MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)
Institute of Life Sciences and Biomedicine (School)

APPROVE
Director of the Institute of Life Sciences
and Biomedicine (Schools)

Yu.S.Khotimchenko
Full name

December 21, 2021

COLLECTION OF WORKING PROGRAMS OF PRACTICES

DIRECTION OF PREPARATION
06.04.01 Biology
Master's program
"Molecular and Cell Biology (in English)"

Graduate Qualification - Master

Full-time form of education
Normative period for mastering the program
(full-time education): 2 years
Starting year of preparation: 2022

Vladivostok
2021

APPROVAL SHEET
collection of work programs of practices

in the direction of preparation 06.04.01 Biology
"Molecular and Cellular Biology (together with NSCMB FEB RAS)"

The collection of practice work programs was compiled in accordance with the requirements of the Federal State Educational Standard in the field of study 06.04.01 Biology, approved by order of the Ministry of Science and Higher Education of the Russian Federation dated 11.08.2020 No. 934.

Considered and approved at the meeting of the Board of Directors of the Institute of Life Sciences and Biomedicine (Schools) on December 21, 2021 (Minutes No. 2)

Considered and approved at a meeting of the FEFU CC, as part of the OPOP on January 27, 2022 (minutes No. 01-22)

Head of OP  Department Director
V.V. Kumeiko

Deputy Director for educational work O.L. Kalinina 

Department Director V.V.  Kumeiko

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MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
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INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE
Director of the Institute of Life Sciences
and Biomedicine (Schools)

Yu.S.Khotimchenko
Full name

December 21, 2021

WORKING PROGRAM OF TRAINING PRACTICE Educational practice. Practice in the direction of professional activity

06.04.01 Biology

Master's program

Molecular and Cellular Biology (together with NSCMB FEB RAS)

Vladivostok
2021

1. OBJECTIVES OF LEARNING PRACTICE

The purpose of educational practice: the acquisition of skills and abilities necessary for successful research activities.

2. OBJECTIVES OF LEARNING PRACTICE

The tasks of educational practice are:

– to consolidate the students' theoretical foundations obtained during the mastering of the disciplines of the first semester of the master's program in the direction 06.04.01 Biology, profile "Molecular and Cellular Biology (together with the NSCMB FEB RAS)";

– to acquaint students with the specifics of scientific activity within the framework of the direction of research chosen by the student;

– to acquaint with the methods of collecting and cameral processing of material, organizing the experiment.

3. THE PLACE OF LEARNING PRACTICE IN THE STRUCTURE OF THE OPOP

Educational practice: Practice in the direction of professional activity is included in the mandatory part of Block 2 "Practices" of the curriculum (B2.O.01 (U)). It is a type of training sessions that are directly focused on the professional and practical training of students. Educational practice is based on the logical and methodological content of general scientific and professional disciplines of the first year of study in the master's program: "Molecular Biology", "Project Management and Methodology of Scientific Research", "Bioinformatics", "Biostatistics", "Molecular Biology of the Cell", "Methodology and Methods teaching natural sciences", "Molecular genetics, human genetics", "Biomedical cell technologies", "Comparative histology".

4. TYPES, METHODS, PLACE AND TIME OF LEARNING PRACTICE

Type of practice - educational practice.

Type of practice - Educational practice. Practice in the direction of professional activity.

Method of carrying out - stationary / visiting.

The form of holding is concentrated.

Educational practice is carried out in the 2nd semester on the 1st year (labor intensity according to the curriculum 3 credit units).

The practice is carried out in accordance with the program of educational practice for undergraduates together with the NSCMB FEB RAS. The management of the

educational practice is carried out by the supervisor of the undergraduate in agreement with the head of the master's program.

For persons with disabilities and the disabled, the choice of places for internship is consistent with the requirement of their accessibility for these students, and the practice is carried out taking into account the peculiarities of their psychophysical development, individual capabilities and health status.

5.COMPETENCES OF THE STUDENT FORMED AS A RESULT OF PASSING THE TRAINING

As a result of the training practice, students should form the following universal and general professional competencies.

Universal competencies of students and indicators of their achievement:

Name of the category (group) of universal competencies	Code and name of the graduate's universal competence	Code and name of the indicator of achievement of universal competence
Teamwork and Leadership	UK-3 Able to organize and manage the work of the team, developing a team strategy to achieve the goal	UK-3.1 Develops a teamwork strategy to achieve the set goal, organizes the selection of team members UK-3.2 Organizes and corrects the work of the team, including on the basis of collegial decisions, distributes functional responsibilities, resolves possible conflicts and contradictions UK-3.3 Coordinates the overall work, organizes feedback, controls the result, takes managerial responsibility
Communication	UK-4 Able to use modern communication technologies, including in a foreign language(s), for academic and professional interaction	UK-4.1 Creates various types of written and oral texts in Russian and foreign languages for academic and professional interaction UK-4.2 Participates in the processes of professional communication in Russian and foreign languages, including the use of modern communication technologies UK-4.3 Presents the results of research and project activities at various public events, participates in academic and professional discussions in a foreign language
Intercultural interaction	UK-5 Able to analyze and take into account the diversity of cultures in the process of intercultural interaction	UK-5.1 Analyzes the socio-cultural parameters of various groups and communities and the socio-cultural context of interaction UK-5.2 Builds socio-cultural communication and interaction, taking into account the necessary parameters

		of intercultural communication and socio-cultural context UK-5.3 Builds professional interaction in a multicultural environment

General professional competences of students and indicators of their achievement:

Name of the category (group) of universal competencies	Code and name of the graduate's universal competence	Code and name of the indicator of achievement of universal competence
	GPC-1 Able to use and apply fundamental biological concepts and modern methodological approaches for setting and solving new non-standard tasks in the field of professional activity	GPC-1.1 Monitors current topical issues, major discoveries and methodological developments in the field of biological and related sciences GPC-1.2 Analyzes trends in the development of scientific research and practical developments in the chosen field of professional activity, formulates innovative proposals for solving non-standard problems, using in-depth general scientific and methodological special training GPC-1.3 Applies modern methodological approaches and methods for setting and solving new non-standard tasks in the field of professional activity
	GPC-2 Able to creatively use in professional activities the knowledge of fundamental and applied sections of disciplines (modules) that determine the direction of the master's program	GPC-2.1 Considers the theoretical foundations, traditional and modern research methods in accordance with the core activity GPC-2.2 Forms new solutions by integrating various methodological approaches and creative use of special theoretical and practical knowledge GPC-2.3 Uses in professional activities the knowledge of fundamental and applied sections of disciplines (modules) that determine the direction of the profile type of activity
	GPC-5 Able to participate in the creation and implementation of new technologies in the field of professional activity and control of their environmental safety using living objects	GPC-5.1 Applies the theoretical foundations and practical experience of using various biological objects in the field of professional activity, bio- and environmental safety GPC-5.2 Applies biosafety performance criteria GPC-5.3 Participates in the creation and implementation of new

		technologies in the field of professional activity and the control of their environmental safety using living objects GPC-5.4 Applies the experience of working with living objects promising for biotechnological processes, in accordance with the core activity
	GPC-7 is able in the field of his professional activity to independently determine the strategy and issues of research, make decisions, including innovative ones, choose and modify methods, be responsible for the quality of work and implement their results, and ensure industrial safety measures when solving a specific problem.	GPC-7.1 Uses the main sources and methods of obtaining professional information, directions of scientific research corresponding to the direction of the master's program GPC-7.2 Identifies promising problems and formulates principles for solving actual research problems based on the use of complex information, including at the intersection of knowledge areas GPC-7.3 Develops methods for solving and coordinating the implementation of individual tasks under the leadership of a group of researchers, taking into account safety requirements GPC-7.4 Determines the strategy and issues of research, makes decisions, including innovative ones, chooses methods, is responsible for the quality of work and the implementation of their results, ensures industrial safety measures when solving a specific problem GPC-7.5 Uses methods for analyzing the reliability and assessing the prospects of the results of experiments and observations; -experience in generalization and analysis of scientific and scientific and technical information GPC-7.6 Apply the experience of presenting the results obtained in the form of reports and publications
	GPC-8 Able to use modern research equipment and computer technology to solve innovative problems in professional activities	GPC-8.1 Works with technical documentation, if necessary, prepares proposals for the modification of technical means to solve innovative problems in professional activities GPC-8.2 Uses types of modern equipment for field and laboratory research in the field of professional

		activity GPC-8.3 Uses modern research equipment and computer technology to solve innovative problems in professional activities

6. STRUCTURE AND CONTENT OF PRACTICE INCLUDING PRACTICAL TRAINING

The total labor intensity of the training practice is 3 credits, 2 weeks, 108 hours.

Section (stage) of practice	Type of educational work in practice, including independent work of students and labor intensity (in hours)				Current control form
	Briefing on safety, compliance with sanitary and hygienic rules and pharmaceutical order at the workplace.	Consultation	Collection, processing of material	Independent work	
1.Preparatory stage	3	3	3	3	Attendance check. Safety briefing and test. Checking the execution of the stage.
2. Main stage	-	3	42	24	Attendance check. Presentation of the collected materials to the head of the practice. Checking the execution of the stage.
3.Final stage	-	3	6	3	Attendance check. Testing. Checking the execution of the stage.
4. Report preparation	-	3	6	6	Submission and defense of practice reports
Total	3	12	57	36	
Total	108				

7. EDUCATIONAL AND METHODOLOGICAL SECURITYINDEPENDENT WORK OF STUDENTS ON LEARNING PRACTICE

Independent work (SIW) is an integral part of the educational process and is necessary for the formation of undergraduates' skills and abilities to conduct scientific activities, the formation of abilities to independently plan and implement scientific experiments, as well as analyze materials and draw reasonable conclusions. During the internship, students systematize, strengthen and expand theoretical knowledge, are formed as specialists in their field of research.

Independent work is carried out on the basis of an individual assignment for practice, designated by the supervisor.

Independent work includes setting goals and objectives, working with literary sources on the research topic, choosing and mastering methods to achieve the goals, setting up an experiment, as well as analyzing the results and writing a report.

According to the curriculum for educational practice, 90 hours of independent work and 18 hours of supervised independent work (CSW) are provided. The CSR includes the development of an internship plan, the formulation of the goals and objectives of the study, the provision of a literary review on the research topic to the head, the compilation and writing of an internship report and its defense at a department meeting after checking by the head.

The structure for compiling a report on the results of an internship and recommendations for keeping an internship diary are located in Appendices No. 1-3.

Independent work of master's students is regulated by certain documents. These include:

a) GEF 06.04.01 Biology;

b) documents defining the procedure and specifics of production practice:

- program of educational practice for students in the direction 06.04.01 Biology;
- direction for internship;
- a report on the internship completed by the student;
- feedback on the internship

c) methodological literature of the laboratory

The specific content of the individual task and the schedule depends on the specifics of the institution and the laboratory, the research topics in the laboratory and the specific research topic of the trainee.

8. FORMS OF CERTIFICATION (BY THE RESULTS OF PRACTICE)

The form of attestation in practice is a test with an assessment.

The form of attestation based on the results of the practice: defense of the report at the meeting of the department with the provision of a written report on the practice, verified by the head of the practice, practice diary.

The following forms are used as current attestation:

1. Checking the practice diary by the head (weekly);
2. Providing the leader with a review of the literature on the topic of the study and the results of the experiment;
3. Verification by the head of the practice report.

Grading scale and criteria for evaluating the practice report

Rating "Excellent"

A) The program of practice is completed in full.

B) The head of the enterprise rated the student's work as "Excellent".

C) The report is written correctly, in full compliance with the requirements.

D) The report is submitted on time to the head of the department.

E) Oral report and answers to questions are complete and competent.

Rated "Good"

A) The program of practice is completed in full.

B) The report is submitted in due time to the head of the department.

C) The report is written correctly, in full compliance with the requirements.

D) The head of the enterprise rated the student's work as "Good";

E) Roughness in the presentation of the material, inaccuracies in the answers to questions that are corrected after clarifying questions.

Grade "Satisfactory"

A) The program of practice is completed in full.

B)Supervisorfrom the enterprise evaluated the work of the student
to "Satisfactory";

C) The report is written correctly, in full compliance with the requirements.

D) The report is submitted on time to the head of the department.

E) Roughness in the presentation of the material, inaccuracies in the answers to questions that are not always corrected after clarifying questions.

Grade "Unsatisfactory"

A) The practice program has not been fully implemented.

B) The manager from the enterprise rated it as “Unsatisfactory”.

C) The report is not drawn up or is drawn up incorrectly.

D) The report is not submitted on time to the head of the department.

E) Oral report and answers to questions are not complete and not literate.

Typical control questions for preparing for the defense of a practice report:

– What is the relevance of the chosen research topic?

– Why was this method chosen to achieve the results of the tasks set? What are its advantages?

– What is the scientific interest of your results?
– Similar work was carried out earlier by other researchers?
– How do your results compare with their data?

10. EDUCATIONAL-METHODOLOGICAL AND INFORMATION SUPPORT OF TRAINING PRACTICE

Main literature

1. Boychenko, V.S. Boichenko, V. S., Petrovsky, A. B., Pronichkin, S. V. Grants in science: accumulated potential and development prospects. - Moscow: PolyPrintService, 2014. - 438 p.

https://lib.dvfu.ru:8443/lib/item?id=chamo:798297&theme=FEFU.

2. Voronkov, Yu.S. History and methodology of science: a textbook for undergraduate and graduate studies / Yu. S. Voronkov, A. N. Medved, Zh. V. Umanskaya; Russian State University for the Humanities. - Moscow: Yurayt, 2016. - 489 p.

https://lib.dvfu.ru:8443/lib/item?id=chamo:811820&theme=FEFU.

3. Kosmin, V.V. Fundamentals of scientific research. (General course): textbook / VV Kosmin. - Moscow: Rior: Infra-M. – 2015.- 213 p. - https://lib.dvfu.ru:8443/lib/item?id=chamo:795570&theme=FEFU.

4. Dutta A. Laboratory workshop in biology. Publishing House "Intellect", 2015.

5. http://lib.dvfu.ru:8080/lib/item?id=chamo:795830&theme=FEFUExperiment planning [electronic resource]. - Access mode:http://www.sciencefiles.ru/section/33/

additional literature

1. How to write and publish an article in an international scientific journal: a method. recommendations / comp. I.V. Sviderskaya, V.A. Kratasyuk. – Krasnoyarsk: Sib. federal. un-t, 2011. - 52 p.

Kulinkovich, T.O. Fundamentals of scientific citation: method. manual for students and undergraduates studying in special. -23 01 04 "Psychology" / T. O. Kulinkovich. - Minsk: BGU, 2010. - 58 p.

2. Maryanovich, A.T. New Erratology / A. T. Maryanovich. - St. Petersburg: Dean, 2005. - 352 p.

3. Nesgovorova G.P. Manual for writing various kinds of business texts [electronic resource]. - Access mode: http://www.iis.nsk.su/files/articles/sbor_kas

eleven. MATERIAL AND TECHNICAL SUPPORT OF TRAINING PRACTICE

B as material and technical support are instruments, apparatus and other technical means of the laboratory in accordance with the profile and subject of the study.

To carry out work related to the implementation of the assignment for practice at FEFU, as well as to organize independent work, students have access to educational laboratories that comply with applicable sanitary and fire safety standards, as well as safety requirements for conducting educational work:

Name of equipped premises and premises for independent work	List of main equipment
Reading rooms of the FEFU Scientific Library with open access to the fund (building A - level 10)	HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW,GigEth,Wi-Fi,BT,usb kbd/ mse,Win7Pro (64-bit)+Win8.1Pro(64-bit),1-1-1 Wty Internet access speed 500 Mbps. Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers
Audience for independent work of students Vladivostok, about. Russian village Ajax, 10, Building M (25.1), room. M621 Area 44.5 m2	Monoblock Lenovo C360G-i34164G500UDK 19.5" Intel Core i3-4160T 4GB DDR3-1600 SODIMM (1x4GB)500GB Windows Seven Enterprise - 17 pieces; Wired LAN - Cisco 800 series; wireless LAN for students provided by a system based on access points 802.11a / b /g/n 2x2 MIMO(2SS).
Audience for practical classes Vladivostok, about. Russian village Ajax, 10, Building L, room. L 403, area 30.6 m2	Computer class: 15 workstations with access to the FEFU local network and the Internet; monoblock HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, Wi-Fi, W, usb kbd/ mse, Win7Pro(64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty.
Audience for practical classes Vladivostok, about. Russian village Ajax, 10, Building L, room. L 432	Biosafety Center SBM FEFU: microbiological safety cabinets BMB-II Laminar-S performed by BMB-II-“Laminar-S”-1.2, real-time polymerase chain reaction device Rotor-Gene Q, 6 plex, automatic luminescent multichannel analyzer ALA-1/4 (4-channel), high-speed mini-centrifuge Microspin, medical aspirator OM-1, Microcentrifuge / shaker TETA-2, solid-state thermostat Thermo 24/15, thermostat programmable for

	PCR analysis four-channel "Tertsik", automatic pipettes.

Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers. In order to provide special conditions for the education of people with disabilities and people with disabilities in FEFU, all buildings are equipped with ramps, elevators, lifts, specialized places equipped with toilets, information and navigation support signs.

ANNEX 1

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE:
Head of OP
_____FULL NAME.
"____" _____20__

INDIVIDUAL TASK

By _____
(type of practice)

student _____groups _____
(Name of the student)

Educational program 06.04.01 Biology, master's program "Molecular and Cellular Biology" (together with NSCMB FEB RAS)_____

Base (place, organization) of practice_____
_____

Terms of practice from _____20___ to _____ 20___

Generalized task statement	

Job Schedule

Name of the tasks (activities) that make up the task	Task completion date (activities)
1.	
2.	
3.	

Practice leader _____ _____
signature Full name, position

APPENDIX 2

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
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INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIARY

according to _____ practice
student _____ group _____
program_____
Place of practice _____
Term of practice _____ weeks_____

Head of practice from FEFU
_____
Head of practice from a specialized organization
_____

1. Student's calendar schedule

No. p \ p	Name of works	calendar dates		Surname of the he the practice
		Start	ending	

2. Student work diary

date	Brief summary of the trainee's work	Signature leader

3. Report protection results

The report is protected by "____" _____ 20___

Rated _____

Department Director _____ AND ABOUT. Surname

APPENDIX 3

Practice Report Title Page Form

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
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INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

The report is protected with an estimate
_____
"_____" _____ 20__

Supervisor
educational program
_____ Surname I.O.

.

REPORT

about the educational practice. Practice in the direction of professional activity
(full name of the profile organization)

Student of _____ group _____ (_____)
Signature Full name
Practice leader
from a specialized organization_____ (_____)
Signature Full name

Practice leader
from FEFU_____ (_____)
Signature Full name

APPENDIX 4

Form of referral to educational practice

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
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"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIRECTION
for educational practice

student__ master's course
_Surname First name Patronymic of the group _____
(Full Name)

sent to _____
name of the base organization

address _____

Order on referral to industrial practice dated No. _____
for passing_____
in the direction of preparation 06.04.01 Biology
for a period from _____ 20 to _____ 20 (continuous / discrete)

Supervisoreducational practice.

M.P. _____ _____ _____
(position, academic title) (signature) (I.O.F)

Marks on completion and timing of practice

Business name	Check-in and check-out	Signature, signature transcript, seal
Name of the enterprise, organization in accordance with the contract	Arrived __.__.20__	
	Dropped out __.__.20__	

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APPROVE
Director of the Institute of Life Sciences
and Biomedicine (Schools)

Yu.S.Khotimchenko
Full name

December 21, 2021

INTERNSHIP WORKING PROGRAM Industrial practice. Research work
06.04.01 Biology
Master's program
Name of the educational program:
Molecular and Cell Biology (in English)

Vladivostok
2021

1. OBJECTIVES OF DEVELOPMENT OF SCIENTIFIC RESEARCH WORK

The objectives of the internship "Research work" are to consolidate and deepen the theoretical training of undergraduates in the disciplines of the variable parts of the OBEP "Molecular and Cell Biology (in English)", as well as to obtain professional competencies in the preparation of future final qualifying work (WQR).

2. RESEARCH OBJECTIVES

The objectives of the research work are:

– the study of scientific and technical information, the performance of literary and patent searches on the subject of the study;

– mathematical modeling of processes and objects based on standard computer-aided design packages;

– performance of experimental studies and tests according to a given methodology, mathematical processing of experimental data;

– participation in the implementation of research and development results;

– preparation of data for reporting, reviews, scientific publications;

– participation in activities for the protection of intellectual property.

According to the results of the research work, the student must:

Know:

– the history of the development of a specific scientific problem, its role and place in the scientific direction under study;

– the degree of scientific development of the problem under study;

– the specifics of the technical presentation of scientific material;

– Own:

– modern problems of this branch of knowledge;

– the main methods of the research;

– scientific discussion skills;

Be able to:

– apply certain methods in scientific research;

– to practically carry out scientific research, experimental work in a particular scientific field related to the performance of a qualifying work / master's thesis;

– search for bibliographic sources;

– work with information software products and Internet resources, etc.

3. THE PLACE OF SCIENTIFIC RESEARCH WORK IN THE STRUCTURE OF THE BRI

Internship. Research work is included in Block 2 "Practices" of the curriculum (B2.V.01 (P)). It is a type of training sessions that are directly focused on the professional and practical training of students. The practice is based on the knowledge and skills gained in the process of studying the disciplines "Molecular Biology", "Project Management and Methodology of Scientific Research", "Bioinformatics", "Biostatistics", "Molecular Biology of the Cell", "Methodology and methods of teaching natural sciences" ", "Molecular genetics, human genetics", "Biomedical cell technologies", "Comparative histology", "Immunology", "Commercialization of developments and transfer of technologies", "Modeling and analysis of big data in biology", "Molecular and cellular mechanisms of carcinogenesis" ,

The competencies acquired by students during the internship are necessary for writing a qualifying work, and will also be necessary when passing subsequent types of internships.

4.TYPES, METHODS, PLACE AND TIME OF INTERNSHIP

- Type of practice - Production practice.
- Type of practice - Production practice. Research work
- Method of carrying out - stationary / visiting.
- The form of conducting is dispersed.

Industrial practice is carried out in 1-3 semesters at 1.2 courses (labor intensity according to the curriculum 12 credit units).

The supervision of the internship is carried out by the supervisor of the undergraduate in agreement with the head of the master's program.

For persons with disabilities and the disabled, the choice of places for internship is consistent with the requirement of their accessibility for these students, and the practice is carried out taking into account the peculiarities of their psychophysical development, individual capabilities and health status.

5. STUDENT COMPETENCES FORMED AS A RESULT OF INTERNSHIP

The internship process is aimed at developing the following competencies:

Code and name of professional competence	PS code (if PS is available) or reference to other grounds	Labor function code (if there is a PS)	Competence achievement indicators
Type of tasks of professional activity: research			
PC-1 Able to creatively use			PC-1.1 Works with scientific and

in scientific and industrial-technological activities the knowledge of fundamental and applied sections of disciplines (modules) that determine the field of activity of molecular and cellular biology.			technical information and specialized literature, studies the achievements of domestic and foreign science in the field of molecular and cellular biology using new technologies and electronic databases. PC-1.2 Comprehends and formulates diagnostic solutions to the problems of molecular and cellular biology by integrating fundamental biological concepts and specialized knowledge in the field of professional activity PC-1.3Uses in scientific and industrial-technological activities the knowledge of fundamental and applied sections of disciplines that determine the field of activity of molecular and cellular biology
PC-2 Able to apply the methodological foundations of design, laboratory biological, environmental research, use modern equipment and computer systems in molecular and cellular biology.			PC-2.1Develops rules and algorithms for designing, performing laboratory biological, environmental studies. PC-2.2Performs laboratory biological, environmental research using the scientific methodological foundations of fundamental research. PC-2.3 Applies the methodological foundations for designing, performing laboratory biological and environmental studies, uses modern equipment and computer systems in molecular and cellular biology.
PC-3He is able to conduct research on biopolymers, their components and complexes, the structure and function of genes and genomes.			PC-3.1 Studying the structure and functions of biopolymers, their components and complexes, mechanisms of storage, transmission and implementation of genetic information at the molecular level; PC-3.2 Describes in detail the main processes occurring in a living cell: the processes of replication, transcription, translation, recombination, repair, RNA and protein processing, protein folding and docking. PC-3.3 Explores the main methods

			of intermolecular interactions and mutual regulation of the processes of functioning of a living cell as part of a multicellular organism. PC-3.4 Analyzes the structure and functions of genes and genomes, conducts structural and functional analysis of individual proteins and the proteome as a whole.
PC-4 Able to conduct scientific research in molecular and cellular biology in order to develop the scientific potential of the Russian Far East and develop the resources of the World Ocean.			PC-4.1 Carries out the rationale for scientific research in molecular and cellular biology in order to develop the scientific potential of the Russian Far East and the development of the resources of the World Ocean. PC-4.2 Performs applied and exploratory research and development in molecular and cellular biology aimed at developing the scientific potential of the Russian Far East and developing the resources of the World Ocean. PC-4.3 Interprets the results of scientific research in molecular and cellular biology aimed at developing the scientific potential of the Russian Far East and developing the resources of the World Ocean.
PC-5Able to conduct a systematic analysis of the relationships between cells, tissues and functional systems of organisms.			PC-5.1 Studies the relationship of cells, tissues and functional systems of organisms. PC-5.2 Explores the relationship of cells, tissues and functional systems of organisms. PC-5.3 Conducts a systematic analysis of the relationships between cells, tissues and functional systems of organisms.
PC-6 Able to develop experimental models, methods of cytological diagnostics, morphometry, marker histo- and cytochemistry, etc.			PC-6.1 Designs and carries out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions PC-6.2 Develops and critically evaluates an experimental research model in the field of cytology and histology

			PC-6.3Performs histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry
PC-7 Able to develop new drugs, conduct biomedical research using living organisms and biological systems of various levels of organization.			PC-7.1 Carries out the justification of biomedical research with the aim of developing medicines using living organisms and biological systems of various levels of organization. PC-7.2 Defines the goals and objectives of biomedical research and drug development. Plans biomedical research, selects the design of scientific research in accordance with the goals and objectives. PC-7.3Conducts biomedical research using living organisms and biological systems of various levels of organization, analyzes the results. PC-7.4 Interprets the results of biomedical research and development in order to elucidate the molecular mechanisms of biochemical processes.

4. STRUCTURE AND CONTENT OF INTERNSHIP

The total labor intensity of the field trip is 12 CU, 8 weeks, 432 hours.

Section (stage) of practice	Type of educational work in practice, including independent work of students and labor intensity (in hours)				Current control form
	Briefing on safety, compliance with sanitary and hygienic rules and pharmaceutical order at the workplace.	Consultation	Collection, processing of material	Independent work	
1.Preparatory stage	4	4	80	6	Attendance check. Safety briefing and test. Checking the execution of the stage.
2. Main stage	-	4	144	20	Attendance check.

					Presentation of the collected materials to the head of the practice. Checking the execution of the stage.
3.Final stage	-	4	130	2	Attendance check. Testing. Checking the execution of the stage.
4. Report preparation	-	4	20	10	Submission and defense of practice reports
Total	4	16	374	38	
Total	432				

Carrying out research work includes the fulfillment of tasks on the preparation of the final qualification work.

The result of the research work in the 1st semester is: the approved topic of the final qualifying work; a schedule of work on the WRC with an indication of the main activities and the timing of their implementation; setting goals and objectives of WRC; definition of the object and subject of research; substantiation of the relevance of the chosen topic; characteristics of the current state of the problem under study; characteristics of the methodological apparatus that is supposed to be used, selection and study of the main literary sources that will be used as a theoretical basis for the study.

The result of the research work in the 2nd semester is a detailed literature review on the topic of the WRC research, which is based on current research publications and contains an analysis of the main results and provisions, an assessment of their applicability within the framework of the research on the topic of the WRC. The literature review should be based on sources that reveal the theoretical aspects of the issue under study, primarily scientific monographs and articles in scientific journals.

The result of the research work in the 3rd semester is the collection of factual material when conducting scientific research and testing the results on the topic of the final qualification work, including the development of a methodology for collecting data, methods for processing results, assessing their reliability and sufficiency to complete the work on the WRC.

5. EDUCATIONAL AND METHODOLOGICALSECURITYINDEPENDENT WORK OF STUDENTS WHEN PERFORMING SCIENTIFIC RESEARCH WORK

Independent work (SIW) is an integral part of the educational process and is necessary for the formation of undergraduates' skills and abilities to conduct scientific activities, the formation of abilities to independently plan and implement scientific experiments, as well as analyze materials and draw reasonable conclusions. During the internship, students systematize, strengthen and expand theoretical knowledge, are formed as specialists in their field of research.

Independent work is carried out on the basis of an individual assignment for practice, designated by the supervisor.

Independent work includes setting goals and objectives, working with literary sources on the research topic, choosing and mastering methods to achieve the goals, setting up an experiment, as well as analyzing the results and writing a report.

According to the curriculum for industrial practice, 378 hours of independent work and 54 hours of controlled independent work (CSW) are provided for 3 semesters (1,2,3). The CSR includes the development of an internship plan, the formulation of the goals and objectives of the study, the provision of a literature review on the research topic to the head, the compilation and writing of a practice report and its defense at a department meeting, after checking by the head.

The structure for compiling a report on the results of an internship and recommendations for keeping an internship diary are located in Appendices No. 1-3.

Independent work of master's students is regulated by certain documents. These include:

a) GEF 3 in the direction 06.04.01 Biology

b) documents defining the procedure and specifics of production practice:

- internship program for students in the direction 06.04.01 Biology;
- direction for internship;
- a report on the internship completed by the student;
- feedback on the internship.

c) methodological literature of the laboratory.

The specific content of the individual task and the schedule depends on the specifics of the institution and the laboratory, the research topics in the laboratory and the specific research topic of the trainee.

9. FORMS OF CERTIFICATION (BY THE RESULTS OF PRACTICE)

The form of attestation in practice is a test with an assessment.

The form of attestation based on the results of the practice: defense of the report at the meeting of the department with the provision of a written report on the practice, verified by the head of the practice, practice diary.

Reporting procedure

The research report includes: a brief description of the results of the work in accordance with the tasks according to the plan for conducting a real research project carried out by the student within the approved topic of scientific research in the direction of study and the topic of the final qualification work, the results achieved, an analysis of the problems encountered and options for their elimination, a list of used sources (printed publications and electronic resources - textbooks, manuals, reference books, standards, reports, Internet resources, etc.), applications (documents or materials taken from the main part of the report, which are illustrative).

The R&D report is compiled in the course of completing the tasks of the main stage of work.

The report is drawn up in accordance with the requirements of the standards of requirements for the design of written work performed by students and trainees of FEFU.

The R&D report is submitted in printed form (title page in the prescribed form) and in electronic form (report file, including the title page).

Form of certification for research: protect the report.

Certification based on the results of research is carried out on the last week of the academic semester.

The decision on attestation of research work is made by a commission appointeddepartmentthat implements the OBEP HE, with marks "excellent", "good", "satisfactory", "unsatisfactory".

The undergraduate makes a 5-10 minute oral report on the defense of the report and answers questions from members of the commission.

Estimates for research are put down simultaneously in the examination sheet and the record book by the leaders of research.

When grading a master's student in the R&D test, the following criteria are used.

Grade "excellent" is given to a master student who: on time, in full and correctly completed the tasks of research work; when defending and writing a report, he demonstrated a deep and solid assimilation of the program material on the tasks of research; exhaustively, consistently, clearly and logically expounds it; owns versatile skills and techniques for performing research tasks; prepared a report in accordance with the requirements.

Rated "good"undergraduatewho: completed the research tasks on time, but with minor comments; PDuring the defense and writing of the report, he demonstrated a solid knowledge of the program material on the tasks of research; competently and to the point sets it out, avoiding significant inaccuracies in answering questions; owns the

necessary skills and techniques for their implementation; prepared a reportwith minor remarks.

