



Press equipment

Educational component work program (Syllabus)

Educational component details

Level of higher education	First (bachelor's)
Discipline	<i>13 Mechanical Engineering</i>
Specialty	<i>133 Industrial mechanical engineering</i>
Educational program	<i>OPP Engineering of equipment for the production of polymer and building materials and products</i>
Status educational component	<i>Selective</i>
Form of study	<i>full-time (day)</i>
Year of training, semester	<i>3rd year, spring semester</i>
Amount educational component	<i>4(120)</i>
Semester control/control measures	<i>Test</i>
Class schedule	<i>4 hours per week (2 hours of lectures, 1 hour of practical and 1 hour of laboratory classes)</i>
Language of instruction	<i>Ukrainian</i>
Information about the course leader/teachers	Lecturer: <i>Prof., Ph.D., Sivetsky Volodymyr Ivanovych, https://cpsm.kpi.ua/sivetskij-volodimir-ivanovich.html?tmpl=component</i> Practical/Seminar: <i>Prof., Ph.D., Sivetsky Volodymyr Ivanovych, https://cpsm.kpi.ua/sivetskij-volodimir-ivanovich.html?tmpl=component</i>
Course placement	<i>Sikorsky Platform: https://do.ipk.kpi.ua/course/view.php?id=4395</i>

Educational component training program

1. Description of the educational component, its purpose, subject of study and learning outcomes

The educational component belongs to the cycle of the educational component of professional training, to the educational components of professional and practical training.

Pressing is the most common method of manufacturing products from thermosets and rubber mixtures, sometimes it is also used to produce products from thermoplastics. The method is based on the ability of these materials to transition to a viscous state when heated and consists in forming a product from a melt in a closed volume by creating irreversible deformations in the material. The fixation of the specified dimensions and configuration of the product occurs as a result of solidification during the processing of thermosets, the course of a chemical reaction of vulcanization of rubber mixtures or as a result of cooling of the thermoplastic material.

Polymer and silicate engineering occupies a special place in the field of mechanical engineering due to its wide connections with others and a large range of equipment used in various sectors of the national economy: chemical, petrochemical, light, electrical and other industries.

Subject The educational component "Pressing Equipment" is equipment for the production of one-off products using the static forming method and pressing processes. The educational component orients students to the current world level of scientific and technical developments in the fields of application of equipment for the production of polymer and building materials.

Goal educational component «Press equipment»

The purpose of studying the educational component is to form in bachelors a complex of knowledge regarding the design features of equipment for the production of polymer and building materials and products.

In accordance with the goal, the training of bachelors in this specialty requires strengthening the competencies formed in students:

Integral competence: The ability of a person to solve complex specialized tasks and practical problems in a certain field of professional activity or in the process of learning, which involves the application of certain theories and methods of relevant sciences and is characterized by the complexity and uncertainty of conditions.

ZK1 Ability to think abstractly. ZK2 Ability to apply knowledge in practical situations. ZK4 Ability to search, process and analyze information from various sources. ZK10 Skills in using information and communication technologies. ZK12 Ability to exercise one's rights and obligations as a member of society, to realize the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of man and citizen in Ukraine. FK2 Ability to apply fundamental scientific facts, concepts, theories, principles to solve professional tasks and practical problems of the engineering industry. FK6 Ability to assess the technical and economic efficiency of typical systems and their components based on the application of analytical methods, analysis of analogues and the use of available data. FK11 Ability to analyze, select, assign processes and equipment for the production of polymer and building materials and products. FK12 Ability to perform engineering calculations on a PC using a high-level algorithmic language (Fortran, etc.)

1.2. According to the requirements of the program educational component "Press Equipment", after mastering it, students must demonstrate the following program learning outcomes:

- knowledge:
- PH1 Knowledge and understanding of the principles of technological, fundamental and engineering sciences that underlie the branch of mechanical engineering of the relevant industry.
 - PH2 Knowledge and understanding of mechanics and mechanical engineering and the prospects for their development.
 - PH8 Understand appropriate methods and have the skills to design typical assemblies and mechanisms in accordance with the task.

skills:

- PH12 Apply technical control tools to evaluate the parameters of objects and processes in industrial mechanical engineering.
- PH19 Know and understand the features of the technology of processing polymer materials into products and parts.

