

SYLLABUS OF THE COURSE "ELECTRICAL APPARATUS"



Educational Level	First (bachelor)
Educational program	"Electrical energetics, electrical engineering and electromechanics"
Duration of teaching	8 quarter
Classes:	spring semester
lectures:	2 hours
laboratory classes:	2 hours
Language of teaching	English

Course page in the system of distance education of DUT <https://do.nmu.org.ua/course/view.php?id=3405>

Department of Electric Power Engineering



Lecturer:

Rohoza Mikhailo

Professor, Candidate of Technical Sciences,
Dean of the Faculty of Electrical Engineering

Personal page

<https://se.nmu.org.ua/ua/kafedra/vykladachi/Rogoza/>

E-mail:

[Rohoza. M.VA@nmu.one](mailto:Rohoza.M.VA@nmu.one)

1. Annotation to the course

An electrical apparatus is an electrical device used to turn electrical circuits on and off, control, measure, protect, control, and regulate installations designed to transmit, convert, distribute, and consume electricity.

The purpose of the discipline – formation of competencies for the development of reliable, safe and economical power supply systems, which will provide high quality electricity to its consumers in accordance with the technology of industrial production.

Achieving the goal requires the transformation of program learning outcomes into disciplinary and adequate selection of the content of the discipline according to this criterion.

Disciplinary learning outcomes (DLO):

- Determine the structure and principles of operation of electrical devices, high and low voltage distribution devices, and electric drive devices, as well as the design of device nodes, their modes of operation, operational characteristics.
- To justify the choice of the electric drive system, their design methods considering the requirements of technology and operating conditions, as well as to calculate and select the main elements of the electric drive and control systems.

2. Structure of the Course

LECTURES	LABORATORY CLASSES
1. General provisions on electrical apparatus 2. Electrical contacts. 3. Switching off electrical circuits. 4. Start-up and adjusting devices. 5. Contactors and magnetic starters	1. Research of designs of oil switches. 2. Research of a design and the principle of action of electromagnetic switches. 3. Research of a design and the principle of action of fuses.

6. Contactless switching devices . 7. Automatic low voltage air switches. 8. Switching devices of high voltage switchgear. 9. Limiting devices. 10. Devices for measuring.	4. Research of the design and principle of operation of disconnectors, separators and short circuits. 5. Research of a design and the principle of action of vacuum switches. 6. Research of a design and the principle of action of SF6 switches

3. Evaluation system and requirements

3.1. The academic achievements of higher education students based on the results of the course will be assessed on the scale below:

Rating scale	Institutional scale
90 – 100	excellent
74 – 89	good
60 – 73	satisfactory
0 – 59	unsatisfactory

3.2. Applicants of higher education can receive **a final grade** in the academic discipline based on the current assessment of knowledge, provided that the number of points scored is at least 60 points.

Maximum rating:

Theoretical part	The laboratory part	Bonus	Total
40	60	5	100

The theoretical part is evaluated based on the results of passing the control test work, which contains 2 questions, which are open tests, each weighing 20 points. Assessment is conducted once a semester during control measures, in accordance with the schedule of the educational process.

3.3 Evaluation criteria of theoretical work

Two open test questions are evaluated in **20 points each (40 points in total)**. The test survey is conducted using remote platform technology Moodle, Microsoft Office 365.

Wherein:

- **0 points** – there was no answer to the question or the answer was not relevant to the question;
- **4 points** – the answer is incomplete and contains only general data of the content of the question, or several serious mistakes were made in the answer;
- **8 points** – the answer is incomplete and contains a serious error or most of the answer is not related to the topic of the question;
- **12 points** – the answer basically reflects the essence of the question, but several inaccuracies were made or part of it does not correspond to the question, or the answer is schematic without the necessary explanations;
- **16 points** – the answer fully corresponds to the question, but some explanations are missing or a slight inaccuracy is allowed, or there is no consistency in the answer;
- **20 points** – the answer fully corresponds to the question, contains the necessary explanations and drawings, is written concisely, consistently and competently, and also contains a situational analysis.

3.4 Criteria for evaluating laboratory work

The laboratory part consists of six laboratory works in the initial semester, each weighing 10 points (total 60 points). Laboratory works are performed and submitted consecutively during the respective semesters and must be submitted before the theoretical part is completed.