The rating "satisfactory" is putundergraduate, who: made miscalculations and mistakes when performingadany R&D, did not fully fulfill the tasks of research work;has knowledge of only the basic material on the tasks of research, but has not mastered its details; allows inaccuracies, insufficiently correct formulations, violations of the logical sequence in the presentation of program material on research assignments; draws superficial conclusionsprepared a report with comments.

The rating "unsatisfactory" is putundergraduatewho: did not complete the research tasks, or completed with gross violations of the requirements; did not submit a report on research, or prepared a report with gross violations of the requirements; does not know much of the softwarematerial according to research assignments, makes significant mistakes, uncertainly, with great difficulty, performs research work.

ORGANIZATION OF SCIENTIFIC RESEARCH WORK

Research work should be carried out in the following forms:

– fulfillment of tasks of the supervisor in accordance with the approved individual plan of research work;

– participation in scientific events of FEFU and the department;

– preparation of reports and speeches at scientific conferences, seminars, symposiums and other scientific events at the regional, all-Russian and international levels;

– preparation and publication of abstracts of reports, scientific articles;

– preparation and defense of course work in the direction of ongoing scientific research;

– participation in research projects carried out at the university within the framework of research programs;

– preparation and defense of the final qualifying work.

– applicability within the chosen topic, as well as the alleged personal contribution of the author to the development of the topic (the novelty of the study and the formulation of specific author's proposals). Participation in the scientific and methodological seminar.

1 Setting goals and objectives of scientific research; definition of the object and subject of research; determination of the methodological apparatus that is supposed to be used, selection and study of the main bibliographic sources that will be used as a theoretical basis for the study; study of special literature and other scientific and

technical information, achievements of domestic and foreign science and technology in the relevant field of molecular biotechnology.

2 Collection, processing, analysis and systematization of scientific and technical information on the topic of work, compilation of a literature review, systematization of factual material for research. Participation in conducting experiments, developing measurement methods (if any) and conducting scientific research on the topic of work.

In order to identify the novelty, technical level, competitiveness and effectiveness of the developed topic, a patent search is performed. Sources of information about inventions are: abstract publication "Inventions of the World", official bulletins of the Russian Agency for Patents and Trademarks "Inventions", "Inventions. Utility models", descriptions of the invention, abstract journals of VINITI, materials of the Federal Institute of Patent Property.

Patent research makes it possible to analyze the latest achievements of domestic and foreign science and technology in this field, identify the main technical directions in solving the problem, create prerequisites for improving the research methodology, clarifying the experimental design scheme, and contribute to obtaining results that are at the level of the invention.

Patent research is carried out by the developer under the guidance and with the participation of a research supervisor and an employee of the patent department.

Patent research includes the following types of work:

- development of search regulations;
- search and review of patent and other scientific and technical documentation;
- systematization and analysis of the selected documentation;
- summarizing the results, choosing analogs, compiling a certificate of patent research and introducing materials into a literature review.
- The search procedure is carried out in the following sequence:
- definition of the subject of the search (object as a whole, its constituent parts);
- determination of countries (firms) of information search;
- definition of types of information sources;
- classification of search items according to the international classification of inventions (ICI), universal decimal classification (UDC), according to the national classification of inventions (NCI);
- determination of the required search depth;
- establishing the location of sources of information;
- definition of types and methods of search.
- As a rule, patent research is carried out sequentially at the stages:
- planning and forecasting R&D;

– during the implementation of research;
– in the process of completing research and using its results.

Patent search is carried out on the funds of patent documentation of the Russian Federation and countries that are leading in this field, and other scientific and technical literature with a retrospective of at least 10 years (usually 15 - 20 years). During the search, the current level of development is determined, the development of this area is forecasted based on an analysis of the level of industrially developed technology and equipment.

The level of industrially mastered technology and technology is determined on the basis of information obtained from the retrospective patent fund, data from scientific and technical literature, standards, specifications, advertising and catalog magazines, technical journals, etc., by comparing domestic and foreign solutions, their technical economic indicators.

The level of technical developments is determined by comparing the results of domestic and foreign R&D and design developments protected by copyright certificates and patents over the past 10-15 years and set out in R&D reports over the past 2-3 years. Particular attention is paid to the description of copyright certificates and patents in recent years. This type of analysis allows you to choose technical solutions - analogues with the highest technical and economic indicators.

The level of technical solutions in the future is determined by studying the latest inventions and patents, which makes it possible to predict the level of development of technology for 10-15 years in advance and determine the most progressive directions.

As a result of a patent study, one or more ways to solve the problem are fixed, the expediency and degree of use of known technical solutions are determined, and the probability of providing a patent-free technical solution is estimated.

3 Participation in the scientific and methodological seminar. Preparation of a report for a student scientific conference of the university. Speech at conferences of young scientists and students, as well as participation in other interuniversity and regional scientific conferences. Publication of a scientific article.

Writing a review of the scientific literature of the final qualification work and its public discussion within the framework of the scientific and methodological seminar.

Preparation of the final text of the final qualification work, its technical design.

Based on the results of the implementation of the individual plan of research work, the final grade is given by the supervisor.

Control questions and tasks for conducting current certification by sections (stages) of research work

1. Systems for the production of recombinant proteins in E. coli.

2. Hormonal regulation of gene expression at the level of transcription.

3. Effect of changing cultivation conditions on different genotypes of the species Syringa vulgaris.

4. Use of molecular mechanisms of intracellular regulation in biotechnological production.

5. Application of methods of molecular genetics and microbiology in ecology and biotechnology of cyanobacteria.

6. Molecular design of polymeric materials for biotechnology and medicine.

7. Molecular biological approaches to the selection of bacterial cultures when creating starter cultures for biotechnology.

8. Objects of molecular biotechnology.

9. Molecular biotechnology of prokaryotes.

10. Molecular biotechnology of eukaryotes.

11. Point mutagenesis and genetic engineering of proteins.

12. Molecular biotechnology in pharmacy.

13. Molecular biotechnology of vaccines.

14. Molecular biotechnology of microbiological systems.

15. Current state and problems of amino acid production.

16. Current state and problems of production of biologically active substances.

17. Current state and problems of antibiotic production.

18. Current state and problems of insulin production.

19. Current state and problems of obtaining pectins.

20. Current state and problems of obtaining carotenoids.

21. Problems of production of biologically active molecules.

22. The use of genetic engineering to obtain practically useful strains of microorganisms.

23. Optimization of biotechnological processes with the help of software products.

24. Oversynthesis of metabolic products using genetic methods.

25. Influence of cultivation conditions on plasmid stability and biosynthetic activity of recombinant bacterial strains.

Experiment planning.

Based on the analysis of literature data, the main, well-known technical and technological directions and solutions to the problem posed in the work are identified, its relevance is assessed, and the goal is clarified. In the first approximation, the ways of

its possible solution are outlined, i.e. a working hypothesis is formulated, specific research objectives are determined.

During the planning of the experiment, the course of work is developed - a step-by-step (descriptive or graphical) block diagram of the organization of the study, containing its main stages, objects and methods of research, etc.

When starting to prepare a scheme for setting up an experiment, one should understand the purpose and objectives of the study, represent the essence of the chosen approaches, the specifics of the objects and methods used. The methodology of work must be discussed with the supervisor. The scheme of setting up the experiment should be specific, informative, reflect the essence of the work, its main stages and their focus.

The correct choice of research objects largely determines the degree of reliability of experimental data. The object must be stable in composition and properties; when working, the rules for sampling and sampling should be strictly observed.

The chosen methods and means of measurement should ensure the accuracy and objectivity of the results of the experiment.

It must be borne in mind that studies are divided into direct and indirect, objective (individual, biological, biochemical, etc.) and subjective (organoleptic indicators). When planning an experiment, one should choose methods that have the smallest error and correlate with each other.

Preparatory work related to the allocation of a workplace, the selection of equipment, materials and reagents, working documentation,

installation of equipment that provides a given measurement accuracy should be planned in advance.

When conducting research work, the student must conduct a series of preliminary experiments to master the selected research methods, clarifying their duration and identifying interference that affects the accuracy of the results.

Taking into account the specific nature of the research work being carried out on the instructions of the leader in order to study the mathematical model of the process under study and use it to determine the optimal conditions, it is recommended to carry out mathematical planning of the experiment.

Conducting experimental studies.

The main purpose of the experiment is to test the validity of the formulation of the working hypothesis and optimize the results of the study. The experimental part of the diploma scientific work after passing the safety briefing is carried out by students independently with consultations and control certification of the head, provided for by the schedule and calendar plan.

Experimental protocols are kept in a working journal with numbered pages. The manager periodically checks the journal and makes comments and recommendations in it. Each experiment must be described in detail and recorded.

In the general part of the experiment protocol, the name of the experiment and its number, the date of the experiment, the characteristics of the object of study, possible options for the research method, the specific plan of the experiment, the purpose of its setting, and the parameters to be determined are recorded.

The data and observations obtained during the experiment are recorded in pre-prepared tables. If necessary, the student writes down special remarks that arose during the experiment.

Scientific documentation is attached to the protocol: diagrams, graphs, diagrams, photographs, photocopies of documents (for example, tasting reports), chromatograms, aminograms, densitograms, etc.

Protocols and appendices to them are the only objective scientific documentation for writing a thesis.

As a rule, experimental studies are carried out in two stages: at the first stage, primary data are obtained on model systems (which allows for clarification or adjustment of the work program), at the second stage, the main results are obtained at basic objects.

Experimental data should be carried out in absolute or relative terms, indicators of the same type should have the same degree of rounding. Quantities that have a physical meaning must have a dimension and designation in accordance with the international system of units (SI).

When performing experimental studies, it is necessary to pay attention to obtaining reliable results, which is achieved by analyzing several parallel experiments (3-4), processing the results by statistical methods.

By systematizing and processing the data obtained in this way, the possibility of erroneous conclusions and conclusions is excluded.

10. EDUCATIONAL AND INFORMATIONAL SUPPORT OF SCIENTIFIC RESEARCH WORK

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11. MATERIAL AND TECHNICAL SUPPORT OF SCIENTIFIC RESEARCH WORK

Scientific laboratories of biomedical cellular technologies equipped with the following equipment:

– Robotic system for automated cell cultivation CompacT SelecT SC - APM, with a module for preparing plates for analysis, THE AUTOMATION PARTNERSHIP;

– System for continuous monitoring of live cells in culture, formation and analysis of images Cell-IQ MLF, Chip Technologies, Czech Republic;

– System of deep optical imaging of biomaterials FluoView FV1200MPE (FV12M-5XX-3XX);

– Incubator personal CO2 - with a system for monitoring and increasing the vitality of cells Galaxy (CO48R-230-1200);

– Spectrophotometer with accessories for BioSpectrometer-kinetic sample processing;

– Device for polymerase chain reaction with detection of amplification products in the "real time" mode CFX96 Touch Real Time System;

– System for volumetric fixation and preparation of deposited biosamples in the Volume Fixation System kit;

– Multimodular station for rotary sedimentation processing of samples Sediment Modules;

– Automated system Biacore X100 System for the analysis of intermolecular interactions with a set of additional parts and software;

– DNA sequence analysis system Ion S5™ XL System + Starter kit for testing and commissioning the system;

– Genetic analyzer Applied Biosystems 3500 + Set of consumables Starter kit for checking the performance and commissioning of the system;

– Cell sorter high-speed MoFlo Astrios EQ

– Sample preparation system for whole genome sequencing Ion Chef™ Instrument + Starter kit for testing and commissioning the system.

Reading rooms of the FEFU Scientific Library with open access to the fund (building A - level 10):

HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW,GigEth,Wi-Fi,BT,usb kbd/ mse,Win7Pro (64-bit)+Win8.1Pro(64-bit),1-1-1 Wty Internet access speed 500 Mbps. Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers.

For persons with disabilities and the disabled, the choice of places for internship is consistent with the requirement of their accessibility for these students, and the practice is carried out taking into account the peculiarities of their psychophysical development, individual capabilities and health status.

Instruments, devices and other technical means of the laboratory in accordance with the profile and subject of the study act as material and technical support.

To carry out work related to the implementation of the assignment for practice at FEFU, as well as to organize independent work, students have access to educational laboratories that comply with applicable sanitary and fire safety standards, as well as safety requirements for conducting educational work:

Name of equipped premises and premises for independent work	List of main equipment
Reading rooms of the FEFU Scientific Library with open access to the fund (building A - level 10)	HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW,GigEth,Wi-Fi,BT,usb kbd/ mse,Win7Pro (64-bit)+Win8.1Pro(64-bit),1-1-1 Wty Internet access speed 500 Mbps. Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers
Audience for independent work of students Vladivostok, about. Russian village Ajax, 10, Building M	Monoblock Lenovo C360G-i34164G500UDK 19.5" Intel Core i3-4160T 4GB DDR3-1600 SODIMM (1x4GB)500GB Windows Seven Enterprise - 17 pieces; Wired LAN - Cisco 800 series; wireless LAN for students provided by a system based on access points 802.11a / b /g/n 2x2 MIMO(2SS).

(25.1), room. M621 Area 44.5 m2	
Audience for practical classes Vladivostok, about. Russian village Ajax, 10, Building L, room. L 403, area 30.6 m2	Computer class: 15 workstations with access to the FEFU local network and the Internet; monoblock HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, Wi-Fi, W, usb kbd/ mse, Win7Pro(64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty.
Audience for practical classes Vladivostok, about. Russian village Ajax, 10, Building L, room. L 432	Biosafety Center SBM FEFU: microbiological safety cabinets BMB-II Laminar-S performed by BMB-II-“Laminar-S”-1.2, real-time polymerase chain reaction device Rotor-Gene Q, 6 plex, automatic luminescent multichannel analyzer ALA-1/4 (4-channel), high-speed mini-centrifuge Microspin, medical aspirator OM-1, Microcentrifuge / shaker TETA-2, solid-state thermostat Thermo 24/15, thermostat programmable for PCR analysis four-channel "Tertsik", automatic pipettes.
FSC Biodiversity FEB RAS Vladivostok, ave. 100th anniversary of Vladivostok, 159/1	Virology laboratory: microscopes, a greenhouse complex for working with phytoviruses, general laboratory equipment. Centre of collective usage: Axio Observer inverted microscope (Palm Micro Beam microdissector), CryoStar NX70 cryostat, Merlin electronic scanning microscope, Mass spectrometric complex based on the HCT Ultra ETD II System ion trap mass spectrometer and Proxeon's Easy-nLC nano-LC system, Station for isolation of nucleic acids and proteins QIAcube, QX200 digital drop PCR system, ABI PRISM 3130 Genetic Analyzer DNA sequencer, four-channel, EDX-800P X-ray fluorescence spectrometer

LIST OF INFORMATION TECHNOLOGIES AND SOFTWARE

Programs:

– Microsoft Office Professional Plus 2010 - an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.);

– 7Zip 9.20 is a free file archiver with a high degree of data compression;

– ABBYY FineReader 11 is a program for optical character recognition;

– Adobe Acrobat XI Pro - a software package for creating and viewing electronic publications in PDF format;

– ESET Endpoint Security is a comprehensive protection of workstations based on Windows OS. Virtualization support + new technologies;

– WinDjView 2.0.2 - a program for recognizing and viewing files with the same name format DJV and DjVu;

Local network resources:

– Reference and legal system Garant operating system – Microsoft Windows Linux (with WINE@Etersoft) iOS Android, etc.;

– Computer reference legal system ConsultantPlus - operating system Microsoft Windows, Linux (with WINE), Apple iOS Android, Windows Phone;

– Professional help system Techexpert - Microsoft Windows, Linux, FreeBSD operating systems.