2. Prerequisites and postrequisites of the educational component (place in the structural and logical scheme of training according to the relevant educational program)

Studying the educational component "**Press equipment**" is based on the principles of integrating various knowledge obtained by students during the bachelor's degree when studying educational components, in particular: "Technology of composite materials", "Rheology", "Technology of polymer processing", "Mechanics of a solid deformed body", "Theory of mechanisms and machines", "Theoretical mechanics", "Hydromechanics and hydraulics", "Installation, operation and reliability of technological equipment", "Technological foundations of mechanical engineering", "Occupational safety and civil protection".

3. Course content *educational component*

Chapter 1. General issues of designing polymer equipment. Introduction

Topic 1. Purpose and content of the discipline. Modern design trends and requirements for polymer equipment. Structural materials and requirements for them. Classification of press equipment

Chapter 2. Thermoplastic tableting machines

Topic 1. Purpose and classification of tableting machines.

Topic 2. Sound' The effect of tableting effort, tablet strength and dimensions.

Topic 3. Power calculation of a crank tablet machine

Topic 4. Rotary machines.

Topic 5. Hydraulic tablet machines.

Section 3. Hydraulic presses

Topic 1. Purpose, classification and essence of the method is present.

Topic 2. Design of hydraulic presses.

Topic 3. Basic parameters of hydraulic presses and their calculation

Topic 4. Construction and calculation of hydraulic cylinders

Topic 5. Individual and group hydraulic drives.

Topic 6. Rotary presses and automatic presses.

4. Educational materials and resources

Basic literature

1. Press equipment [Electronic resource]: a teaching aid for bachelor's degree applicants in the educational program "Packaging and packaging equipment engineering", "Engineering and computer-integrated technologies for designing innovative industry equipment" speciality 131 "Applied mechanics", 133 "Industrial mechanical engineering" / Igor Sikorsky Kyiv Polytechnic Institute; compiler: V. I. Sivetsky, D. G. Shvachko. – Electronic text data (1 file: 4.12 MB). – Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2023. – 147 p. – Screen title. <https://ela.kpi.ua/handle/123456789/62813A.I>.
2. Dubynina, Equipment of chemical production and construction materials enterprises: a manual / A.I. Dubynin, V.M. Atamanyuk, V.P. Duleba, D.M. Symak; edited by prof. A.I. Dubynina. – Lviv: Lviv Polytechnic Publishing House, 2013. – 292 p.
3. Soroka, W Fundamentals of Packaging Technology. — IoPP, 2002. — ISBN 1-930268-25-4
4. Justification of the operating mode of equipment for mixing components of mixtures for tableting / O. O. Chepelyuk, O. M. Chepelyuk, O. O. Gubanya / Food industry. - 2018. - No. 24. - P. 118-124.
5. Shibetsky, V.Yu. Development of a tableting machine design for the production of triturated tablets [Text] / V.Yu. Shibetsky, V.V. Povodzinsky // "Technological audit and production reserves". - 2014. - No. 4(17). - p. 4- 8. (5s).
6. Technology of industrial drug production: a textbook for students of higher education. ed. : in 2 parts / V. I. Chuyeshov, E.V. Gladukh, I. V. Sayko and others. - 2nd ed., revised and supplemented - Kh. : NPhA : Original, 2012. - Part 1. - 694 p. : ill.
7. Hydraulics, hydro- and pneumatic drives: lecture notes / compiled by E. V. Kolisnichenko, A. S. Mandryka, V. O. Panchenko. – Sumy: Sumy State University, 2021. – 176 p.
8. Dezhko V. I. Hydrogasdynamics: a textbook. / V. I. Dezhko, V. O. Vinogradov-Saltykov, V. G. Fedorov. – Kyiv: NTUU "KPI", 2014. – 414 p.
9. Konstantinov Yu. M. Technical mechanics of liquids and gases: textbook / Yu. M. Konstantinov,

O. O. Gizha. – Kyiv: Higher School, 2002. – 277 p.

10. *Hydraulics, hydro- and pneumatic drive: textbook / edited by O. O. Fedorets, O. F. Salenko. – 2nd edition, revised and supplemented – Kyiv: Knowledge, 2009. – 502 p. – (Higher education of the 21st century).*