Correctly performed **laboratory work** is valued at 10 points (for the final semester), wherein:

- **10 points** – full compliance with the essence of the work;
- **8 points** – compliance with the essence of the work with minor deviations and inaccuracies;
- **6 points** – partial compliance with the essence of the work without its full disclosure;
- **4 points** – there are significant errors in the execution of the work;

- **0 points** – the work is not listed or does not relate to the topic of the work.

3.5 Evaluation criteria of the final work

If the student of higher education received less than 60 points according to the current performance or seeks to improve the grade, a **final assessment (exam)** is conducted during the session.

The exam is conducted in the form of a complex control paper, which includes questions from the theoretical and practical part of the course. The ticket consists of three theoretical open tests and two practical open tests (tasks) each weighing 20 points (**100 points in total**).

Wherein:

- **20 points** – full correspondence to the essence of the question;
- **15 points** – compliance with the essence of the question with minor deviations and inaccuracies;
- **10 points** – partial correspondence to the essence of the question without its full disclosure;
- **5 points** – there are significant errors in the performance of the test;
- **0 points** – the answer is not given or does not relate to the topic of the question.

4. Course policy

4.1. Academic Integrity Policy

Academic integrity of higher education students is an important condition for mastering the results of training in the discipline and obtaining a satisfactory grade from the current and final tests. Academic integrity is based on condemnation of the practices of copying (writing with external sources other than those permitted for use), plagiarism (reproduction of published texts by other authors without attribution), fabrication (fabrication of data or facts used in the educational process). The policy on academic integrity is regulated by the Regulation "Regulations on the system of prevention and detection of plagiarism at the Dnipro University of Technology.

http://www.nmu.org.ua/ua/content/activity/us_documents/System_of_prevention_and_detection_of_plagiarism.pdf.

In case of violation of academic integrity by the applicant (copying, plagiarism, fabrication), the work is evaluated unsatisfactorily and must be repeated. The teacher reserves the right to change the topic of the task.

4.2. Communication policy

Applicants for higher education must have activated university mail.

All written questions to teachers regarding the course should be sent to the university e-mail.

4.3. Reassembly policy

Works that are submitted in violation of deadlines without good reason are evaluated at a lower grade. Reassignment takes place with the permission of the dean's office if there are good reasons (for example, hospital).

4.4 Evaluation Appeal Policy

If the applicant of higher education does not agree with the assessment of his knowledge, he may protest the assessment given by the teacher in the prescribed manner..

4.5. Attending classes

For higher education students, full-time attendance is mandatory. Good reasons for not attending classes are illness, participation in university events, academic mobility, which must be documented. The applicant for higher education and the reasons for absence must notify the teacher either in person or through the headmaster.

For objective reasons (for example, academic mobility) training can take place online in consultation with the course leader.

5. Recommended sources of information

1. Рогоза М.В. Електричні апарати: Навч. посібник – Дніпропетровськ: Національний гірничий університет, 2012. – 208 с./ Rogoza MV Electrical apparatus: Textbook. manual - Dnepropetrovsk: National Mining University, 2012. - 208 p.
2. Клименко Б.В. Електричні апарати комутації та захисту. Загальний курс: навчальний посібник. – Харків. Вид-во «Точка». 2012. – 340 с./Klimenko BV Electrical switching and protection devices. General course: textbook. - Kharkiv. View "Point". 2012. - 340 p.
3. Клименко Б.В. Комутаційна апаратура, апаратура керування, запобіжники. Терміни, тлумачення, коментарі. – Навчальний посібник. – Х.: Вид-во «Талант», 2008. – 228 с. / Klymenko B.V. Switching equipment, control equipment, fuses. Terms, interpretation, comments. - Tutorial. - Kh.: "Talent" publishing house, 2008. - 228 p.
4. Клименко Б.В. Електричні та магнітні пристрої, електричні аксесуари, електричні установки. Терміни, тлумачення, коментарі. – Навчальний посібник. – Х.: Вид-во «Точка», 2009. – 272 с./ Klymenko B.V. Electrical and magnetic devices, electrical accessories, electrical installations. Terms, interpretation, comments. - Tutorial. - Kh.: "Tochka" Publishing House, 2009. - 272 p.