

Документ подписан простой электронной подписью
Информация о владельце:
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Должность: Ректор
Дата подписания: 24.09.2024 10:27:55
Уникальный программный ключ:
ca953a0120d891083f939673078ef1a989dae18a

**Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
RUDN University**

Academy of Engineering

educational division (faculty/institute/academy) as higher education programme developer

INTERNSHIP SYLLABUS

Undergraduate Training

internship title

Undergraduate

internship type

Recommended by the Didactic Council for the Education Field of:

13.04.03 «Power Engineering»

field of studies / speciality code and title

The student's internship is implemented within the professional education programme of higher education:

Mechanical Engineering

higher education programme profile/specialisation title

1. INTERNSHIP GOAL(s)

The purpose of conducting Undergraduate Training is to deepen, systematize and consolidate theoretical knowledge, as well as to collect, process and analyze the material necessary for the development of the final qualification work; formation and development of practical skills and competencies of the master, acquisition of experience in independent professional scientific activity; consolidation and deepening of the obtained theoretical knowledge in the studied disciplines; formation of masters' skills applying the knowledge gained during training in independent professional scientific activities.

The main objectives of Undergraduate Training are:

- study the composition and scope of the final qualification work;
- learn the methods of developing a scientific project;
- collect initial data on the topic of the final qualification work and conduct the necessary research.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Undergraduate Training is aimed at developing the following competencies in students:

- Ability to manage a project at all stages of its life cycle (GC-2);
- Ability to analyze, make scientific generalizations and conclusions, put forward new ideas, interpret and present the results of scientific research (PC-1);
- Ability to carry out research and development in the field of professional activity (PC-2).

The result of the internship is knowledge, ability, skills and experience of professional activity, characterizing the stages of the formation of competencies and ensuring the achievement of the planned results of mastering the educational program, presented in Table 2.1.:

Table 2.1. List of competences that students acquire during the internship

Competence code	Competence descriptor	Competence formation indicators (within this course)
GC-2	Ability to manage a project at all stages of its life cycle	GC-2.1 Formulates a project task based on the problem set and the way to solve it through the implementation of project management
		GC-2.2 Develops a project concept within the framework of the designated problem: formulates the goal, tasks, justifies the relevance, significance, expected results and possible areas of their application
		GC-2.3 Plans the necessary resources, including taking into account the possibility of their replacement
PC-1	Ability to analyze, make scientific generalizations and conclusions, put forward new ideas,	PC-1.1. Knowledge of modern methods of scientific research in the subject area
		PC-1.2. The ability to conduct scientific research, analysis and put forward new ideas

Competence code	Competence descriptor	Competence formation indicators (within this course)
	interpret and present the results of scientific research	PC-1.3. Have the skills to interpret and present the results of scientific research
PC-2	Ability to carry out research and development in the field of professional activity	PC-2.1 Know the basics of using information technology
		PC-2.2 Conducting research on individual tasks
		PC-2.3 Have the skills to generalize and evaluate the results of scientific research

3. INTERNSHIP IN HIGHER EDUCATION PROGRAMME STRUCTURE

The internship refers to the core/variable/elective* component of (B2) block of the higher educational programme curriculum.

Within the higher education programme students also master other disciplines (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the internship.

Table 3.1. The list of the higher education programme components that contribute to the achievement of the expected learning outcomes as the internship results.

Competence code	Competence descriptor	Previous courses/modules, internships*	Subsequent courses/modules, internships*
GC-2	Ability to manage a project at all stages of its life cycle	Modern computer communication technologies Special chapters of the theory of heat engine theory Mathematical modeling of thermal processes Modern problems of science and production in power engineering	State final certification
PC-1	Ability to analyze, make scientific generalizations and conclusions, put forward new ideas, interpret and present the results of scientific research	Modern computer communication technologies Special chapters of the theory of heat engine theory Mathematical modeling of thermal processes Modern problems of science and production in power engineering	State final certification
PC-2	Ability to carry out research and development in the field of professional activity	Modern computer communication technologies	State final certification

Competence code	Competence descriptor	Previous courses/modules, internships*	Subsequent courses/modules, internships*
		Special chapters of the theory of heat engine theory Mathematical modeling of thermal processes Modern problems of science and production in power engineering	

* To be filled in according with the competence matrix of the higher education programme.

4. INTERNSHIP WORKLOAD

Possible wording

1)The total workload of the internship is 6 credits (216 academic hours).

5. INTERNSHIP CONTENTS

*Table 5.1. Internship contents**

Modules	Contents (topics, types of practical activities)	Workload, academic hours
Module 1. Organizational and preparatory	Receiving an individual task from the head	2
	Workplace safety instruction (in the laboratory and/or production site)	2
Module 2. Main	Collection of analytical data in accordance with the individual task	26
	Analysis and processing of the obtained data	60
	Conducting scientific research on the topic of the individual task	100
Module 3. Control	Current control of the internship by the supervisor	8
Writing an internship report		9
Preparing for defence and defending the internship report		9
TOTAL:		216

* The contents of internship through modules and types of practical activities shall be FULLY reflected in the student's internship report.