Additional literature

11. Krasowski E. *Hydraulics. Hydraulics machines / E. Krasowski, I. Nikolenko, J. Gliński, A. Dashchenko, S. Sosnowski. - Lublin: Polish Academy of Sciences Branch in Lublin, 2011. - 350 p*
12. *Hydraulics and hydraulic drive: a reference book / V.G. Fedorov, N.S. Mameliuk, O.I. Kepko, O.S. Pushka; edited by V.G. Fedorov. Uman: Publishing and printing center "Vizavi", 2017. – 135 p.*
13. Pelevin L. E., Mishchuk D. O., Rashkivskyi V. P., Horbatiuk E. V. *Hydraulics, hydraulic machines and hydropneumatic automation:Textbook, KNUBA, MONU.-Kyiv, 2015.-340 p.*
14. Nazarenko I.I. *Machinery and equipment of building materials enterprises: Designs and basics of operation: Textbook / I.I. Nazarenko, O.V. Tumanovskaya. – K.: Vyscha shkola, 2004. – 590 p. 2.*
15. *Technology of industrial production of medicinal products, edited by D. I. Dmitrievsky. - Vinnytsia: NOVA KNYGA, 2008. - 280 p.*
16. D.E. Walsh *Do It Yourself Vacuum Forming for the Hobbyist, Workshop Publishing, Lake Orion, MI, 2002*
17. Yam, KLEncyclopedia of Packaging Technology. — John Wiley & Sons, 2009. — ISBN 978-0-470-08704-6
18. *Basic processes, machines and apparatuses of chemical production: Textbook / I. V. Kovalenko, V. V. Malinovsky. — Kyiv: Inres: Volya, 2005. — 264 p.: ill. — Bibliography: p. 253—255. ISBN 966-8329-26-0*
19. *Technological foundations of processing of polymeric materials [Electronic resource]: textbook. I. O. Mikulyonok. 2nd ed., revised and supplemented; Igor Sikorsky Kyiv Polytechnic Institute. — Electronic text data (1 file: 7.21 MB). — Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2020. — 292 p. — Bibliography: p. 287—288.*
20. *Technological equipment for the production of building and polymer products - 1. Equipment for building materials and products. Laboratory practical course on the academic discipline: a textbook / V. I. Sivetsky, V. M. Kurylenko, I. Ivitsky. — Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2018. — 45 p.*
21. Voronin V.G. *Hydraulic presses with battery-free oil pump drive. - M.: Mechanical Engineering, - 2004. - 264 p.*
22. Kulinchenko V. R. *K 90 Hydraulics, hydraulic machines and hydraulic drive: Textbook. — Kyiv: Firm "INKOS", Center for Educational Literature, 2006. - 616 p.*
23. Sivetsky V.I. *Polymer processing equipment: Extrusion and pressing equipment. Lecture notes. — Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2018. — 68 p.*
24. Sivetsky V.I. Sokolsky O.L. *Methodical instructions for practical classes on the course Technological equipment of chemical, polymer and silicate production NTUU "KPI" 2007.*

Information resources on the Internet

25. **Association of Manufacturers of Profiled Polymer Products -**
<https://www.bau.com.ua/f/appm/>
26. **Ukrainian Association of Polymer Products Manufacturers -**
<https://opendatabot.ua/c/44034222>

Educational content

5. Methodology for mastering the educational component

Lectures are aimed at:

- providing modern, holistic, interdependent knowledge of the educational component, the level of which is determined by the target setting for each specific topic;
- ensuring creative work of students together with the teacher during the lecture;
- fostering professional and business qualities in students and developing their independent creative thinking;
- developing the necessary interest in students and providing direction for independent work;
- determination of the current level of development of science and technology in the field of numerical calculation methods;
- reflection of the methodological processing of the material (highlighting the main ideas and provisions, underlining conclusions, repeating them in different formulations);
- acquisition of visual, combining if possible with the demonstration of audiovisual materials, models, models and samples;
- teaching in clear and concise language, explaining all newly introduced terms and concepts; accessibility for audience perception.