Educational software complexes:

– 1C Enterprise 8.2, (educational version), version 8.2.13.205, training software package;

– Windows Seven Enterprise, version SP3x64, operating system

– Eset NOD32 Antivirus, version 4.2.76.1, malware detection tool;

– Microsoft Office 2010 Professional Plus Version 14.0.6029.1000 Office Suite;

– Microsoft Office Professional Plus 2013 Version 15.0.4420.1017 Office Suite;

– Microsoft Visual Studio 2012 Professional, version 11.0.50727.26, learning suite;

– Microsoft Visual Studio 2013 Community, version 12.0.31101, learning suite;

– 7-Zip, version 9.20.00.0, training package;

– Abbyy FineReader 11, version 11.0.460, educational software package;

– Adobe Acrobat XI Pro, version 11.0.00, training suite of programs;

– Adobe Photoshop CS6, version 13.0, Educational software package;

– Autodesk 3DS Max Design 2013 Version 15.0.0.347 Tutorial;

– Autodesk 3DS Max Design 2015 Version 17.1.149.0 Tutorial;

– Autodesk Autocad 2012, version 18.2.51.0, training software package;

– Autodesk Autocad 2013, version 19.0.55.0, educational software package;

– Autodesk Autocad 2013, version 19.0.59.0, educational software package;

– Autodesk Autocad 2015 version 20.0.51.0, training package;

– Autodesk Autocad Architecture 2013, version 7.0.50.0, learning suite;

– Autodesk Autocad Electrical 2016, version 20.0.46.0, learning suite;

– Autodesk Autocad Revit 2013, version 12.02.21203, training software package;

– Autodesk DWG TrueView 2013 Version 19.0.55.0 Tutorial;

– Autodesk Invertor 2015, version 19.0.15900.0000, learning suite;

– Autodesk Revit 2015 Version 15.0.207.0 Tutorial;

– Google Chrome, version 42.0.2311.90, web browser;

– CoreDraw Graphics Suite X3. version 13.0.0.739, training software package;

– CoreDraw Graphics Suite X6, Version 16.1.0.843, Tutorial;

– Free Pascal, version 2.6.4, a training set of programs;

– Gimp 2.8.10, version of Gimp 2.8.14, a graphics package for teaching students;

– GNU Octave, version 3.8.2, a training package;

– MySQL Community, version 5.6, a training complex for databases;

– MySQL Database, version 5.5.23, database training suite.

PROVISION OF RESOURCES FOR THE ELECTRONIC LIBRARY SYSTEM AND THE ELECTRONIC INFORMATION AND EDUCATIONAL ENVIRONMENT

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Contract R-470-17 dated May 24, 2017 ELS "University Library Online"	06/06/2019-06/05/2020
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Sublicense agreement No. INSPEC/34 dated 01/09/18 INSPEC database Competition of the Ministry of Education and Science	09.01.18-30.06.20
Sublicense Agreement No. CUP/34 dated 01/09/18 Scientific journals published by Cambridge University Press.	09.01.18-30.06.20
Sublicense Agreement No. CASC/34 dated January 9, 2018 EBSCO Publishing Computer Applied Sciences Complete Database	09.01.18-30.06.20
Sublicense Agreement No. AIP/34 dated January 9, 2018. Scientific journals of the American Institute of Physics Press.	09.01.18-30.06.20
Sublicense Agreement No. APS/34 dated January 9, 2018 APS Online Journals Database	09.01.18-30.06.20
Sublicense agreement No. IOP/34 dated 01/09/18 Scientific journals of the publishing house of the Institute of Physics (Great Britain)	09.01.18-30.06.20
Sub-license agreement No. T&F/34 09.01.18 Taylor & Francis Group magazines "Social Sciences and Humanities" and "Natural Sciences and Technologies" Competition of the Ministry of Education and Science	09.01.18-30.06.20
Agreement No. 1415-17 dated 01/26/2018. EBS "Lan" Engineering and technical sciences. Mathematics. Computer science. Physics. Theoretical mechanics. Chemistry	01.02.2018-31.01.2020
Contract No. R-70-18 dated May 30, 2018 EBS "Lan" Psychology. Pedagogy, Physical culture and sports	07/01/2018-06/30/2020
Agreement No. R-509-18 dated 06/15/2018. EBS “Student Consultant” “Medicine. Health care”, “Architecture and construction”, “Mechanical engineering”, “Energy”, Publishing house “Vostochnaya kniga”, Publishing house “Flinta” “Linguistics and literary criticism”	07/01/2019-06/30/2020
Contract No. 24/IA/18 dated 06/15/2018 EB Grebennikov Publishing House	07/01/2019- 06/30/2020
Contract No. R-672-18 dated July 11, 2018 EBS_YURIGHT	17.09.2019 -16.09.2020
Agreement No. RT-046/18 dated June 15, 2018 RUKONT electronic versions of educational and scientific publications in Russian	01.03.2019-28.02.2020
Contract No. R-699-18 dated 03.07.2018 EBS "Lan" Food production technology	08/01/2019-07/31/2020
Contract No. R-656-18 dated July 12, 2018 EBS INFRA-M (EBS ZNANIUM.COM)	08/01/2019-07/31/2020
Agreement No. P-803-18 dated 14.08.2018 LLC "IPR Media" EBS IPRbooks (basic version)	09/01/2019- 08/31/2020
License Agreement No. P-979-18_ with Tongfang Knowledge Network Technology Co., Ltd., Beijing China dated September 24, 2018	01.10.19 – 30.09.20

ANNEX 1

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE:
Head of OP
_____FULL NAME.
"____" _____20__

INDIVIDUAL TASK

By _____
(type of practice)

student _____groups _____
(Name of the student)

Educational program 06.04.01 Biology, master's program "Molecular and Cellular Biology" (together with NSCMB FEB RAS)_____

Base (place, organization) of practice_____
_____

Terms of practice from _____20___ to _____ 20___

Generalized task statement	

Job Schedule

Name of the tasks (activities) that make up the task	Task completion date (activities)
1.	
2.	
3.	

Practice leader _____ _____
signature Full name, position

APPENDIX 2

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIARY

according to _____ practice
student _____ group _____
program_____
Place of practice _____
Term of practice _____ weeks_____

Head of practice from FEFU
_____
Head of practice from a specialized organization
_____

4. Student's calendar schedule

No. p \ p	Name of works	calendar dates		Surname of the he the practice
		Start	ending	

5. Student work diary

date	Brief summary of the trainee's work	Signature leader

6. Report protection results

The report is protected by "____" _____ 20___

Rated _____

Department Director _____ AND ABOUT. Surname

APPENDIX 3

Practice Report Title Page Form

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

The report is protected with an estimate
_____
"_____" _____ 20__

Supervisor
educational program
_____ Surname I.O.

.

REPORT

on industrial practice. Research work
(full name of the profile organization)

Student of _____ group _____ (_____)
Signature Full name
Practice leader
from a specialized organization_____ (_____)
Signature Full name

Practice leader
from FEFU_____ (_____)
Signature Full name

APPENDIX 4

Form of referral to educational practice

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)
DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIRECTION
for work practice

student__ master's course
_Surname First name Patronymic of the group _____
(Full Name)

sent to _____
name of the base organization

address _____

Order on referral to industrial practice dated No. _____
for passing_____
in the direction of preparation 06.04.01 Biology
for a period from _____ 20 to _____ 20 (continuous / discrete)

Supervisorindustrial practice.
Research work

M.P. _____ _____ _____
(position, academic title) (signature) (I.O.F)

Marks on completion and timing of practice

Business name	Check-in and check-out	Signature, signature transcript, seal
Name of the enterprise, organization in accordance with the contract	Arrived __.__.20__	
	Dropped out __.__.20__	

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)
INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE
Director of the Institute of Life Sciences
and Biomedicine (Schools)

Yu.S.Khotimchenko
Full name

December 21, 2021

INTERNSHIP WORKING PROGRAM Industrial practice. Practice for obtaining professional skills and experience in teaching

06.04.01 Biology
Master's program
Name of the educational program:
Molecular and Cellular Biology (together with NSCMB FEB RAS)

Vladivostok
2021

1. **OBJECTIVES OF MASTERING INDUSTRIAL PRACTICE**

The purpose of the production practice is to acquire the skills and abilities necessary for successful teaching. The main goal of the teaching practice of students is the assimilation of theoretical knowledge and the acquisition of practical teaching skills

2. OBJECTIVES OF INDUSTRIAL PRACTICE

The objectives of the production practice are:

– consolidation of knowledge, skills and abilities acquired by undergraduates in the process of studying the disciplines of the master's program;

– mastering the methodology of preparing and conducting various forms of conducting classes;

– mastering the methodology for analyzing training sessions;

– understanding of modern educational information technologies;

– instilling the skills of self-education and self-improvement, promoting the activation of the scientific and pedagogical activities of masters;

– development of personal qualities among undergraduates, determined by the general goals of training and education set out in the OBEP.

During teaching practice, the student must

explore:

– - state educational standard and working curriculum for

– one of the educational programs;

– educational and methodical literature, laboratory and software on the recommended disciplines of the curriculum;

– forms of organization of educational and scientific activities at the university;

master:

– conducting practical and laboratory classes with students on the recommended topics of academic disciplines;

– conducting trial lectures in student classrooms under control

– teacher on topics related to the research work of the undergraduate.

3. THE PLACE OF INTERNSHIP IN THE STRUCTURE OF BRI

Internship. The practice of obtaining professional skills and experience in pedagogical activity is included in Block 2 "Practices" of the curriculum (B2.V.02 (P)). It is a type of training sessions that are directly focused on the professional and practical training of students. The practice is based on the knowledge and skills gained in the process of studying disciplines.

4.TYPES, METHODS, PLACE AND TIME OF INTERNSHIP

Type of practice - Production practice.

Type of practice - Production practice. Practice for obtaining professional skills and experience in teaching.

The method of carrying out is stationary.

The form of conducting is dispersed.

Industrial practice is carried out in the 3rd semester in the 2nd year (labor intensity according to the curriculum 6 s. e.).

The supervision of the internship is carried out by the supervisor of the undergraduate in agreement with the head of the master's program.

For persons with disabilities and the disabled, the choice of places for internship is consistent with the requirement of their accessibility for these students, and the practice is carried out taking into account the peculiarities of their psychophysical development, individual capabilities and health status.

5. STUDENT COMPETENCES FORMED AS A RESULT OF INTERNSHIP

The internship process is aimed at developing the following competencies:

Code and name of professional competence	PS code (if PS is available) or reference to other grounds	Labor function code (if there is a PS)	Competence achievement indicators
Type of tasks of professional activity: pedagogical			
PC-8Able to form educational material, conduct lectures, seminars, practical and laboratory classes on higher education programs.			PC-8.1 Develops methodological materials on topics and forms of classes in higher education programs. PC-8.2Forms educational and thematic material on higher education programs in accordance with methodological developments and regulatory requirements. PC-8.3 Conducts lectures, seminars, practical and laboratory classes on higher education programs.
PC-9 Able to present educational material in oral, written and graphic forms for various contingents of students.			PC-9.1Develops educational materials on topics and forms of classes in oral, written and graphic forms for various contingents of students. PC-9.2 Presents educational material in oral, written and graphic forms for various contingents of students.
PC-10Able to teach in general education			PC-10.1 Plans classes in educational institutions, as well as in educational

institutions, as well as in educational institutions of higher education and to manage the research activities of students.			institutions of higher education and the management of research activities of students. PC-10.2Organizes classes in general educational organizations, as well as in educational organizations of higher education and manages the research activities of students. PC-10.3 Teaches in general education institutions, as well as in educational institutions of higher education and manages the research activities of students.
PC-11Able to use in teaching knowledge about the history of the development of marine biology in the Far East, the contribution of Far Eastern scientists to the research and scientific production potential of the country.			PC-11.1Uses in teaching activities knowledge about the history of the development of marine biology in the Far East, the contribution of Far Eastern scientists to the research and scientific production potential of the country.
PC-12Able to form educational material, conduct lectures, seminars, practical and laboratory classes on vocational education programs for various contingents of students			PC-12.1Develops methodological materials on topics and forms of classes in vocational education programs for various audiences PC-12.2Forms, in accordance with methodological developments and regulatory requirements, educational and thematic material on vocational education programs for various contingents of students PC-12.3Conducts lectures, seminars, practical and laboratory classes on professional education programs for various audiences
PC-13Able to teach in professional educational organizations and manage the research activities of students.			PC-13.1Plans classes in the field of vocational training and additional professional education using the knowledge and methodology of vocational training. PC-13.2Organizes classes in the field of vocational training and additional professional education, using the methodology in accordance with professional training. PC-13.3Conducts training sessions in the field of vocational training and

			additional professional education, using knowledge and methodology in accordance with professional training. PC-13.4Plans the research activities of students in the field of professional interests using the knowledge of scientific design and research methodology. PC-13.5Organizes research activities of students in the field of professional interests using the knowledge of scientific design and research methodology. PC-13.6Manages the research activities of students in the field of professional interests using the knowledge of scientific design and research methodology.

6.STRUCTURE AND CONTENT OF INTERNSHIP

The total labor intensity of the industrial practice is 6 z.u., 4 weeks, 216 hours.

Section (stage) of practice	Type of educational work in practice, including independent work of students and labor intensity (in hours)				Current control form
	Briefing on safety, compliance with sanitary and hygienic rules and pharmaceutical order at the workplace.	Consultation	Collection, processing of material	Independent work	
1.Preparatory stage (Independent study of educational literature)	4	6	10	10	Attendance check. Safety briefing and test. Checking the execution of the stage.
2. The main stage is pedagogical (Attending lectures and practical classes of teachers of the department, Participation in the development of work programs for disciplines of a scientific specialty, Conducting training sessions in	-	6	54	54	Attendance check. Presentation of the collected materials to the head of the practice. Checking the execution of the stage.

an academic group in agreement with the teacher of the academic discipline)					
3.Final stage	-	6	20	20	Attendance check. Checking the execution of the stage.
4. Preparation of a practice report	-	6	10	10	Submission and defense of practice reports
Total	4	24	100	100	
Total	216				

Organization of teaching practice

Before the start of practice, an organizational meeting is held, at which undergraduates are informed of all the necessary information on conducting pedagogical practice.

The management of pedagogical practice is entrusted to the supervisor of the undergraduate, together with whom, in the first week of practice, the undergraduate

makes an individual plan. It plans all the work of the trainee in pedagogical activity.

To complete the internship, the student, together with the supervisor, chooses an academic discipline to analyze the classes, as well as independently conduct classes. The work schedule of undergraduates is compiled in accordance with the schedule of academic disciplines in agreement with the faculty of the department.

As a result of the internship, the undergraduate must master the skills of independent pedagogical activity in the professional field on the basis of:

- selection of content and construction of classes with modern requirements of didactics (scientific character);

- updating and stimulating the creative approach of undergraduates to conducting classes based on the development of students as subjects of the educational process (creativity);

- taking into account the scientific interests of undergraduates (the practice provides for conducting classes in subjects and disciplines that correspond to the research interests of undergraduates).

As a result of the internship, the undergraduate should be able to:

- prepare and conduct training sessions on the instructions of the head of practice, visit and analyze the classes of experienced teachers and their colleagues;

- to formulate and solve their problems arising in the course of pedagogical activity.

The content of teaching practice

The practice of undergraduates is carried out within the framework of the general concept of master's training. The main idea of the practice, which should provide its content, is the formation of skills related to pedagogical activity, as well as communication skills that reflect interactions with other people. The types of undergraduate activities in the process of internship involve the formation and development of strategic thinking, a panoramic vision of the situation, the ability to manage a group of people. In addition, it contributes to the process of socialization of the undergraduate's personality, switching to a completely new type - pedagogical activity, the assimilation of social norms, the values of the profession, as well as the formation of a personal business culture of future masters.

7.EDUCATIONAL AND METHODOLOGICALSECURITYINDEPENDENT WORK OF STUDENTS ON INDUSTRIAL PRACTICE

To ensure independent work of undergraduates, methodological recommendations have been developed, as well as work programs for academic disciplines developed by teachers of the department. During the internship, a master student must: study the structure of the educational process in a higher educational institution and the rules for maintaining reporting documentation by a teacher; study the documents of the normative support of the educational activities of the University.

In the process of working with regulatory documents, the student must study the structure and content of the Federal State Educational Standard of Higher Education in the direction and highlight the requirements for the professional preparedness of the bachelor; analyze the bachelor's curriculum and work program of the provided course; get acquainted with the methods of preparing and conducting all forms of training sessions - lectures, laboratory and practical classes, seminars, consultations, tests, exams, course and diploma design; master innovative educational technologies; get acquainted with the existing computer training programs, the possibilities of technical teaching aids, etc.; determine the discipline and its module for which training sessions will be held, prepare didactic materials; get acquainted with the program and content of

the chosen course; get to know the student group. The result of this stage are notes, diagrams, visual aids and other didactic materials.

