

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution for Higher Education
«North-Caucasus Federal University»

APPROVED BY

Dean of FPE of NCFU

Candidate of Technical Sciences,

Associate Professor A.E. Verisokin

INDUSTRIAL PRACTICE PROGRAM

Pre-graduation internship

Field of study	13.04.02 Electric Power Engineering and Electrical Engineering
Specialization (Profile)	Training Program of Electrical Engineering
Year of commencement of studies	2026
Mode of study	full-time
Implemented in semester(s)	4

DEVELOPED BY:

Associate Professor of the
Department of Automated
Electric Power Systems and
Power Supply, Candidate of
Technical Sciences
Zelensky E.G.

Stavropol, 2026 r.

1. Objectives of the Practice

The objectives of the work practice – pre-graduation internship in the field of study 13.04.02 "Electric Power Engineering and Electrical Engineering" – are to prepare the student for the completion of the final qualifying work by studying, selecting, and systematizing the necessary materials and documentation on the topic of the diploma project, participating in design, engineering, technological, and research developments of the enterprise; and familiarizing with the production activities of the enterprise and its individual departments. The pre-graduation practice is organized and conducted at modern power plants and substations, electrical grid enterprises, and design organizations. During the pre-graduation practice, the final topic of the final qualifying work must be determined, its goal substantiated, and the ways to achieve it outlined.

2. Objectives of the Practice

The objectives of the practice are:

- analysis, systematization, and generalization of scientific and technical information on the research topic;
- theoretical or experimental research within the framework of the stated tasks, including mathematical (simulation) experiments;
- analysis of the reliability of the obtained results;
- comparison of the research results of the development object with domestic and foreign analogues;
- analysis of the scientific and practical significance of the conducted research, as well as the technical and economic efficiency of the development.

3. Place of the Practice in the Structure of the Higher Education Program

The practice belongs to Block 2. Practice, the part formed by the participants of educational relations.

4. Place and Time of the Practice

The bases for the pre-graduation practice of students in the field of study 13.04.02 "Electric Power Engineering and Electrical Engineering" are the structural units of the university equipped with modern equipment and testing instruments, as well as enterprises of the city of Stavropol. These include enterprises directly involved in the generation of electric power (power plants) and its distribution (electrical networks and substations of the Interregional Grid Company, urban electrical grid networks and substations), as well as enterprises that consume electric power (factories, industrial complexes, housing and utility facilities, electrical installation organizations). Students who have concluded contracts with future employers complete their pre-graduation practice at the respective enterprises, institutions, and organizations. The practice may take place in various departments of these enterprises (e.g., the dispatch service, substation service, relay protection service, the enterprise's electrical workshop, or the repair shop). This allows for a comprehensive study of the necessary issues corresponding to the practice objectives. Depending on the location of the practice, the content issues are adjusted accordingly. The duration of the practice is established in accordance with the academic plan and the academic calendar for the corresponding academic year. The total duration of the practice is 14 weeks and is conducted in the 4th semester.

5. Перечень планируемых результатов по практике, соотнесённых с планируемыми результатами освоения образовательной программы

Competency Code and Formulation	Indicator Code and Formulation	Planned Results Characterizing the Stages of Competency and Indicator Formation
PC-1 Capable of participating in research and development activities in the field of electrical power engineering	ID-1 _{PC-1} . Performs analysis and processing of scientific and technical information on the research subject from domestic and foreign sources;	Conducts systematic analysis and processing of scientific and technical information on the research topic.
	ID-2 _{PC-1} . Conducts experiments according to a given methodology; processing and analyses research results;	Conducts an experiment according to a given methodology; processes the obtained data, performs their analysis, interprets the results taking into account errors and possible improvements to the methodologies.
	ID-3 _{PC-1} . Compiles reports and presents the results of completed work;	Prepares a report on the work performed, including visualizing the obtained results using modern digital technologies.
	ID-4 _{PC-1} Prepares applications for industrial property objects.	Prepares a description of the technical solution in accordance with the requirements of Rospatent
PC-2 Capable of participating in the design of objects of professional activity	ID-1 _{PC-2} Performs calculation and analysis of the economic and technical characteristics of the object being designed;	Determines the technical characteristics of the research object.
	ID-2 _{PC-2} Evaluates the feasibility of implementing an investment project and selects the most optimal investment alternative.	Compiles a list of possible solutions to the assigned tasks.

6. Structure and content of the practice

The total workload of the pre-graduation practice is 21 credit units, 756 hours.

Sections (stages) of practice	Competencies /indicators implemented	Types of academic work during the practice, including independent work	Labor intensity (hours)	Labor intensity (hours)
Introductory lecture	ID-3 _{PC-1}	Familiarization with the practice program, consultations on issues arising during the educational practice	2	Interview

Safety briefing	ID-3 _{PC-1}	Familiarization with safety instructions	2	Interview
Collection of materials	ID-3 _{PC-1} ID-1 _{PC-2} ID-2 _{PC-2}	Work on the individual assignment	300	Interview
Processing of factual material	ID-3 _{PC-1} ID-1 _{PC-2} ID-2 _{PC-2}	Work on the individual assignment	300	Interview
Systematization of factual and literary material	ID-3 _{PC-1}	Independent work	130	Interview
Preparation of the practice report	ID-3 _{PC-1}	Formatting of the report	22	Defense of the report

The practice is implemented in the form of practical training. Practical training is a form of organizing educational activities during the completion of an educational program, under which students perform specific types of work related to their future professional activities and aimed at forming, reinforcing, and developing practical skills and competencies relevant to the profile of the corresponding educational program.