6. INTERNSHIP EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Bld. 5, 8, Podolskoye Highway Classroom: room No. 3030	set of specialized furniture; chalk board; technical means: projection screen; multimedia projector; system block
Bld. 5, 8, Podolskoye Highway Laboratory No. 52	Research bench multistage heat pump, Research bench two-stage heat pump,
Bld. 5, 8, Podolskoye Highway Laboratory No. 90	UIT-85 motor stand, IDT-90 motor stand, Fuel test bench for high pressure fuel pumps research

7. INTERNSHIP LOCATION AND TIMELINE

The internship can be carried out at the structural divisions of RUDN University (at Moscow-based organisations, as well as those located outside Moscow).

The internship at an external organisation (outside RUDN University) is legally arranged on the grounds of an appropriate agreement, which specifies the terms, place and conditions for an internship implementation at the organisation.

The period of the internship, as a rule, corresponds to the period indicated in the training calendar of the higher education programme. However, the period of the internship can be rescheduled upon the agreement with the Department of Educational Policy and the Department for the Organization of Internship and Employment of RUDN students.

8. RESOURCES RECOMMENDED FOR INTERNSHIP

Main readings:

1. Kavtaradze R. Z. Teoriya porshnevykh dvigatelei [Theory of piston engines]. Textbook for Universities, Moscow: Bauman Moscow State Technical University Publishing House, 2016, 720 p.
2. Kavtaradze R. Z. Local heat exchange in piston engines.- 3rd ed. reprint. Moscow: Bauman Moscow State Technical University Publishing House, 2016, 520 p.
3. Patrakhaltsev N. N. Collection of problems and solutions for the course of combined internal combustion engines. 2011 16 s.
4. Combined internal combustion engines: A textbook for university students / N. D. Chynov, N. A. Ivashchenko, A. N. Krasnokutsky, L. L. Myagkov; Edited by N. D. Chynov. - Moscow: Mashinostroenie, 2008. - 496 p.
5. Engines of automotive equipment: Textbook./ Shatrov M. G., Morozov K. A., Alekseev I. V.-Moscow: Knorus, 2016. - 400 p.
6. Patrakhaltsev N. N. Nadduv dvigatelei vnutrennego sboraniya: Uchebnoe posobie [Supercharging of internal combustion engines]. Moscow, RUDN University, 2002, 318 p.

Additional readings:

1. Valkov V.A., Golovatyuk V.A., Kochergin V.I., Shchukin S.G. Osnovy nauchnykh issledovaniy i patentovedenie: uchebno-metodicheskoe posobie [Fundamentals of scientific research and patent science]. Novosibirsk: Novosibirsk State Agrarian University, 2013, 228 p. (in Russian) Access mode: <http://biblioclub.ru/index.php?page=book&id=230540>
2. Safiullin R.N., Shkardin A.G. Exploitation of cars: a textbook for universities/ R.N. Safiullin, A. G. Bashkardin. – 2nd ed., ispr. Moscow: Yurayt PublishingHouse, 2019, 204 p. <https://www.biblio-online.ru/viewer/ekspluatsiya-avtomobiley-437151#page/2> www.biblio-online.ru/viewer/ekspluatsiya-avtomobiley-437151#page/2
3. Silaev G. V. Konstruktsiya avtomobilei i traktorov: uchebnik dlya vuzov [Construction of cars and tractors: a textbook for universities]. Moscow: Yurayt PublishingHouse, 2019, 404 p. <https://www.biblio-online.ru/viewer/konstrukciya-avtomobiley-i-traktorov-423525#page/2> www.biblio-online.ru/viewer/konstrukciya-avtomobiley-i-traktorov-423525#page/2

4. Stepanov V. N. Avtomobilnye dvigateli [Automobile engines]. Calculations: textbook. manual for academic bachelor/ V. N. Stepanov. - 2nd ed., ispr. Moscow: Yurayt PublishingHouse, 2019, 149 p. <https://www.biblio-online.ru/viewer/avtomobilnye-dvigateli-raschety-437507#page/1>

Internet sources

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:

- RUDN Electronic Library System (RUDN ELS) <http://lib.rudn.ru/MegaPro/Web>
- EL "University Library Online" <http://www.biblioclub.ru>
- EL "Yurayt" <http://www.biblio-online.ru>
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" <http://e.lanbook.com/>
- EL "Trinity Bridge"

2. Databases and search engines:

- electronic foundation of legal and normative-technical documentation <http://docs.cntd.ru/>

- Yandex search engine <https://www.yandex.ru/>
- Google search engine <https://www.google.ru/>
- Scopus abstract database <http://www.elsevierscience.ru/products/scopus/>

The training toolkit and guidelines for a student to do an internship, keep an internship diary and write an internship report:*

1. Safety regulations to do the internship (safety awareness briefing).
2. Machinery and principles of operation of technological production equipment used by students during their internship; process flow charts, regulations, etc. (if necessary).
3. Guidelines for keeping an internship diary and writing an internship report.

*The training toolkit and guidelines for the internship are placed on the internship page in the university telecommunication training and information system under the set procedure.

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL AS INTERNSHIP RESULTS

The assessment toolkit and the grading system* to evaluate the level of competences (competences in part) formation as the internship results are specified in the Appendix to the internship syllabus.

* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

DEVELOPERS:

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position, educational department

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