The student, according to his individual work plan, must complete the main tasks of the practice - attend classes of leading university teachers in various academic disciplines, as well as lectures and seminars conducted by his supervisor in the discipline taught.

The undergraduate must independently analyze the classes, both lecture and practical, from the point of view of the organization of the pedagogical process, the features of the interaction between the teacher and students, the form of the lesson, etc. The results of the analysis are drawn up in writing.

8. FORMS OF CERTIFICATION (BY THE RESULTS OF PRACTICE)

The form of attestation in practice is a test with an assessment.

The form of attestation based on the results of the practice: defense of the report at the meeting of the department with the provision of a written report on the practice, verified by the head of the practice, practice diary.

The following forms are used as current attestation:

1. Checking the practice diary by the head (weekly);
2. Providing the leader with a review of the literature on the topic of the study and the results of the experiment;
3. Verification by the head of the practice report.

Grading scale and criteria for evaluating the practice report

Rating "Excellent"

A) The program of practice is completed in full.

B) The head of the enterprise rated the student's work as "Excellent".

C) The report is written correctly, in full compliance with the requirements.

D) The report is submitted on time to the head of the department.

E) Oral report and answers to questions are complete and competent.

Rated "Good"

A) The program of practice is completed in full.

B) The report is submitted in due time to the head of the department.

C) The report is written correctly, in full compliance with the requirements.

D) The head of the enterprise rated the student's work as "Good";

E) Roughness in the presentation of the material, inaccuracies in the answers to questions that are corrected after clarifying questions.

Grade "Satisfactory"

A) The program of practice is completed in full.

B) Supervisor from enterprises appreciated the work student to "Satisfactory";

C) The report is written correctly, in full compliance with the requirements.

D) The report is submitted on time to the head of the department.

E) Roughness in the presentation of the material, inaccuracies in the answers to questions that are not always corrected after clarifying questions.

Grade "Unsatisfactory"

A) The practice program has not been fully implemented.

B) The manager from the enterprise rated it as “Unsatisfactory”.

C) The report is not drawn up or is drawn up incorrectly.

D) The report is not submitted on time to the head of the department.

E) Oral report and answers to questions are not complete and not literate.

10. EDUCATIONAL-METHODOLOGICAL AND INFORMATION SUPPORT OF INDUSTRIAL PRACTICE

Main literature

1. Psychology and Pedagogy: textbook. for universities / ed. P. I. Pidkasistogo. - M.: Yurait: Higher. education, 2010. - 714, [6] p.

2. V. A. Slastenin, V. P. Kashirin. Psychology and pedagogy. - 8th ed., erased. - M.: Ed. center "Academy", 2010. - 477, [3] p.

3. Demidova, N.N. Formation of geoecological culture of students in school geographical education: monograph / N.N. Demidov. - N. Novgorod: NGPU, 2011. - 143 p.

4. Smirnov, S.D. Pedagogy and psychology of higher education [Text]: Proc. allowance: from activity to personality / S.D. Smirnov. - M. : Aspect Press, 1995. - 271 p.

5. Smirnov, S.D. Pedagogy and psychology of higher education: from activity to personality [Text]: textbook. allowance for universities / S.D. Smirnov. - M.: Academy, 2003. - 304 p.

6. Yakunin, V.A. Pedagogical psychology: textbook. allowance / V.A. Yakunin. - 2nd ed. - St. Petersburg. : Publishing House of Mikhailov V.A., 2000. - 349 p.

7. Pedagogy [Text]: textbook. for universities / ed. P. I. Pidkasistogo. - M.: Ped. Society of Russia, 2004. - 608 p.

Additional literature:

1. Talyzina N.F. Pedagogical psychology. – M.: academy, 2006. – 288 p.

2. Konarzhevsky Yu.A. Lesson analysis. - M .: Center "Pedagogical search". 2000.

3. Skok G.B. How to analyze your own pedagogical activity: Uchebn. A guide for teachers / Ed. Ed.

Yu.A. Kudryavtsev - M .: Pedagogical Society of Russia. 2001.

11. LOGISTICS AND TECHNICAL SUPPORT OF INDUSTRIAL PRACTICE

B as material and technical support are instruments, apparatus and other technical means of the laboratory in accordance with the profile and subject of the study.

To carry out work related to the implementation of the assignment for practice at FEFU, as well as to organize independent work, students have access to educational laboratories that comply with applicable sanitary and fire safety standards, as well as safety requirements for conducting educational work:

Name of equipped premises and premises for independent work	List of main equipment
Reading rooms of the FEFU Scientific Library with open access to the fund (building A - level 10)	HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW,GigEth,Wi-Fi,BT,usb kbd/ mse,Win7Pro (64-bit)+Win8.1Pro(64-bit),1-1-1 Wty Internet access speed 500 Mbps. Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers
Audience for independent work of students Vladivostok, about. Russian village Ajax, 10, Building M (25.1), room. M621 Area 44.5 m2	Monoblock Lenovo C360G-i34164G500UDK 19.5" Intel Core i3-4160T 4GB DDR3-1600 SODIMM (1x4GB)500GB Windows Seven Enterprise - 17 pieces; Wired LAN - Cisco 800 series; wireless LAN for students provided by a system based on access points 802.11a / b /g/n 2x2 MIMO(2SS).
Audience for practical classes Vladivostok, about. Russian village Ajax, 10, Building L,	Computer class: 15 workstations with access to the FEFU local network and the Internet; monoblock HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB

room. L 403, area 30.6 m2	HDD 7200 SATA, DVD+/-RW, GigEth, Wi-Fi, W, usb kbd/ mse, Win7Pro(64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty.

Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers.

B in order to provide special conditions for the education of disabled people and people with disabilities in FEFU, all buildings are equipped with ramps, elevators, lifts, specialized places equipped with toilets, information and navigation support signs.

ANNEX 1

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE:
Head of OP
_____FULL NAME.
"____" _____20__

INDIVIDUAL TASK

By _____
(type of practice)

student _____groups _____
(Name of the student)

Educational program 06.04.01 Biology, master's program "Molecular and Cellular Biology" (together with NSCMB FEB RAS)_____

Base (place, organization) of practice_____
_____

Terms of practice from _____20___ to _____ 20___

Generalized task statement	

Job Schedule

Name of the tasks (activities) that make up the task	Task completion date (activities)
1.	
2.	
3.	

Practice leader _____ _____
signature Full name, position

APPENDIX 2

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIARY

according to _____ practice
student _____ group _____
program_____
Place of practice _____
Term of practice _____ weeks_____

Head of practice from FEFU
_____
Head of practice from a specialized organization
_____

7. Student's calendar schedule

No. p \ p	Name of works	calendar dates		Surname of the he the practice
		Start	ending	

8. Student work diary

date	Brief summary of the trainee's work	Signature leader

9. Report protection results

The report is protected by "____" _____ 20___

Rated _____

Department Director _____ AND ABOUT. Surname

APPENDIX 3

Practice Report Title Page Form

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

The report is protected with an estimate
_____
"_____" _____ 20__

Supervisor
educational program
_____ Surname I.O.

.

REPORT

on industrial practice. Practice for obtaining professional skills and experience in teaching
(full name of the profile organization)

Student of _____ group _____ (_____)
Signature Full name
Practice leader
from a specialized organization_____ (_____)
Signature Full name

Practice leader
from FEFU_____ (_____)
Signature Full name

APPENDIX 4

Form of referral to educational practice

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)
DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIRECTION
for work practice

student__ master's course
_Surname First name Patronymic of the group _____
(Full Name)

sent to _____
name of the base organization

address _____

Order on referral to industrial practice dated No. _____
for passing_____
in the direction of preparation 06.04.01 Biology
for a period from _____ 20 to _____ 20 (continuous / discrete)

Supervisorindustrial practice.
Research work

M.P. _____ _____ _____
(position, academic title) (signature) (I.O.F)

Marks on completion and timing of practice

Business name	Check-in and check-out	Signature, signature transcript, seal
Name of the enterprise, organization in accordance with the contract	Arrived __.__.20__	
	Dropped out __.__.20__	

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)
INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE
Director of the Institute of Life Sciences
and Biomedicine (Schools)

Yu.S.Khotimchenko
Full name

December 21, 2021

INTERNSHIP WORKING PROGRAM Industrial practice. Practice for obtaining professional skills and experience in research activities

06.04.01 Biology

Master's program

Name of the educational program: Molecular and Cellular Biology (together with NSCMB FEB RAS)

Vladivostok
2021

1. OBJECTIVES OF LEARNING PRACTICE

The objectives of the practical training "Practice for obtaining professional skills and experience in research activities" are to consolidate and deepen the theoretical training of undergraduates in the disciplines of the variable parts of the OPOP "Molecular and Cellular Biology (together with the NSCMB FEB RAS)", as well as to obtain professional competencies in the preparation future final qualifying work (WQR). The purpose of this practice isto form students' skills and develop the competencies of research activities, allowing them to solve professional problems.

2. OBJECTIVES OF PRACTICE

The tasks are:

– preparation of objects and mastering the methods of research, analysis and processing of experimental data obtained during the execution;

– development of modern information technologies and software products used for scientific research in the field of biotechnology;

– obtaining biological material for laboratory research;

– participation in laboratory and biomedical research according to a given methodology;

– analysis, systematization and generalization of scientific and technical information on the topic of research;

– selection of technical means and methods of work, work on experimental facilities, preparation of equipment;

– analysis of the obtained laboratory biological information using modern computer technology;

– assessment of the scientific and practical significance of ongoing research and the reliability of the results;

– the formation of skills in the presentation of the results of scientific research (formulation of a report, writing scientific articles, abstracts of reports).

– the study of scientific and technical information, the performance of literary and patent searches on the subject of the study;

– mathematical modeling of processes and objects based on standard computer-aided design packages;

– performance of experimental studies and tests according to a given methodology, mathematical processing of experimental data;

– participation in the implementation of research and development results;

– preparation of data for reporting, reviews, scientific publications;

– participation in activities for the protection of intellectual property.

1. THE PLACE OF PRACTICE IN THE STRUCTURE OF THE OPOP

"Internship. Practice for obtaining professional skills and experience in research activities" is included in Block 2 "Practices" of the curriculum (B2.V.03(P)). It is a type of training sessions that are directly focused on the professional and practical training of students. The practice is based on the knowledge and skills gained in the process of studying the disciplines: "Molecular Biology", "Project Management and Methodology of Scientific Research", "Bioinformatics", "Biostatistics", "Molecular Biology of the Cell", "Methodology and methods of teaching natural sciences disciplines", "Molecular genetics, human genetics", "Biomedical cell technologies", "Comparative histology", "Immunology", "Commercialization of developments and transfer of technologies", "Modeling and analysis of big data in biology", "Molecular and cellular mechanisms of carcinogenesis", "Research seminar "Modern problems of molecular and cellular biology"", "Industrial practice. Research work", "Educational practice. Practice in the direction of professional activity.

4.TYPES, METHODS, PLACE AND TIME OF INTERNSHIP

- Type of practice - Production practice.
- Type of practice - Production practice. Practice for obtaining professional skills and experience in research activities
- Method of carrying out - stationary / visiting.
- The form of holding is concentrated.

Industrial practice is carried out in the 4th semester on the 2nd course (labor intensity according to the curriculum 21 z.u.).

The supervision of the internship is carried out by the supervisor of the undergraduate in agreement with the head of the master's program.

For persons with disabilities and the disabled, the choice of places for internship is consistent with the requirement of their accessibility for these students, and the practice is carried out taking into account the peculiarities of their psychophysical development, individual capabilities and health status.

5. STUDENT COMPETENCES FORMED AS A RESULT OF INTERNSHIP

The internship process is aimed at developing the following competencies:

Code and name of professional competence	PS code (if PS is available) or reference to other	Labor function code (if there is a	Competence achievement indicators

	grounds	PS)	
Type of tasks of professional activity: research			
PC-1 Able to creatively use in scientific and industrial-technological activities the knowledge of fundamental and applied sections of disciplines (modules) that determine the field of activity of molecular and cellular biology.			PC-1.1 Works with scientific and technical information and specialized literature, studies the achievements of domestic and foreign science in the field of molecular and cellular biology using new technologies and electronic databases. PC-1.2 Comprehends and formulates diagnostic solutions to the problems of molecular and cellular biology by integrating fundamental biological concepts and specialized knowledge in the field of professional activity PC-1.3Uses in scientific and industrial-technological activities the knowledge of fundamental and applied sections of disciplines that determine the field of activity of molecular and cellular biology
PC-2 Able to apply the methodological foundations of design, laboratory biological, environmental research, use modern equipment and computer systems in molecular and cellular biology.			PC-2.1Develops rules and algorithms for designing, performing laboratory biological, environmental studies. PC-2.2Performs laboratory biological, environmental research using the scientific methodological foundations of fundamental research. PC-2.3 Applies the methodological foundations for designing, performing laboratory biological and environmental studies, uses modern equipment and computer systems in molecular and cellular biology.
PC-3He is able to conduct research on biopolymers, their components and complexes, the structure and function of genes and genomes.			PC-3.1 Studying the structure and functions of biopolymers, their components and complexes, mechanisms of storage, transmission and implementation of genetic information at the molecular level; PC-3.2 Describes in detail the main processes occurring in a living cell: the processes of replication, transcription, translation,

			recombination, repair, RNA and protein processing, protein folding and docking. PC-3.3 Explores the main methods of intermolecular interactions and mutual regulation of the processes of functioning of a living cell as part of a multicellular organism. PC-3.4 Analyzes the structure and functions of genes and genomes, conducts structural and functional analysis of individual proteins and the proteome as a whole.
PC-4 Able to conduct scientific research in molecular and cellular biology in order to develop the scientific potential of the Russian Far East and develop the resources of the World Ocean.			PC-4.1 Carries out the rationale for scientific research in molecular and cellular biology in order to develop the scientific potential of the Russian Far East and the development of the resources of the World Ocean. PC-4.2 Performs applied and exploratory research and development in molecular and cellular biology aimed at developing the scientific potential of the Russian Far East and developing the resources of the World Ocean. PC-4.3 Interprets the results of scientific research in molecular and cellular biology aimed at developing the scientific potential of the Russian Far East and developing the resources of the World Ocean.
PC-5Able to conduct a systematic analysis of the relationships between cells, tissues and functional systems of organisms.			PC-5.1 Studies the relationship of cells, tissues and functional systems of organisms. PC-5.2 Explores the relationship of cells, tissues and functional systems of organisms. PC-5.3 Conducts a systematic analysis of the relationships between cells, tissues and functional systems of organisms.
PC-6 Able to develop experimental models, methods of cytological diagnostics, morphometry, marker histo- and cytochemistry, etc.			PC-6.1 Designs and carries out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions

			PC-6.2 Develops and critically evaluates an experimental research model in the field of cytology and histology PC-6.3Performs histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry
PC-7 Able to develop new drugs, conduct biomedical research using living organisms and biological systems of various levels of organization.			PC-7.1 Carries out the justification of biomedical research with the aim of developing medicines using living organisms and biological systems of various levels of organization. PC-7.2 Defines the goals and objectives of biomedical research and drug development. Plans biomedical research, selects the design of scientific research in accordance with the goals and objectives. PC-7.3Conducts biomedical research using living organisms and biological systems of various levels of organization, analyzes the results. PC-7.4 Interprets the results of biomedical research and development in order to elucidate the molecular mechanisms of biochemical processes.

2. STRUCTURE AND CONTENT OF INTERNSHIP

The total labor intensity of the industrial practice is 21 CU, 14 weeks, 756 hours.