7. Methodological Recommendations for Students on Completing the Practice

7.1. Use of the Material from the Educational and Methodological Complex of the Practice

At the first stage, it is necessary to familiarize yourself with the structure of the practice, the mandatory types of work, and the forms of reporting.

For the successful completion of assignments for the work pre-graduation practice in the field of study 13.04.02 Electric Power Engineering and Electrical Engineering, the student must prepare and defend a report in accordance with the received individual assignment.

7.2. Assessment Tools for the Practice

The Assessment Tools (FOS) for the practice are based on the list of competencies being mastered, indicating the stages of their formation during the practice. The FOS ensures objective monitoring of the achievement of the planned learning outcomes. The FOS includes:

- a description of indicators and criteria for assessing competencies at various stages of their formation, a description of assessment scales;
- methodological materials defining the procedures for assessing knowledge, skills, abilities and (or) experience of activities characterizing the stages of competency formation;
- standard control tasks and other materials necessary for assessing knowledge, skills, and the level of mastery of the competencies being formed during the practice.

8. Educational, Methodological, and Information Support for the Practice

8.1 List of Primary and Additional Literature.

8.1.1 List of Primary Literature:

1. Rybalova, E.A. *Project Management: A Textbook* : [16+] / E.A. Rybalova ; Tomsk State University of Control Systems and Radioelectronics (TUSUR), Faculty of Distance Learning. – Tomsk : Faculty of Distance Learning of TUSUR, 2015. – 206 p. : diagrs., tables, ill. – Access mode: by subscription. –URL: <https://biblioclub.ru/index.php?page=book&id=480900> (accessed: April 12, 2022). – Bibliography: pp. 175-177. – Text : electronic.

2. Sidorenkov, A.V. *Managing the Effectiveness of Groups and Teams in Organizations: A Textbook* / A.V. Sidorenkov, [N.Yu.](#) Ulyanova ; Ministry of Education and Science of the

Russian Federation, Southern Federal University. – Rostov-on-Don : Publishing House of the Southern Federal University, 2016. – 325 p. : diags., tables. – Bibliography in the book. – ISBN 978-5-9275-1989-7 ; Same [Electronic resource]. – URL: <http://biblioclub.ru/index.php?page=book&id=493314>

Перечень дополнительной литературы:

1. Pavlov, A.N. *Effective Project Management Based on the PMI PMBOK® 6th Edition Standard: A Practical Guide* : [16+] / A.N. Pavlov. – Electronic edition. – Moscow : Laboratory of Knowledge, 2019. – 273 p. : diags., tables. – (Projects, Programs, Portfolios). – Access mode: by subscription. – URL: <https://biblioclub.ru/index.php?page=book&id=494023> (accessed: April 12, 2022). – ISBN 978-5-00101-619-9. – Text : electronic.

2. Krasnostanova, M.V. *From an Inventive Team to a Hi-Tech Corporation: Human Factors and Dynamics of an Innovation Project: A Textbook* / M.V. Krasnostanova. – Moscow : RG-Press, 2014. – 88 p. : diags. – Bibliography in the book. – ISBN 978-5-9988-0270-6 ; Same [Electronic resource]. – URL: <http://biblioclub.ru/index.php?page=book&id=276547>.

8.1.3. List of Methodological Literature:

Methodological Guidelines for Completing Work Practice – Pre-Graduation Practice in the Field of Study 13.04.02 "Electric Power Engineering and Electrical Engineering"

8.1.4. Internet resources

1. <http://catalog.ncfu.ru> – electronic catalogs of the Association of Electronic Libraries of Educational Institutions and Organizations of the North Caucasus Federal District.
2. <http://elibrary.ru> – Scientific Electronic Library [eLIBRARY.RU](http://elibrary.ru)
3. <https://biblioclub.ru/> Electronic Library System "University Library Online"
4. www.iprbookshop.ru – Electronic Library System IPRbooks

8.2. Software:

No special software is required.

9. Material and technical support of the practice

A classroom equipped with specialized furniture and technical teaching aids used for presenting educational information to a large audience: personal computers, an instructor's computer, a projector, and a magnetic marker board.

10. Features of Completing the Practice for Persons with Disabilities

Students with disabilities are provided with special textbooks, teaching aids and didactic materials, special technical means of learning for collective and individual use, services of an assistant who provides students with the necessary technical assistance, as well as sign language interpreting and typhlo-sign language interpreting services. Completing the practice by students with disabilities may be organized together with other students, as well as in separate groups.

Completion of the practice by students with disabilities is carried out taking into account the characteristics of psychophysical development, individual capabilities and health status. In order to ensure accessibility of higher education under the educational program for persons with disabilities during the practice, the following is provided:

1) For persons with visual disabilities:

- presence of an assistant who provides the student with the necessary technical assistance taking into account individual characteristics (helps to take a seat, move around, read and complete the task, including writing under dictation);
- written assignments, as well as instructions on the procedure for their completion, are formatted in enlarged font;
- special textbooks, teaching aids and didactic materials (with large print or audio files);
- individual uniform lighting of at least 300 lux;
- if necessary, a magnifying device is provided to the student for completing the task.

2) For persons with hearing disabilities:

- presence of an assistant who provides the student with the necessary technical assistance taking into account individual characteristics (helps to take a seat, move around, read and complete the task, including writing under dictation);
 - provision of collective sound amplification equipment; if necessary, the student is provided with individual sound amplification equipment;
 - provision of appropriate sound means of information reproduction.
- 3) For persons with musculoskeletal disorders (including those with severe motor impairments of the upper limbs or absence of upper limbs):
- written assignments are performed on a computer with specialized software or dictated to an assistant;
 - at the student's request, assignments may be completed orally.