No. sal ary	Title of the lecture topic and list of main questions (list of didactic aids, references to literature and tasks for the SRS)	Hours
Chapter 1. General issues in the design of polymer equipment. Introduction		
1.	TOPIC 1. Purpose and content of the discipline. Modern design trends and requirements for press equipment. Structural materials and requirements for them. Classification of press equipment <i>Literature:</i> [8] p. 5-8, [2] p. 10-18, <i>Tasks for the CPS. Main types of polymers and their application</i>	2
Chapter 2. Thermoplastic tableting machines		
2.	TOPIC 1. Purpose and classification of tableting machines. <i>Design, principle of operation and cycle diagrams of a crank tablet machine.</i> <i>Literature:</i> [8] p. 44-51, [11] p. 58-74, <i>Tasks on the CTC. Tableting methods, requirements for press materials.</i>	2
3.	TOPIC 2. Sound The effect of tableting effort, tablet strength and dimensions. <i>Sound The relationship between tableting efforts, tablet strength and dimensions. Distribution of efforts during tableting.</i> <i>Literature</i> [8] p. 45-49; 60-64; [11] p. 202-224; <i>Tasks on the SRS. Devices for heating tablets.</i>	4
4.	TOPIC 3. Power calculation of a crank tablet machine <i>Calculation of power parameters of a crank tablet machine. Power of a crank tablet machine.</i> <i>Literature:</i> [8] pp. 52-55, [Error! Reference source not found.] pp. 243-247 <i>Tasks for the SRS. Sequence of force calculation.</i>	4
5.	TOPIC 4. Rotary machines. <i>Basic parameters and designs of rotary and hydraulic tablet machines</i> <i>Literature:</i> [8] pp.55-60, [Error! Reference source not found.] pp. 243-247 <i>Tasks for the CTC. Structural diagrams of rotary machines.</i>	2

6.	TOPIC 5. Hydraulic tablet machines. <i>Basic parameters and designs of hydraulic tablet machines</i> Literature: [8] pp.55-60, [Error! Reference source not found.] pp. 243-247 <i>Tasks for the CTC. Structural diagrams of rotary and hydraulic tablet machines.</i>	2
Section3.Hydraulic presses		
7.	TOPIC 1. Purpose, classification and essence of the present method. <i>Purpose, classification, design, principle of operation.</i> <i>References: [8] 50-54,[2] 68-74.</i> <i>Task for the CPC: Types of polymer materials processed by pressing.</i>	2
8.	TOPIC 2. Design of hydraulic presses. <i>Design features of hydraulic presses with upper and lower main cylinder locations.</i> <i>References: [8] 52-55,[8] 70-70</i> <i>Tasks on the CPC: Parameters determined by the product configuration.</i>	2
9.	TOPIC 3. Basic parameters of hydraulic presses and their calculation <i>Effective, nominal press force, pressing speed and stroke size. Work cycle</i> <i>References: [8] 52-54, [2] 79-81,71-75,</i> <i>Tasks for the CTC: Schemes of direct and face pressing processes</i>	2
10.	TOPIC 4. Construction and calculation of hydraulic cylinders <i>Schemes and designs of hydraulic cylinders and types of seals. Strength calculation.</i> <i>Types of seals.</i> <i>.References: [8] 56-61.</i> <i>Tasks for the CPC: Structural materials for the manufacture of hydraulic cylinders and seals</i>	6
11.	TOPIC 5. Individual and group hydraulic drives. <i>Component units and distribution equipment. Energy accumulators and calculation of elements of pneumatic-hydraulic energy accumulators. Hydraulic diagrams of press control.</i> <i>References: [8] 62-65,[2] .98-109</i> <i>Tasks for the SRS: Types of working fluid and pumps. List the advantages and disadvantages of a group drive over an individual drive.</i>	4
12.	TOPIC 6. Rotary presses and automatic presses. <i>Structural diagrams. Mechanisms for automated loading of raw materials and unloading of products</i> <i>References:[8] 66-72,75-79, [2] 109-116,</i> <i>Tasks for the CPC: Types of pumps for individual group presses. Working fluids.</i>	4
	Total	36

Practical classes

The purpose of the cycle of practical classes in the educational component is to consolidate theoretical knowledge and develop skills in conducting parametric calculations and thermal calculations, as well as calculations for the strength and reliability of components and parts of equipment.

The main tasks of the practical training cycle:

- help students systematize, consolidate and deepen their knowledge theoretical in the field of chemical engineering and polymer processing;
- to teach students techniques for solving practical problems, to promote the acquisition of skills and abilities for performing calculations, graphics and other types of problems;
- teach them to work with scientific and reference literature, documentation and diagrams;

- to form the ability to learn independently, that is, to master the methods, means and techniques of self-study, self-development and self-control.