Section (stage) of practice	Type of educational work in practice, including independent work of students and labor intensity (in hours)				Current control form
	Briefing on safety, compliance with sanitary and hygienic rules and pharmaceutical order at the workplace.	Consultation	Collection, processing of material	Independent work	
1.Preparatory stage:Preparatory (organizational) stage: – obtaining	6	6	40	6	Attendance check. Safety briefing and test. Checking the execution of the stage.

documents for practice (referral, diary, individual task); – arrival at the place of practice and passing introductory, primary and briefing at the workplace; – organization of the workplace and acquaintance with the team.					
– 2.Main stage:familiarization with the basic methods of work in biochemical and cultural laboratories, as well as safety precautions when working in the laboratory; – selection of technical means and methods of work, work on experimental facilities, preparation of equipment; – preparation of objects and development of research methods; – acquisition of practical skills in preparing solutions for biochemical methods and cell culture methods; – acquisition of skills in working with laboratory animals and isolation of	– safety briefing in the laboratory; – fulfillment of practice tasks in accordance with the program and individual task; – study of materials and documents at the place of internship; – processing and analysis of the received practice materials.	6	350	48	Attendance check. Presentation of the collected materials to the head of the practice. Checking the execution of the stage.

biomaterial; – mastering the method of isolation and fractionation of high-molecular protein compounds; – acquisition of skills in working with cell culture in a laminar box: defrosting, transplanting, changing the medium and freezing.					
– 3.Final stage:processing and systematization of the received material; – registration of a report on the passage of industrial practice; – defense of the work practice report.	– systematizati on of the material; – execution of an individual task; – writing a report; – preparing a presentation; report protection.	6	226	6	Attendance check. Testing. Checking the execution of the stage.
4. Report preparation	-	6	thirty	20	Submission and defense of practice reports
Total	6	24	646	80	
Total	756				

Carrying out research work includes the fulfillment of tasks on the preparation of the final qualification work.

The result of the research work is: the collection of factual material in the course of scientific research and the testing of the results on the topic of the final qualification work, including the development of a methodology for collecting data, methods for processing the results, assessing their reliability and sufficiency to complete the work on the WRC.

3. EDUCATIONAL AND METHODOLOGICALSECURITYSTUDENTS' INDEPENDENT WORK DURING PRACTICE

The practice of obtaining professional skills and experience in research activities is aimed at familiarizing students with the material and technical support of the laboratory of cell technologies, software and modern methods of laboratory research and testing.

During the practice of obtaining professional skills and experience in research activities, regardless of the place of its passage, students should pay special attention to issues related to life safety and labor protection. To do this, it is necessary to consider the principles of state and public control over compliance with labor laws, the organization of the life safety service and its tasks.

The practice of obtaining professional skills and experience in research activities begins with the preparation of a general description of the laboratory, its functions, a description of the structure of the laboratory, a program of research activities, and the study of development directions.

Independent work (SIW) is an integral part of the educational process and is necessary for the formation of undergraduates' skills and abilities to conduct scientific activities, the formation of abilities to independently plan and implement scientific experiments, as well as analyze materials and draw reasonable conclusions. During the internship, students systematize, strengthen and expand theoretical knowledge, are formed as specialists in their field of research.

Independent work is carried out on the basis of an individual assignment for practice, designated by the supervisor.

Independent work includes setting goals and objectives, working with literary sources on the research topic, choosing and mastering methods to achieve the goals, setting up an experiment, as well as analyzing the results and writing a report.

According to the curriculum for industrial practice, 738 hours are provided. independent work and 18 hours. controlled independent work (CSR) per semester (semester 4). The CSR includes the development of an internship plan, the formulation of the goals and objectives of the study, the provision of a literature review on the research topic to the head, the compilation and writing of a practice report and its defense at a department meeting, after checking by the head.

The structure for compiling a report on the results of an internship and recommendations for keeping an internship diary are located in Appendices No. 1-3.

Independent work of master's students is regulated by certain documents. These include:

a) GEF 3 in direction 06.04.01 "Biology";

b) documents defining the procedure and specifics of production practice:

- the program of industrial practice of students in the direction 06.04.01 "Biology";
- direction for internship;
- a report on the internship completed by the student;
- feedback on the internship

c) methodological literature of the laboratory

The specific content of the individual task and the schedule depends on the specifics of the institution and the laboratory, the research topics in the laboratory and the specific research topic of the trainee.

9. FORMS OF CERTIFICATION (BY THE RESULTS OF PRACTICE)

The form of attestation in practice is a test with an assessment.

The form of attestation based on the results of the practice: defense of the report at the meeting of the department with the provision of a written report on the practice, verified by the head of the practice, practice diary.

Reporting procedure

Report on “Manufacturing practice. Practice for obtaining professional skills and experience in research activities" includes: a brief description of the results of the work in accordance with the tasks according to the plan for conducting a real research project carried out by the student within the approved topic of scientific research in the direction of study and the topic of the final qualifying work, the results achieved, analysis of the problems encountered and options for their elimination, a list of sources used (printed publications and electronic resources - textbooks, manuals, reference books, standards, reports, Internet resources, etc.), applications (documents or materials taken from the main part of the report, illustrative).

The report is compiled during the execution of tasks of the main stage of work.

The report is drawn up in accordance with the requirements of the standards of requirements for the design of written work performed by students and trainees of FEFU.

The report is submitted in printed form (title page according to the established form) and in electronic form (report file, including the title page).

Form of certification: protect the report.

Before the internship, the student receives an individual task from the head of the practice from the University, the content and scope of which are negotiated with the head of the practice.

Based on the results of the internship, the student draws up a report on the internship, participates in the final conference with a presentation of the results of the internship, after which he receives a credit with an assessment.

The practice report should contain the following elements:

− title page (Appendix 3);

- task and schedule of practice (Appendix 1);

− a document confirming the fact of internship;

- a description compiled by the head of practice from an organization or structural unit, if the practice is carried out on the basis of FEFU;

− content;

− introduction (modern problems and methods of molecular biotechnology, the place of cell biology and its methodological approaches in the system of biological sciences);

− the main part about activities in the process of internship;

− completed individual task;

− conclusion;

− sources of information;

The report is drawn up in accordance with the "Requirements for the design of written work performed by students and students of FEFU".

Approximate structure of the main part of the report:

1. General information about the laboratory and its brief description (history, list of structural units with their purpose; description of the functions of the laboratory, research programs, description of development directions).

2. Description of technical means and methods of work, work on experimental facilities, preparation of equipment and research objects.

3. Planning an experiment and building a model using the example of growing microorganisms.

4. Description of methods and techniques of genetic engineering.

5. Description of methods for carrying out the transformation of a biological object.

6. Technique for registration of transformation, detection of inserted genes and their expression.

By agreement with the internship supervisor from the University and depending on the place of this type of internship, the structure of the report or its individual parts may change.

After completing the practice and completing the report in accordance with the requirements, the student submits his report for protection to the head of the university.

Based on the results of the defense, a test is given with an assessment (excellent, good, satisfactory, unsatisfactory):

"Excellent" - the necessary practical skills and professional competencies, provided for by the program of educational practice, are fully formed, the tasks are completed, the quality of their performance is estimated by a number of points close to the maximum.

"Good" - the necessary practical skills and professional competencies provided for by the program of educational practice are fully formed, the tasks are completed, the quality of none of them is rated with the minimum number of points, some types of tasks are completed with errors or not thoroughly enough.

"Satisfactory" - the necessary practical skills and professional competencies are basically formed, the gaps are not significant, some of the completed tasks contain errors.

"Unsatisfactory" - the necessary practical skills and professional competencies provided for by the program of training practice are not formed, all completed training tasks contain gross errors, additional independent work on the report materials will not lead to any significant improvement in the quality of assignments.

When grading a master's student in the practice test, the following criteria are used.

Grade "excellent" is given to a master student who: completed the tasks on time, in full and correctly; when defending and writing a report, he demonstrated a deep and solid assimilation of the program material on the tasks of practice; exhaustively, consistently, clearly and logically expounds it; owns versatile skills and techniques for performing research tasks; prepared a report in accordance with the requirements.

Rated "good"undergraduatewho: completed the practice tasks on time, but with minor comments; PDuring the defense and writing of the report, he demonstrated a solid knowledge of the program material on the assignments of the practice; competently and to the point sets it out, avoiding significant inaccuracies in answering questions; owns the necessary skills and techniques for their implementation; prepared a reportwith minor remarks.

The rating "satisfactory" is putundergraduate, who: made miscalculations and mistakes when performingpractice assignments, did not fully complete the tasks of the practice;has knowledge of only the basic material on the assignments of practice, but has not mastered its details; allows inaccuracies, insufficiently correct formulations, violations of the logical sequence in the presentation of program material on the assignments of practice; draws superficial conclusionsprepared a report with comments.

The rating "unsatisfactory" is putundergraduatewho: did not complete the assignments of practice, or completed with gross violations of the requirements; did not

submit a practice report, or prepared a report with gross violations of the requirements; does not know much of the softwarepractice assignment material, makes significant mistakes, uncertainly, with great difficulty, performs research work.

10. EDUCATIONAL AND INFORMATIONAL SUPPORT OF SCIENTIFIC RESEARCH WORK

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11. LOGISTICS AND TECHNICAL SUPPORT OF SCIENTIFIC RESEARCH WORK

11.1 Scientific laboratories of biomedical cellular technologies equipped with the following equipment:

– Robotic system for automated cell cultivation CompacT SelecT SC - APM, with a module for preparing plates for analysis, THE AUTOMATION PARTNERSHIP;

– System for continuous monitoring of live cells in culture, formation and analysis of images Cell-IQ MLF, Chip Technologies, Czech Republic;

– System of deep optical imaging of biomaterials FluoView FV1200MPE (FV12M-5XX-3XX);

– Incubator personal CO2 - with a system for monitoring and increasing the vitality of cells Galaxy (CO48R-230-1200);

– Spectrophotometer with accessories for BioSpectrometer-kinetic sample processing;

– Device for polymerase chain reaction with detection of amplification products in the "real time" mode CFX96 Touch Real Time System;

– System for volumetric fixation and preparation of deposited biosamples in the Volume Fixation System kit;

– Multimodular station for rotary sedimentation processing of samples Sediment Modules;

– Automated system Biacore X100 System for the analysis of intermolecular interactions with a set of additional parts and software;

– DNA sequence analysis system Ion S5™ XL System + Starter kit for testing and commissioning the system;

– Genetic analyzer Applied Biosystems 3500 + Set of consumables Starter kit for checking the performance and commissioning of the system;

– Cell sorter high-speed MoFlo Astrios EQ

– Sample preparation system for whole genome sequencing Ion Chef™ Instrument + Starter kit for testing and commissioning the system.

11.2 Reading rooms of the FEFU Scientific Library with open access to the fund (building A - level 10):

HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW,GigEth,Wi-Fi,BT,usb kbd/ mse,Win7Pro (64-bit)+Win8.1Pro(64-bit),1-1-1 Wty Internet access speed 500 Mbps. Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers.

For persons with disabilities and the disabled, the choice of places for internship is consistent with the requirement of their accessibility for these students, and the practice is carried out taking into account the peculiarities of their psychophysical development, individual capabilities and health status.

12. LIST OF INFORMATION TECHNOLOGIES AND SOFTWARE

12.1 Programs:

– Microsoft Office Professional Plus 2010 - an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.);

– 7Zip 9.20 is a free file archiver with a high degree of data compression;

– ABBYY FineReader 11 is a program for optical character recognition;

– Adobe Acrobat XI Pro - a software package for creating and viewing electronic publications in PDF format;

– ESET Endpoint Security is a comprehensive protection of workstations based on Windows OS. Virtualization support + new technologies;

– WinDjView 2.0.2 - a program for recognizing and viewing files with the same name format DJV and DjVu;

12.2 Local network resources:

– Reference and legal system Garant operating system – Microsoft Windows Linux (with WINE@Etersoft) iOS Android, etc.;

– Computer reference legal system ConsultantPlus - operating system Microsoft Windows, Linux (with WINE), Apple iOS Android, Windows Phone;

– Professional help system Techexpert - Microsoft Windows, Linux, FreeBSD operating systems.

12.3 Educational software packages:

– 1C Enterprise 8.2, (educational version), version 8.2.13.205, training software package;

– Windows Seven Enterprise, version SP3x64, operating system

– Eset NOD32 Antivirus, version 4.2.76.1, malware detection tool;

– Microsoft Office 2010 Professional Plus Version 14.0.6029.1000 Office Suite;

– Microsoft Office Professional Plus 2013 Version 15.0.4420.1017 Office Suite;

– Microsoft Visual Studio 2012 Professional, version 11.0.50727.26, learning suite;

– Microsoft Visual Studio 2013 Community, version 12.0.31101, learning suite;

– 7-Zip, version 9.20.00.0, training package;

– Abbyy FineReader 11, version 11.0.460, educational software package;

– Adobe Acrobat XI Pro, version 11.0.00, training suite of programs;

– Adobe Photoshop CS6, version 13.0, Educational software package;

– Autodesk 3DS Max Design 2013 Version 15.0.0.347 Tutorial;

– Autodesk 3DS Max Design 2015 Version 17.1.149.0 Tutorial;

– Autodesk Autocad 2012, version 18.2.51.0, training software package;

– Autodesk Autocad 2013, version 19.0.55.0, educational software package;

– Autodesk Autocad 2013, version 19.0.59.0, educational software package;

– Autodesk Autocad 2015 version 20.0.51.0, training package;

– Autodesk Autocad Architecture 2013, version 7.0.50.0, learning suite;

– Autodesk Autocad Electrical 2016, version 20.0.46.0, learning suite;

– Autodesk Autocad Revit 2013, version 12.02.21203, training software package;

– Autodesk DWG TrueView 2013 Version 19.0.55.0 Tutorial;

– Autodesk Invertor 2015, version 19.0.15900.0000, learning suite;

– Autodesk Revit 2015 Version 15.0.207.0 Tutorial;

– Google Chrome, version 42.0.2311.90, web browser;

– CoreDraw Graphics Suite X3. version 13.0.0.739, training software package;

– CoreDraw Graphics Suite X6, Version 16.1.0.843, Tutorial;

– Free Pascal, version 2.6.4, a training set of programs;

– Gimp 2.8.10, version of Gimp 2.8.14, a graphics package for teaching students;

– GNU Octave, version 3.8.2, a training package;

– MySQL Community, version 5.6, a training complex for databases;

– MySQL Database, version 5.5.23, database training suite.

