematical and numerical methods of modelling properties, phenomena and processes

СК.08 Ability to clearly and unambiguously communicate own knowledge, conclusions and arguments on materials science and related issues to specialists and non-specialists, including students..

СК.12 Ability to develop and implement projects in the field of materials science, as well as related interdisciplinary projects.

СК.14 Ability to adhere to professional and ethical standards.

Programme learning outcomes:

РН 1. Understand and apply the principles of system analysis, cause and effect relationships between significant factors and scientific and technical solutions in the context of existing theories.

РН 3. To communicate fluently in the state and English languages orally and in writing to discuss professional problems and results of activities in the field of materials science and a wide range of engineering issues, to present research results and innovative projects..

РН 11. Use modern methods to identify, formulate and solve inventive problems in the field of materials science.

РН 13. Plan and perform experimental materials research, select appropriate equipment and techniques, perform statistical processing and statistical analysis of experimental results, and justify conclusions.

РН 18. Collect the necessary information using scientific and technical literature, databases and other sources, analyse and evaluate it.

РН 21. Skills to optimise the composition, structure and properties of composite materials and coatings.

PREREQUISITES FOR STUDYING THE DISCIPLINE

The study of the discipline is based on the study of previous disciplines: ‘Technology of production of powder and composite materials’, “Theoretical bases of formation of powder and composite materials”, “Technology of application and properties of coatings”, as well as for diploma design.

LIST OF TOPICS (THEMATIC PLAN) OF THE DISCIPLINE

Table 1 - General thematic plan of auditorium work

Number of the week	Lecture topics, hours.	Topics of laboratory/practical work or seminars, hours
1	2	3

1	Ceramic-based composite materials. Main types (2 hours).	
2	Raw materials and basic processes of ceramic products technology. Kermets (4 hours)	L.w. № 1 Making products from clay. Determination of physical and technical properties (4 hours)
3	Biomaterials (2 hours)	
5	General classification of building materials (4 hours)	L.w. № 2 Calculation of the composition of heavy concrete (2 hours).
6	Concrete: composition, structure, properties. Technologies for the manufacture of concrete products (4 hours).	
7	Wood: composition, structure, properties (2 hours).	L.w. № 3 Determination of the optimal composition for wood-polymer composites (2 hours)
8	Wood-polymer composites (4 hours).	
9	Organoplastics. Types, composition, properties, production technologies (4 hours)	L.w. №4 Modern materials and technologies. Presentations, discussions (4 hours)
10	Protective polymeric materials. Varieties. Paints and varnishes (4 hours)	L.w. № 5. Creation of a polymer coating, practical application (2 hours).

INDIVIDUAL WORK

Performing L.w. № 1…2 – 7 week.

Performing L.w. № 3…5 - 14 week.

RECOMMENDED INFORMATION AND TRAINING SOURCES

1. Методичні вказівки до проведення практичних занять з дисципліни «Спеціальні розділи теорії та технології порошкових, композиційних матеріалів» для студентів спеціальності 132 «Матеріалознавство» всіх форм навчання / Укл.: Н.В. Широкобокова. - Запоріжжя: НУ «Запорізька політехніка», 2023.

Композитні та порошкові матеріали : навч. посіб. / П.П. Савчук, В.П. Кашицький, М.Д. Мельничук, О.Л. Садова; за заг. ред. П.П. Савчука. – Луцьк: ФОП Теліцин О.В. - 2017. – 368 с.

2. Нові матеріали та композити: навчальний посібник / Ю.А. Бурєнніков, І.О. Сивак, С.І. Сухоруков – Вінниця: ВНТУ, 2013. – 158 с.

3. Копань В. Композиційні матеріали: навч. посіб. ВНЗ /В. Копань; К.: Пульсари, 2004. – 193 с.

4. Солнцев Ю.П. Спеціальні конструкційні матеріали: Підручник / Ю.П. Солнцев, С.Б. Бєліков, І.П. Волчок, С.П. Шейко. – Запоріжжя: Валпіс-Поліграф, 2010. – 536 с.

5. Електроний ресурс: https://ep3.nuwm.edu.ua/4741/1/V55.pdf.

EVALUATION

Types of current control:
1. Current assessment in laboratory work and defence of individual works.
2. Assessment during the written exam.

The system of evaluation of student work during the semester:

Ongoing assessment and independent work						Exam grade	Final grade (total)
L.w 1	L.w 2	L.w 3	L.w 4	L.w. 5		60	100
5	5	5	20	5			

де L.w. 1, L.w. 2, … L.w. 5 – laboratory works.

The final control is a written exam.

COURSE POLICIES

The course policy is based on close interaction between the teacher and the student, regular communication to help with the course. This requires mandatory attendance at classes and completion of scheduled assignments on time. Completion of assignments later than the deadline is allowed only after the student has completed the work provided for in the curriculum. Students must comply with the academic integrity policy. Academic integrity is defined by the Code of Academic Integrity of the National University «Zaporizhzhia Polytechnic» https://zp.edu.ua/uploads/dept_nm/Nakaz_N253_vid_29.06.21.pdf .

TECHNICAL REQUIREMENTS FOR THE COURSE

To access the course materials, you must have personal access to the university learning platform Moodle.