No · sal ary	Title of the topic of the practical lesson and list of main questions (list of didactic material, references to literature and tasks for the CTS)	Hours
1.	Calculation of tableting force of compressed powders. References:[8] pp. 45-49,[2] p. Tasks on the VTST Typical cycle diagrams of RTM operation.Methodology for calculating the components of the RTM work cycle.	2
2.	Calculation of the crank mechanism of the TM. References: [8] p.34,[2] Tasks on the CRC. Typical kinematic diagrams of TM.	2
3.	Calculation of the GTM cycle time. References: [8] p.34, [2] Tasks on the CTC. Varieties of GTM designs.	2
4.	Strength calculation of hydraulic cylinders. References: [8] p.34, [2] Tasks on the CTC. Types of structureshydraulic cylinders.	2
5.	Development and description of the GP wiring diagram. References: [8] p.34, [2] Tasks on the CTC. Types of structuresGP wires.	2
6.	Types of working fluid and pumps. References: [8] p.34, [2] Tasks on the CTC. List the advantages and disadvantages of group driving over individual driving.	2
7.	Schemes of direct and face pressing processes References: [8] p.34, [2] Tasks on the CTC. Hydraulic press control diagrams	2
8.	Calculation of the cycle time and productivity of a hydraulic press. References: [8] p.34, [2] Tasks on the CTC. Perform calculationduration of the work cycle and productivity of the hydropress [11].	2
9.	Modular test work.	2
	Total	18

Laboratory classes

The purpose of the cycle of laboratory work on the educational component is to consolidate theoretical knowledge, develop skills to determine the features of the design of equipment for the manufacture of polymer products, determine the features of the technological processes of tableting, forming products using injection molding, blow molding and rolling methods, and master the methods of processing and analyzing the data obtained in the experiment.

No. sala ry	Name of laboratory work (computer workshop)	Number of listening hours
1	Research into the design and kinematics of a rotary tablet machine.	2
2	Research on the design, kinematics and cycle diagram of a crank tablet press.	2
3	Research on the design and cycle diagram of a hydraulic tablet machine.	2

4	<i>Research on the kinematic scheme of a rotary tablet machine.</i>	2
5	<i>Research into kinematic schemes of crank tablet machines.</i>	2
6	<i>Research of the kinematic scheme of a hydraulic press.</i>	2
7	<i>Study of the design and study of the cycle diagram of the hydraulic press.</i>	2
8	<i>Research on the design of hydraulic cylinders.</i>	2
9	<i>Final lesson. Submission and defense of laboratory assignments.</i>	2
	<i>Total</i>	18

6. Independent work of a higher education student

Independent work of students takes 40% of the time of studying the course, also includes preparation for the exam. The main task of independent work of students is to master scientific knowledge in the field of modern methods of calculating machines for tableting, rolling and calendering, which are not included in the list of lecture questions, through personal search for information, the formation of active interest in a creative approach in educational work and in the performance of coursework. In the process of independent work within the framework of the educational component, the student must learn to deeply analyze the problem of choosing effective methods of calculating chemical production equipment and, based on calculations, come to their own substantiated conclusions.

No. salary	Title of the topic to be studied independently	Number of hours of CTC
1	2	3
Section 1. General issues in the design of polymer equipment		
Introduction		
1	<i>Tasks for the SRS. Compare the main stages of formation and development trends of the polymer engineering and polymer processing industries in Ukraine. Repeat the basic requirements for machine design. rheological and tribotechnical properties of polymers and methods for their processing into products and parts. Main types of polymers and their application. Rheological, thermophysical, tribotechnical and adhesive properties of polymers. Extrusion technology of molded polymer products. 8 [5-9], 2[10-44], 9.</i>	10
Section 2. Thermoplastic tableting machines.		
2	<i>The essence of the method of tableting thermosets. Tableting methods, requirements for press materials. Devices for heating tablets. Sound tableting force, tablet strength and tablet size. Sequence of force calculation. Kinematic diagrams of rotary and hydraulic tablet machines.. Literature: 8 [44-65], 15 pages.</i>	14
Chapter 3. Hydraulic presses		
3	<i>Tasks for the SRS. Types of polymer materials processed by pressing. Specialized presses and automatic presses. Compaction of moving and stationary connections of hydraulic cylinders. Typical materials and types of seals. Advantages and disadvantages of group drive over individual. Basic parameters of working fluids. Types of pumps. Energy accumulators. Hydraulic drive distribution equipment. Devices that ensure safety when</i>	14

	<i>working on hydraulic presses. 8 [50-72],2[68-116]</i>	
4	<i>Preparation for the ICR</i>	4
5	<i>Preparation for the test</i>	6
	Total hours	48

Policy and control

7. Educational component policy

Rules for class attendance and behavior in class

Attendance is a mandatory component of assessment. Students are required to actively participate in the learning process, not be late for classes or miss them without a valid reason, not interfere with the teacher conducting classes, and not be distracted by activities unrelated to the learning process.