13. PROVISION OF RESOURCES FOR THE ELECTRONIC LIBRARY SYSTEM AND THE ELECTRONIC INFORMATION AND EDUCATIONAL ENVIRONMENT

Name of the document with details	Document validity period
Sublicense agreement Springer/34 dated 12/25/17 minescience	25.12.19-31.12.20
Competition of the Ministry of Education and Science. Clarivate Analytics (Scientific) LLC Web of Science database dated 04/01/17	01.04.19-31.03.20
Contract No. P-1370-16 dated January 09, 2017 EBS “Lan” “Engineering and technical sciences. Mathematics. Computer science. Physics. Theoretical mechanics. Chemistry"	01.02.2019-31.01.2020
Agreement No. R-61-17 dated 01/25/2017. EBS “Lan” “Psychology. Pedagogy", "Physical culture and sport")	01.03.2019-28.02.2020
Agreement No. R-62-17 dated 01/25/2017. EBS “Student Consultant” “Medicine. Health care", "Architecture and construction", "Engineering"	Until 03/30/2020
Agreement No. 12 / IA / 17 dated 03/09/2017 EB Grebennikov Publishing House	01.05.2019-30.06.2020
Contract No. SIO-262/17 dated March 16, 2017 SCIENCE INDEX (NEB)	04/12/2019-05/02/2020
Agreement No. R-234-17 dated March 24, 2017 to Ross Intellect Service LLC. Access to the electronic journal of the publishing house "Aktion MTsFER" "Glavbukh"	01.05.2019-30.04.2020
Agreement No. R-230-17 of 04/03/2017. Scientific journals on the ELIBRARY platform (RUNEB)	03.04.19-02.04.20
Agreement No. R-288-17 of 04/06/2017. EBS_URIGHT	02.05.19-01.05.20
Contract No. R-155-17 dated May 2, 2017 EBSCO	02.05.19 – 01.05.20

Contract No. R-396-17 dated May 3, 2017. IVIS LLC Librarianship	01.06.19-31.05.20
Agreement R-472-17 dated 05/24/17. RUKONT electronic versions of educational and scientific publications in Russian	06/05/2019-06/04/2020
Contract R-473-17 dated May 24, 2017 Electronic Library of Dissertations of the RSL	07/12/2019-07/11/2020
Contract R-470-17 dated May 24, 2017 ELS "University Library Online"	06/06/2019-06/05/2020
Agreement R-505-17 dated May 31, 2017 EBS Lan "Technology of food production"	07/01/2019-06/30/2020
Contract No. P-699-17 of 08/01/2017 EBS INFRA-M (EBS ZNANIUM.COM)	08/01/2019-07/31/2020
Agreement No. R-595-17 dated June 19, 2017 IVIS LLC Questions of History	07/05/2019-07/06/2020
Contract No. R-596-17 dated June 19, 2017 IVIS LLC Literature Issues	07/05/2019-07/06/2020
Contract N2931/17 (EU0181626) dated July 3, 2017 IP Air Media LLC EBS IPRbooks (basic version)	09/01/2019-08/31/2020
Contract No. R-889-17 dated August 28, 2017, IVIS LLC “Publications on Defense and Security Issues”.	09/01/2019-08/31/2020
Agreement No. R-880-17 dated 28.08.17 LLC "IVIS base of electronic periodicals of the East View company "Publications in social and human sciences"	09/01/2019-08/31/2020
Agreement No. P-882-17 dated 28.08.17 LLC "IVIS" base of electronic periodicals of the East View company "Statistical publications of Russia and the CIS countries"	09/01/2019- 08/31/2020
Contract 1-12310992873 of 06/01/2017 Publisher Elsevier BV Sci Val Integrated Modular Platform: SciVal Collaboration; SciVal Trends; SciVal Overview; SciVal Benchmarking	06/01/19 – 05/31/20
Agreement (LICENSE AGREEMENT) R-672-17 of 25.08.2017 Tongfang Knowledge Network Technology Co., Ltd., Beijing, China.	08/25/19 – 08/25/20
Sublicense agreement No. R-700-17 (EU0182507) dated August 03, 2017. Clarivate Analytics (US) LLC Journal Citation Report database on the InCites platform	03.08.17 – 02.08.20
Agreement R-1377-17 dated 12/27/17 Non-commercial partnership "National Electronic Information Consortium" NP "NEIKON". Databases and software products from Clarivate Analytics (US) LLC InCites Benchmarking & Analitics	12/27/19 – 12/27/20
Sublicense agreement No. Scopus/261 dated 09.01. 2018 Scopus	09/01.2018 -31.12.2020
Sublicense Agreement No. IEEE/34 dated January 09, 2018. IEEE/IEL database (The Institute of Electrical and Electronics Engineers, Inc)	09.01.18-30.06.20
Sub-license agreement No. RSC/34 dated May 25, 2018	05/25/18-06/30/20
Sublicense Agreement No. Wiley/34 dated 01/09/18 Wiley Journals (Wiley Online Library by Wiley Subscription Services). Competition of the Ministry of Education and Science	09.01.18-30.06.20
Sublicense agreement No. SCI/34 dated 01/09/18	09.01.18-30.06.20
Sublicense agreement No. Questel/34 dated 09.01.18 ORBIT patent base Competition of the Ministry of Education and Science	09.01.18-30.06.20
Sub-license agreement No. ProQuest/34 dated January 09, 2018	09.01.18-30.06.20

Sublicense Agreement MathSciNet/ 34 of January 01, 2018 MathSciNet Database of the American Mathematical Society	09.01.18-30.06.20
Sublicense agreement No. INSPEC/34 dated 01/09/18 INSPEC database Competition of the Ministry of Education and Science	09.01.18-30.06.20
Sublicense Agreement No. CUP/34 dated 01/09/18 Scientific journals published by Cambridge University Press.	09.01.18-30.06.20
Sublicense Agreement No. CASC/34 dated January 9, 2018 EBSCO Publishing Computer Applied Sciences Complete Database	09.01.18-30.06.20
Sublicense Agreement No. AIP/34 dated January 9, 2018. Scientific journals of the American Institute of Physics Press.	09.01.18-30.06.20
Sublicense Agreement No. APS/34 dated January 9, 2018 APS Online Journals Database	09.01.18-30.06.20
Sublicense agreement No. IOP/34 dated 01/09/18 Scientific journals of the publishing house of the Institute of Physics (Great Britain)	09.01.18-30.06.20
Sub-license agreement No. T&F/34 09.01.18 Taylor & Francis Group magazines "Social Sciences and Humanities" and "Natural Sciences and Technologies" Competition of the Ministry of Education and Science	09.01.18-30.06.20
Agreement No. 1415-17 dated 01/26/2018. EBS "Lan" Engineering and technical sciences. Mathematics. Computer science. Physics. Theoretical mechanics. Chemistry	01.02.2018-31.01.2020
Contract No. R-70-18 dated May 30, 2018 EBS "Lan" Psychology. Pedagogy, Physical culture and sports	07/01/2018-06/30/2020
Agreement No. R-509-18 dated 06/15/2018. EBS “Student Consultant” “Medicine. Health care”, “Architecture and construction”, “Mechanical engineering”, “Energy”, Publishing house “Vostochnaya kniga”, Publishing house “Flinta” “Linguistics and literary criticism”	07/01/2019-06/30/2020
Contract No. 24/IA/18 dated 06/15/2018 EB Grebennikov Publishing House	07/01/2019- 06/30/2020
Contract No. R-672-18 dated July 11, 2018 EBS_YURIGHT	17.09.2019 -16.09.2020
Agreement No. RT-046/18 dated June 15, 2018 RUKONT electronic versions of educational and scientific publications in Russian	01.03.2019-28.02.2020
Contract No. R-699-18 dated 03.07.2018 EBS "Lan" Food production technology	08/01/2019-07/31/2020
Contract No. R-656-18 dated July 12, 2018 EBS INFRA-M (EBS ZNANIUM.COM)	08/01/2019-07/31/2020
Agreement No. P-803-18 dated 14.08.2018 LLC "IPR Media" EBS IPRbooks (basic version)	09/01/2019- 08/31/2020
License Agreement No. P-979-18_ with Tongfang Knowledge Network Technology Co., Ltd., Beijing China dated September 24, 2018	01.10.19 – 30.09.20

ANNEX 1

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE:
Head of OP
_____FULL NAME.
"____" _____20__

INDIVIDUAL TASK

By _____
(type of practice)

student _____groups _____
(Name of the student)

Educational program 06.04.01 Biology, master's program "Molecular and Cellular Biology" (together with NSCMB FEB RAS)_____

Base (place, organization) of practice_____
_____

Terms of practice from _____20___ to _____ 20___

Generalized task statement	

Job Schedule

Name of the tasks (activities) that make up the task	Task completion date (activities)
1.	
2.	
3.	

Practice leader _____ _____
signature Full name, position

APPENDIX 2

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIARY

according to _____ practice
student _____ group _____
program_____
Place of practice _____
Term of practice _____ weeks_____

Head of practice from FEFU
_____
Head of practice from a specialized organization
_____

10. Student's calendar schedule

No. p \ p	Name of works	calendar dates		Surname of the he the practice
		Start	ending	

11. Student work diary

date	Brief summary of the trainee's work	Signature leader

12. Report protection results

The report is protected by "____" _____ 20___

Rated _____

Department Director _____ AND ABOUT. Surname

APPENDIX 3

Practice Report Title Page Form

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

The report is protected with an estimate
_____
"_____" _____ 20__

Supervisor
educational program
_____ Surname I.O.

.

REPORT

on industrial practice. Practice for obtaining professional skills and experience in research activities
(full name of the profile organization)

Student of _____ group _____ (_____)
Signature Full name
Practice leader
from a specialized organization_____ (_____)
Signature Full name

Practice leader
from FEFU_____ (_____)
Signature Full name

APPENDIX 4

Form of referral to educational practice

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)
DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIRECTION
for work practice

student__ master's course
_Surname First name Patronymic of the group _____
(Full Name)

sent to _____
name of the base organization

address _____

Order on referral to industrial practice dated No. _____
for passing_____
in the direction of preparation 06.04.01 Biology
for a period from _____ 20 to _____ 20 (continuous / discrete)

Supervisorindustrial practice.
Research work

M.P. _____ _____ _____
(position, academic title) (signature) (I.O.F)

Marks on completion and timing of practice

Business name	Check-in and check-out	Signature, signature transcript, seal
Name of the enterprise, organization in accordance with the contract	Arrived __.__.20__	
	Dropped out __.__.20__	

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE
Director of the Institute of Life Sciences
and Biomedicine (Schools)

Yu.S.Khotimchenko
Full name

December 21, 2021

INTERNSHIP WORKING PROGRAM Industrial practice. Undergraduate practice, including research work
06.04.01 Biology
Master's program
Name of the educational program: Molecular and Cellular Biology (together with NSCMB FEB RAS)

Vladivostok
2021

1. OBJECTIVES OF MASTERING INDUSTRIAL PRACTICE

The goals of undergraduate practice are to consolidate the theoretical knowledge gained in the study of basic and professional disciplines; acquisition of professional skills in future professional activities; the formation of competencies that meet the requirements of the main professional educational program, the presentation of the results of scientific research in the form of a master's thesis in the field of "Biology" (master's program "Molecular and Cellular Biology (together with the NSCMB FEB RAS)") and preparation for the defense of a master's thesis.

2. OBJECTIVES OF INDUSTRIAL PRACTICE

The tasks of undergraduate practice are:

– the study of scientific and technical information, the performance of literary and patent searches on the subject of the study;

– collection and analysis of biomedical and scientific and technical information, as well as generalization of domestic and foreign experience in the field of biotechnology, analysis of patent literature;

– performance of experimental studies and tests according to a given methodology, mathematical processing of experimental data;

– carrying out computational experiments using standard software to obtain mathematical models of biological and biotechnical processes and objects;

– preparation of data, preparation of reports and scientific publications based on the results of the work carried out, participation in the implementation of the results in biomedical practice;

– organization of the protection of intellectual property objects and the results of research and development as a trade secret of the enterprise.

– preparation of data for reporting, reviews, scientific publications.

3. THE PLACE OF UNDERGRADUATE PRACTICE IN THE STRUCTURE OF THE OPOP

"Internship. Pre-diploma practice, including research work" is an obligatory section of the main educational program for the preparation of a master, is included in the part formed by the participants in educational relations of Block 2 "Practices" (B2.V.04 (P)). It is a type of training sessions that are directly focused on the professional and practical training of students. The practice is based on the knowledge and skills gained in the process of studying the disciplines: "Molecular Biology", "Project Management and Methodology of Scientific Research", "Bioinformatics", "Biostatistics", "Molecular Biology of the Cell", "Methodology and methods of teaching natural sciences disciplines", "Molecular genetics, human

genetics", "Biomedical cell technologies", "Comparative histology", "Immunology", "Commercialization of developments and transfer of technologies", "Modeling and analysis of big data in biology", "Molecular and cellular mechanisms of carcinogenesis", "Research seminar "Modern problems of molecular and cellular biology"", "Production practice. Research work", "Educational practice. Practice in the direction of professional activity", "Industrial practice. Practice for obtaining professional skills and experience in research activities. Practice in the direction of professional activity", "Industrial practice. Practice for obtaining professional skills and experience in research activities. Practice in the direction of professional activity", "Industrial practice. Practice for obtaining professional skills and experience in research activities.

4. TYPES, METHODS, PLACE AND TIME OF INTERNSHIP

Type of practice - production practice.

Type of practice - Production practice. Undergraduate practice, including research work.

Method of carrying out - stationary / visiting.

The form of holding is concentrated.

Pre-graduation practice takes place at the end of the examination session for 4 semesters, in the amount of 216 hours (6 credits) is carried out:

- At workplaces in laboratories of research institutes,
- In the departments of FEFU,
- In scientific and practical institutions,
- At the Center for Genomic Medicine, SBM FEFU, laboratory of biomedical cellular technologies;
- Federal State Budgetary Institution of Science "National Scientific Center for Marine Biology named after N.N. A.V. Zhirmunsky, FEB RAS, Vladivostok;
- FNTs Biodiversity FEB RAS, Vladivostok;
- Pacific Institute of Bioorganic Chemistry. G.B. Elyakova FEB RAS, Vladivostok;
- Research Institute of Epidemiology and Microbiology named after G.P. Somova, Laboratory of Molecular Microbiology, Vladivostok

Pre-diploma practice is specialized and takes place continuously. The supervision of the internship is carried out by the supervisor of the undergraduate in agreement with the head of the master's program.

For persons with disabilities and the disabled, the choice of places for internship is consistent with the requirement of their accessibility for these students, and the practice is carried out taking into account the peculiarities of their psychophysical development, individual capabilities and health status.

5.STUDENT COMPETENCES FORMED AS A RESULT OF INTERNSHIP

The internship process is aimed at developing the following competencies:

Code and name of professional competence	PS code (if PS is available) or reference to other grounds	Labor function code (if there is a PS)	Competence achievement indicators
Type of tasks of professional activity: research			
PC-1 Able to creatively use in scientific and industrial-technological activities the knowledge of fundamental and applied sections of disciplines (modules) that determine the field of activity of molecular and cellular biology.			PC-1.1 Works with scientific and technical information and specialized literature, studies the achievements of domestic and foreign science in the field of molecular and cellular biology using new technologies and electronic databases. PC-1.2 Comprehends and formulates diagnostic solutions to the problems of molecular and cellular biology by integrating fundamental biological concepts and specialized knowledge in the field of professional activity PC-1.3Uses in scientific and industrial-technological activities the knowledge of fundamental and applied sections of disciplines that determine the field of activity of molecular and cellular biology
PC-2 Able to apply the methodological foundations of design, laboratory biological, environmental research, use modern equipment and computer systems in molecular and cellular biology.			PC-2.1Develops rules and algorithms for designing, performing laboratory biological, environmental studies. PC-2.2Performs laboratory biological, environmental research using the scientific methodological foundations of fundamental research. PC-2.3 Applies the methodological foundations for designing, performing laboratory biological and environmental studies, uses modern equipment and computer systems in molecular and cellular biology.
PC-3He is able to conduct research on biopolymers,			PC-3.1 Studying the structure and functions of biopolymers, their

their components and complexes, the structure and function of genes and genomes.			components and complexes, mechanisms of storage, transmission and implementation of genetic information at the molecular level; PC-3.2 Describes in detail the main processes occurring in a living cell: the processes of replication, transcription, translation, recombination, repair, RNA and protein processing, protein folding and docking. PC-3.3 Explores the main methods of intermolecular interactions and mutual regulation of the processes of functioning of a living cell as part of a multicellular organism. PC-3.4 Analyzes the structure and functions of genes and genomes, conducts structural and functional analysis of individual proteins and the proteome as a whole.
PC-4 Able to conduct scientific research in molecular and cellular biology in order to develop the scientific potential of the Russian Far East and develop the resources of the World Ocean.			PC-4.1 Carries out the rationale for scientific research in molecular and cellular biology in order to develop the scientific potential of the Russian Far East and the development of the resources of the World Ocean. PC-4.2 Performs applied and exploratory research and development in molecular and cellular biology aimed at developing the scientific potential of the Russian Far East and developing the resources of the World Ocean. PC-4.3 Interprets the results of scientific research in molecular and cellular biology aimed at developing the scientific potential of the Russian Far East and developing the resources of the World Ocean.
PC-5Able to conduct a systematic analysis of the relationships between cells, tissues and functional systems of organisms.			PC-5.1 Studies the relationship of cells, tissues and functional systems of organisms. PC-5.2 Explores the relationship of cells, tissues and functional systems of organisms. PC-5.3 Conducts a systematic analysis of the relationships

			between cells, tissues and functional systems of organisms.
PC-6 Able to develop experimental models, methods of cytological diagnostics, morphometry, marker histo- and cytochemistry, etc.			PC-6.1 Designs and carries out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions PC-6.2 Develops and critically evaluates an experimental research model in the field of cytology and histology PC-6.3Performs histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry
PC-7 Able to develop new drugs, conduct biomedical research using living organisms and biological systems of various levels of organization.			PC-7.1 Carries out the justification of biomedical research with the aim of developing medicines using living organisms and biological systems of various levels of organization. PC-7.2 Defines the goals and objectives of biomedical research and drug development. Plans biomedical research, selects the design of scientific research in accordance with the goals and objectives. PC-7.3Conducts biomedical research using living organisms and biological systems of various levels of organization, analyzes the results. PC-7.4 Interprets the results of biomedical research and development in order to elucidate the molecular mechanisms of biochemical processes.