Rules for assigning incentive and penalty points

- Incentive points can be awarded by the teacher exclusively for performing creative works in the educational component or for additional completion of online specialized courses with the receipt of the corresponding certificate:*
 - <https://www.coursera.org/learn/water-treatment>;*
 - <https://croapaia.com/water-treatment-pro/>;*
 - <https://www.shortcoursesportal.com/studies/56436/introduction-to-drinking-water-treatment.html>).*

But their sum cannot exceed 25% of the rating scale.

- There are no penalty points within the educational component.*

Deadline and Rescheduling Policy

In the event of arrears for the educational component or any force majeure circumstances, students must contact the teacher via available (provided by the teacher) communication channels to resolve problematic issues and agree on an algorithm of actions for work-out.

Academic Integrity Policy

Plagiarism and other forms of dishonest work are unacceptable. Plagiarism includes the lack of references when using printed and electronic materials, quotes, opinions of other authors. Hints and copying when writing tests, conducting classes are unacceptable; taking credit for another student; copying materials protected by the copyright system without the permission of the author of the work. The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More details:<https://kpi.ua/code>

Academic Conduct and Ethics Policy

Students should be tolerant, respect the opinions of others, formulate objections in a correct form, and provide constructive feedback in class.

The norms of ethical behavior of students and employees are defined in Section 2 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More details:<https://kpi.ua/code>

8. Types of control and rating system for assessing learning outcomes (RSO)

Distribution of study time by types of classes and tasks from the educational component according to the working curriculum:

Semester	Study time		Distribution of teaching hours				Control measures		
	Loans	academic year	Lectures	Practical	Lab work	CR C	MK R	R R	Semester control

6	4	120	36	18	18	48	1	–	test
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A student's rating for the educational component consists of the points he receives for:

A bachelor's rating for the educational component consists of the points he receives for work in practical, laboratory classes, and MCR.

Rating (weighting) points system and evaluation criteria

1. Performing practical work.

Weighted score – 5. The maximum number of points for all practical work is:

5 points x 8 points/year = 40 points

Criteria for assessing student knowledge

Mark	Completeness of the answer
5- 4	Timely and complete completion of the task, preparation of all programs, calculations, registration and protection without flaws
3-2	Minor flaws in the programs that do not affect the calculation results
1	Untimely completion of the task, shortcomings in programs, calculations and design
0	Failure to complete the task

2. Completion of modular test work.

Weighted score –12. The modular test has two tasks, each task is evaluated at 6 points. The maximum number of points on the modular test is:

12 points x 1 MCR = 12 points

Criteria for assessing student knowledge

Mark	Completeness of the answer
12-10	Timely and complete completion of the task, preparation of all programs, calculations, registration and protection without flaws
9- 7	Minor flaws in the programs that do not affect the calculation results
6- 4	Untimely completion of the task, shortcomings in programs, calculations and design
3-0	Failure to complete the task

3. Performing laboratory work.

Weighted score – 6. The maximum number of points for laboratory work is:

6 points x 8 labs/year = 48 points

Criteria for assessing student knowledge

Mark	Completeness of the answer
6-5	Timely and complete completion of the task, preparation of all programs, calculations, registration and protection without flaws
4-3	Minor flaws in the programs that do not affect the calculation results
2-1	Untimely completion of the task, shortcomings in programs, calculations and design
0	Failure to complete the task

Students who have a rating of less than 60 points at the end of the semester, as well as those who want to improve their grade, take a final exam. A “hard” system is used, where the student loses their starting rating, and the grade for the discipline of the educational component is given based on their performance in the final exam.

At the test, students complete a written test. Each task contains two theoretical questions. The list of questions is given in the methodological recommendations for mastering the educational component. Each theoretical question is evaluated at 50 points.

Evaluation system for theoretical questions RT1, RT2 ::

"excellent", complete answer (at least 95% of the required information) – 50–48 points;
 "good", sufficiently complete answer (at least 75% of the required information or minor inaccuracies) – 47–38 points;
 "satisfactory", incomplete answer (at least 60% of the required information and some errors) – 37-30 points;
 "unsatisfactory", unsatisfactory answer – 0 points.

The maximum rating for the test is

$$RE=RT1+ RT2 = 50+50 = 100 \text{ points.}$$

Admission requirements for semester control: enrollment of all practical work.

The sum of the starting points and/or points for the credit test is converted into the credit score according to the table:

To obtain a credit score, the sum of all rating points R obtained during the semester is converted according to the table:

Number of points	Rating
95...100	perfectly
85...94	very good
75...84	good
65...74	satisfactorily
60...64	enough
$RD < 60$	unsatisfactorily
Admission conditions not met	not allowed

9. Additional information from educational component

<https://cpsm.kpi.ua/>

Approximate list of questions that can be asked on the MCR and credit

1. Give the method of force calculation of a tablet machine.
2. Draw a structural and kinematic diagram of a rotary tablet machine.
3. Draw a structural and hydraulic diagram of a hydraulic tablet machine.
4. Name the press tool and devices for feeding tablet machines.
5. Describe the equipment for heating tablets and powering hydraulic presses.
6. Give a cycle diagram of the operation of a crank TM.
7. Provide a flow chart of the GTM operation.
8. Describe the design variations of mechanisms for preparing press powders.
9. Describe the design of TM dosing mechanisms
10. Draw a diagram of a hydropress.
11. Give the methodology for calculating the power of the GP.
12. Give the methodology for calculating the components of the GP cycle.
13. Draw a structural-kinematic diagram rotary machines.
14. Draw a structural and hydraulic diagram of the HP.
15. Give the classification of devices for powering hydraulic tablet machines.
16. Give the classification of equipment for powering hydraulic presses.
17. Describe the purpose and provide the classification and layout of hydraulic tablet presses.
18. Describe the design and principle of operation rotary machines.

19. Describe the work cycle and performance of the HP.
20. List the structural variations. tablet machines.
21. Draw a hydraulic diagram of the HP drive.
22. Draw and describe the structures rotary machines.
23. Describe the basic parameters of the GP.
24. Give the calculation method for hydraulic tablet machines.
25. Describe the designs of hydraulic cylinders of the GP.
26. Describe the work cycle diagram and provide a method for calculating the cycle components and the productivity of the HP.
27. Describe the work cycle diagram and provide a method for calculating the cycle components and the productivity of the HP
28. Draw the structural diagrams of the hydraulic cylinders of the hydraulic power unit.
29. Draw a diagram of the group drive of the GP.
30. Give the method for calculating the HP bed.
31. What are the main objectives of the discipline "Press Equipment"?
32. Name the current trends in the development of press equipment for the polymer industry.
33. What structural materials are used in press equipment and what are the basic requirements for them?
34. By what criteria is press equipment classified?
35. What is the purpose and application areas of polymer tableting machines?
36. What are the features of the classification of tablet machines?
37. How are tableting force, tablet strength, and tablet dimensions related?
38. Explain the process of forming tablets from thermosetting materials.
39. Describe the design and operating principle of a crank tablet press.
40. How is the power calculation of a crank tableting machine performed?
41. What is a rotary tablet machine and how does it work?
42. What are the differences between hydraulic tablet machines and mechanical ones? Their advantages.
43. Determine the purpose of hydraulic presses and their principle of operation.
44. Name the main types of hydraulic presses based on their design features.
45. Describe the structural components of a hydraulic press.
46. How are the basic parameters of a hydraulic press determined?
47. Explain the principle of operation of a hydraulic cylinder and give examples of its use.
48. What is the difference between individual and group hydraulic drive?
49. How is force and speed regulation ensured in the hydraulic drive of a press?
50. Explain the purpose, structure, and operating principle of rotary presses and automatic presses.

Work program educational component (syllabus):

Compiled Prof., Ph.D. Sivetsky V.I.

Approved by the department ___KhPSM___ (protocol No.17 from 04.06.2025)

Agreed Methodological Commission of the Faculty of Chemical Engineering (Minutes No. 11 dated 06/27/2025)