6. STRUCTURE AND CONTENT OF INTERNSHIP

The total labor intensity of undergraduate practice is 6 z.u., 4 weeks, 216 hours.

Practice Stage	Types of work in practice, including independent work student	Labor intensity	Forms of the current
Preparatory (organizational) stage: – obtaining documents for practice (referral, diary, individual task);	– orientation lecture; – safety briefing.	2 h 2 h	diary entry; answers on questions

– arrival at the place of practice and passing introductory, primary and briefing at the workplace; – organization of the workplace and acquaintance with the team.			
Main stage: – studying the organizational structure of the practice base; – study of the management structure of an enterprise (organization, institution); – familiarization with the scientific and production structure and program of the enterprise, prospects and plans for its development; – familiarization with plans to expand the range and improve the quality of the company's services; – fulfillment of the terms of reference for graduate design or graduate research work; – conducting a patent search and literature review on the subject of attestation work; – selection and study of regulatory and technical documents and reference materials necessary for use in the performance of attestation work; – development of a program and methodology for experimental research; – carrying out (if possible) experimental work on the key issues of certification work; – participation in solving individual production and scientific problems of the enterprise (organization, institution).	– safety briefing at the enterprise; – fulfillment of practice tasks in accordance with the program and individual task; – study of materials and documents at the place of internship; – processing and analysis of the received practice materials.	2 h 98 h 40 h 40 h	diary entry; answers on questions
– Final stage: – processing and systematization of the received material; – preparation of a report on – undergraduate practice; – defense of the report on undergraduate practice.	– systematization of the material; – decor – individual task; – writing a report; – preparing a presentation; – report protection	10 h 10 h 10 h 2 h	assessment with score

7. EDUCATIONAL AND METHODOLOGICALSECURITYINDEPENDENT WORK OF STUDENTS ON INDUSTRIAL PRACTICE

Pre-diploma practice is aimed at familiarizing students with the scientific and production structure and program of the enterprise, the prospects for its development, at preparing the student for independent solution of scientific and technological problems and for the completion of the final attestation work.

During undergraduate practice, regardless of the place of its passage, students should pay special attention to issues related to life safety, labor protection and industrial sanitation. To do this, it is necessary to consider the principles of state and public control over compliance with labor laws, the organization of the life safety service and its tasks.

Pre-diploma practice begins with drawing up a general description of the enterprise (organization, institution), which includes the history of its development, structure, program of production activities, analysis of the management scheme, and study of promising areas of development.

The acquisition of skills and experience in research activities in the direction of molecular biotechnology should be carried out through the following types of work:

1) analysis of biomedical and scientific and technical information in the field of molecular biotechnology;

2) analysis of patent literature;

3) participation in planning and conducting biomedical experiments according to a given methodology, processing the results using modern information technologies and technical means;

4) participation in conducting computational experiments using standard software in order to obtain

mathematical models of biological and biotechnical processes and objects;

5) preparation of data, preparation of reports and scientific publications based on the results of the work carried out;

6) participation in the implementation of the results in biomedical practice;

7) participation in the organization of the protection of intellectual property objects and the results of research and development as a commercial secret of the enterprise.

An individual task (Appendix 1) is issued to the student at the university by the head of the practice before the start of the practice. It should be aimed at the collection and analysis of biomedical and scientific and technical information, as well as the generalization of domestic and foreign experience in the field of molecular biology, analysis of patent literature, preparation of source material for final qualification work.

9. FORMS OF CERTIFICATION (BY THE RESULTS OF PRACTICE)

Before passing the undergraduate practice, the student receives an individual task from the head of the practice from the university, the content and volume of which are negotiated with the head of the practice.

Based on the results of the internship, the student draws up a report on the internship, participates in the final conference with a presentation of the results of the internship, after which he receives a credit with an assessment.

The practice report should contain the following elements:

− title page (Appendix 3);

- task and schedule of practice (Appendix 1);

− a document confirming the fact of internship;

- a description compiled by the head of practice from an organization or structural unit, if the practice is carried out on the basis of FEFU;

− content;

− introduction;

- the main part about the activities in the process of internship (including the experimental part with the methods and results of research);

− completed individual task;

− conclusion;

− sources of information;

The report is drawn up in accordance with the "Requirements for the design of written work performed by students and listeners of FEFU".

Sample structure of the main part of the report:

1. General information about the enterprise (organization, institution) and its brief description (history, geographical location, structure of the organization and its individual divisions, list of main divisions indicating their purpose, information about the main services of the enterprise, information about the organization of work of small groups of performers) .

2. Analysis of biomedical and scientific and technical information in the field of molecular biotechnology.

3. Analysis of patent literature.

4. Description of biomedical experiments according to a given methodology, processing of results using modern information technologies and technical means.

5. Description of computational experiments using standard software tools to obtain mathematical models of biological and biotechnical processes and objects.

6. Description of the implementation of the results in biomedical practice.

7. Description of the organization of the protection of intellectual property objects and the results of research and development as a trade secret of the enterprise.

8. Conclusion.

By agreement with the head of practice from the university and depending on the place of passing this type of practice, the structure of the report or its individual parts may change.

After completing the practice and completing the report in accordance with the requirements, the student submits his report for defense to the head of the university. Based on the results of the defense, a test is given with an assessment (excellent, good, satisfactory, unsatisfactory):

"Excellent" - the necessary practical skills and professional competencies, provided for by the program of educational practice, are fully formed, the tasks are completed, the quality of their performance is estimated by a number of points close to the maximum.

"Good" - the necessary practical skills and professional competencies provided for by the program of educational practice are fully formed, the tasks are completed, the quality of none of them is rated with the minimum number of points, some types of tasks are completed with errors or not thoroughly enough.

"Satisfactory" - the necessary practical skills and professional competencies are basically formed, the gaps are not significant, some of the completed tasks contain errors.

"Unsatisfactory" - the necessary practical skills and professional competencies provided for by the program of training practice are not formed, all completed training tasks contain gross errors, additional independent work on the report materials will not lead to any significant improvement in the quality of assignments.

Grading scale and criteria for evaluating the practice report

Rating "Excellent"

A) The program of practice is completed in full.

B) The head of the enterprise rated the student's work as "Excellent".

C) The report is written correctly, in full compliance with the requirements.

D) The report is submitted on time to the head of the department.

E) Oral report and answers to questions are complete and competent.

Rated "Good"

A) The program of practice is completed in full.

B) The report is submitted in due time to the head of the department.

C) The report is written correctly, in full compliance with the requirements.

D) The head of the enterprise rated the student's work as "Good";

E) Roughness in the presentation of the material, inaccuracies in the answers to questions that are corrected after clarifying questions.

Grade "Satisfactory"

A) The program of practice is completed in full.

B) Supervisor from enterprises appreciated work student to "Satisfactory";

C) The report is written correctly, in full compliance with the requirements.

D) The report is submitted on time to the head of the department.

E) Roughness in the presentation of the material, inaccuracies in the answers to questions that are not always corrected after clarifying questions.

Grade "Unsatisfactory"

A) The practice program has not been fully implemented.

B) The manager from the enterprise rated it as “Unsatisfactory”.

C) The report is not drawn up or is drawn up incorrectly.

D) The report is not submitted on time to the head of the department.

E) Oral report and answers to questions are not complete and not literate.

Typical control questions for preparing for the defense of a practice report:

What is the relevance of the chosen research topic?

Why was this method chosen to achieve the results of the tasks set? What are its advantages?

What is the scientific interest of your results? Similar work was carried out earlier by other researchers? How

Do your results correlate with their data?

10. EDUCATIONAL-METHODOLOGICAL AND INFORMATION SUPPORT OF INDUSTRIAL PRACTICE

Main literature

1. Basnakyan, I.A. Cultivation of microorganisms with given properties / I.A. Basnakyan. - M.: Medicine, 1992. - 192 p.

2. Biology of stem cells and cell technologies: for medical universities in 2 volumes: v. 1 / M.A. Fingers, R.S. Akchurin, M.A. Aleksandrova □i dr.]; ed. M. A. Paltseva. - Moscow: Medicine, Shiko, 2009. - 272 p. http://lib.dvfu.ru:8080/lib/item?id=chamo:779352&theme=FEFU

3. Biology of stem cells and cell technologies: for medical universities in 2 volumes: v. 2 / M. A. Paltsev, R. S. Akchurin, M. A. Aleksandrova et al.]; ed. M. A. Paltseva. - Moscow: Medicine, Shiko, 2009. - 455 p. http://lib.dvfu.ru:8080/lib/item?id=chamo:779355&theme=FEFU

4. Biotechnology. Principles and application / ed. I. Higgins, D. Best, J. Jones; per. from English. – M.: Mir, 1988. – 480 p.

5. Biotechnology: Textbook for universities. In 8 books. / Ed. N.S. Egorova, V.D. Samuilova. - M .: Higher School, 1987

6. Biotechnology: Textbook for universities. In 8 books. Book 1: Problems and prospects / N.S. Egorov, A.V. Oleskin, V.D. Samuilov. - M.: Higher school, 1987. - 159 p.

7. Biryukov, V.V. Fundamentals of industrial biotechnology / V.V. Biryukov. - M.: KolosS, 2004. - 296 p. http://lib.dvfu.ru:8080/lib/item?id=chamo:231970&theme=FEFU

8. Blazhevich, O.V. Cultivation of cells: a course of lectures / O.V. Blazhevich - Minsk: BSU, 2004. - 78 p.

9. Bratus, A.S. Dynamic systems and models of biology / A.S. Bratus, A.S. Novozhilov, A.P. Platonov. - Moscow: FIZMATLIT, 2009. - 400 p. http://e.lanbook.com/books/element.php?pl1_id=2119

10. Genetic bases of plant breeding. Volume 3. Biotechnology in plant breeding. Cellular engineering [Electronic resource] / V.S. Anokhin [i dr.]. – Electron. text data. http://www.iprbookshop.ru/29441.html. - Minsk: Belarusian Science, 2012. - 490 p. – Access mode:— http://lib.dvfu.ru:8080/lib/item?id=IPRbooks:IPRbooks-29441&theme=FEFU

11. Genetic bases of plant breeding. Volume 4. Biotechnology in plant breeding. Genomics and genetic engineering [Electronic resource] / O.Yu. Urbanovich [i dr.]. – Electron. text data. http://www.iprbookshop.ru/29578.html. - Minsk: Belarusian Science, 2014. - 654 p. – Access mode: http://lib.dvfu.ru:8080/lib/item?id=IPRbooks:IPRbooks-29578&theme=FEFU

12. Glick, B. Molecular biotechnology. Principles and application / B. Glik, J. Pasternak, trans. from English. – M.: Mir, 2002. – 589 p. http://lib.dvfu.ru:8080/lib/item?id=chamo:4799&theme=FEFU

13. Gorlenko V.A. Scientific foundations of biotechnology. Part 1. Nanotechnologies in biology [Electronic resource]: textbook / Gorlenko V.A., Kutuzova N.M., Pyatunina S.K. – Electron. text data. http://www.iprbookshop.ru/24003.html. – M.: Prometheus, 2013. – 262 p. – Access mode: http://lib.dvfu.ru:8080/lib/item?id=IPRbooks:IPRbooks-24003&theme=FEFU

14. Egorova, T.A. Fundamentals of biotechnology: textbook for universities / T.A. Egorova, S.M. Klunova, E.A. Zhivukhin. - M: Academy, 2006. - 208 p. http://lib.dvfu.ru:8080/lib/item?id=chamo:255141&theme=FEFU

15. Elinov, N.P. Fundamentals of biotechnology: textbook / N.P. Elinov. - St. Petersburg: "Nauka", 1995. - 600 p. http://lib.dvfu.ru:8080/lib/item?id=chamo:128910&theme=FEFU

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11. LOGISTICS AND TECHNICAL SUPPORT OF INDUSTRIAL PRACTICE

Scientific laboratories of biomedical cellular technologies equipped with the following equipment:

– Robotic system for automated cell cultivation CompacT SelecT SC - APM, with a module for preparing plates for analysis, THE AUTOMATION PARTNERSHIP;

– System for continuous monitoring of live cells in culture, formation and analysis of images Cell-IQ MLF, Chip Technologies, Czech Republic;

– System of deep optical imaging of biomaterials FluoView FV1200MPE (FV12M-5XX-3XX);

– Incubator personal CO2 - with a system for monitoring and increasing the vitality of cells Galaxy (CO48R-230-1200);

– Spectrophotometer with accessories for BioSpectrometer-kinetic sample processing;

– Device for polymerase chain reaction with detection of amplification products in the "real time" mode CFX96 Touch Real Time System;

– System for volumetric fixation and preparation of deposited biosamples in the Volume Fixation System kit;

– Multimodular station for rotary sedimentation processing of samples Sediment Modules;

– Automated system Biacore X100 System for the analysis of intermolecular interactions with a set of additional parts and software;

– DNA sequence analysis system Ion S5™ XL System + Starter kit for testing and commissioning the system;

– Genetic analyzer Applied Biosystems 3500 + Set of consumables Starter kit for checking the performance and commissioning of the system;

– Cell sorter high-speed MoFlo Astrios EQ

– Sample preparation system for whole genome sequencing Ion Chef™ Instrument + Starter kit for testing and commissioning the system.

– For persons with disabilities and the disabled, the choice of places for internship is consistent with the requirement of their accessibility for these students, and the practice is carried out taking into account the peculiarities of their psychophysical development, individual capabilities and health status.

ANNEX 1

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

APPROVE:
Head of OP
_____FULL NAME.
"____" _____20__

INDIVIDUAL TASK

By _____
(type of practice)

student _____groups _____
(Name of the student)

Educational program 06.04.01 Biology, master's program "Molecular and Cellular Biology" (together with NSCMB FEB RAS)_____

Base (place, organization) of practice_____
_____

Terms of practice from _____20___ to _____ 20___

Generalized task statement	

Job Schedule

Name of the tasks (activities) that make up the task	Task completion date (activities)
1.	
2.	
3.	

Practice leader _____ _____
signature Full name, position

APPENDIX 2

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIARY

according to _____
practice
student _____ group _____
program_____
Place of practice _____
Term of practice _____
weeks_____

Head of practice from FEFU
_____
Head of practice from a specialized organization
_____

13. Student's calendar schedule

No. p \ p	Name of works	calendar dates		Surname of the he the practice
		Start	ending	

14. Student work diary

date	Brief summary of the trainee's work	Signature leader

15. Report protection results

The report is protected by "____" _____ 20___

Rated _____

Department Director _____ AND ABOUT. Surname

APPENDIX 3

Practice Report Title Page Form

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

The report is protected with an estimate
_____
"_____" _____ 20__

Supervisor
educational program
_____ Surname I.O.

.

REPORT

on industrial practice. Undergraduate practice, including research work
(full name of the profile organization)

Student of _____ group _____ (_____)
Signature Full name
Practice leader
from a specialized organization_____ (_____)
Signature Full name

Practice leader
from FEFU_____ (_____)
Signature Full name

APPENDIX 4

Form of referral to educational practice

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"Far Eastern Federal University"
(FEFU)

INSTITUTE OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

DEPARTMENT OF MEDICAL BIOLOGY AND BIOTECHNOLOGY

DIRECTION
for work practice

student__ master's course
Surname First name Patronymic of the group _____
(Full Name)

sent to _____
name of the base organization

address _____

Order on referral to industrial practice dated No. _____
for passing_____
in the direction of preparation 06.04.01 Biology
for a period from _____ 20 to _____ 20 (continuous / discrete)

Supervisorindustrial practice.
Research work

M.P. _____ _____ _____
(position, academic title) (signature) (I.O.F)

Marks on completion and timing of practice

Business name	Check-in and check-out	Signature, signature transcript, seal
Name of the enterprise, organization in accordance with the contract	Arrived __.__.20__	
	Dropped out __.__.20__	