

Academic Internship Programme
for Bachelor’s Programme “HSE and University of London Double Degree
Programme in Data Science and Business Analytics”,
Field of Study 01.03.02 Applied Mathematics and Information Science

Approved by
HSE Academic Council
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Internship load (in credits)	3
Internship length in academic hours, including contact hours	114
Internship length in weeks	2
Year	1
Internship Form	At organizations and manufacturing sites
Internship Type	Academic

1. General provisions

1.1. Academic Internship Goals and Objectives

According to the Regulations for HSE Student Project Work, Research and Internships, the goal of completing an academic internship is to consolidate, broaden, and deepen the theoretical knowledge already gained, while also obtaining primary practical skills by completing specific tasks.

Academic internship objectives:

- consolidate and deepen theoretical knowledge obtained through the course of studying the programme courses;
- develop and improve basic professional skills and competencies in the application of modern mathematical methods and information technologies;
- become familiar with and develop skills for working on actual research, industrial, and educational projects;
- develop informational competencies aimed at ensuring success in professional activities;

- obtain skills for independent and group work;
- process received materials and draft a report on the academic internship experience.

1.2. Place of the Academic Internship within the Structure of the Core Degree Programme

According to the Regulations for HSE Student Project Work, Research, and Internships, the research internship belongs to the Practical Activities Block “Internships, Project and Research Work” within the working curriculum in the field of study 01.03.02 “Applied Mathematics and Information Science” for the Bachelor’s programme “HSE and University of London Double Degree Programme in Data Science and Business Analytics” 2018-19, Year 1.

The academic internship, completed after Year 1, may be based on the following courses:

- Discrete Mathematics
- Linear Algebra and Geometry
- Calculus 1
- Algebra
- Programming Foundations and Methodology
- Algorithms and Data Structures

To master the course, students must possess the following knowledge and competencies:

- ability to learn, obtain new knowledge and skills, including in the fields outside his/her professional field
- ability to work with information: find, evaluate, and use information from different sources
- ability to describe issues and situations related to professional activities using mathematical terminology and tools
- ability to write, format, debug and optimize Python and C++ codes
- know the most important algorithms and data structures and the basic principles of their design and analysis
- ability to conduct written and oral communications in English.

The knowledge, skills, and experience obtained while doing the academic internship serve as the basis for work placements and pre-graduation internships and may be used to complete a research work (i.e., software project, term paper, thesis) or in post-graduation employment activities.

1.3. Academic Internship Method and Forms

Internship method: stationary, on-site.

1.4. Main Participants and their Responsibilities

Internship co-supervisor refers to the internship supervisor in the faculty for students of a particular year of study. He/she holds the following responsibilities:

- advising students on the compliance of internship tasks with the objectives of academic internships in the degree programme “Data Science and Business Analytics”
- collecting internship assignments from the students’ internship supervisors
- monitoring compliance of the internship activities with the requirements of the degree programme “Data Science and Business Analytics”
- coordinating students’ internship assignments (signing internship assignments)
- if the student is completing an internship at a specialized organization, serving as the internship supervisor on behalf of HSE University, and, as such, verifying and evaluating the results of the internship completed by the students (internship reports and internship supervisor feedbacks from organizations) and giving grades for internships.

Internship Supervisor on behalf of HSE University refers to the direct supervisor of the student’s academic internship, appointed from among HSE University’s academic staff. He/she holds the following responsibilities:

- developing individual assignments for students to complete during the internship
- drafting a working plan (schedule) for completing the internship
- participating in the distribution of students across internship sites
- providing direct supervision of the student’s work pursued as per the approved internship assignment
- evaluating the results of the student’s academic internship and determining the final grade.

Internship supervisor from a specialized organization refers to the person appointed from among the staff of the specialized organization and not employed by HSE University, for example, an industry practitioner or project manager. He/she holds the following responsibilities:

- assisting in drafting formal documents for organizing the student’s internship at the outside organization, including the contract or agreement to conduct the internship, letter of consent, etc.
- overseeing the individual assignments, contents, and planned results of the internship
- conducting the initial student training on occupational health and safety and the safety rules for operating equipment
- providing an intern with the workspace
- ensuring conditions that meet the standard sanitary regulations and workplace safety requirements during the student’s internship
- directly supervising the student’s internship within the scope of the agreed-upon internship assignment
- inform the internship co-supervisor about instances of the student violating the organization’s internal code of conduct or failing to complete the internship assignments by the established deadline

- evaluating the results of the internship and drafting written feedback with a recommended grade.

Internship coordinator from the Internship and Project Centre (IPC) refers to the staff member from the Programme Office, responsible for coordinating and organizing the internships of students from a particular year of study. He/she holds the following responsibilities:

- organizing student internship placement
- informing students about the main stages of completing the internship and the deadlines for submitting documents
- advising on the procedures for submitting reports
- together with the internship co-supervisor, monitoring compliance with the internship deadlines and the timely submission of internship reports
- collecting internship-related documents (assignments, reports, feedbacks etc.)

Students refer to those studying under the programme whose curricula include an academic internship. The student must:

- be guided by the programme for academic internships for the Data Science and Business Analytics degree programme
- timely select and agree to the internship placement and supervisor, following the established procedure for choosing and agreeing to the internship placement (including attending induction sessions about internships held at the faculty, using e-resources to select the supervisor etc.)
- by the established deadline, submit the internship assignment to the Programme Office (see Appendix 1. Internship Assignment)
- in the case of internships at specialized organizations, ensure the timely approval of the agreement and/or addendum on completing the internship or the letter of consent with the internship co-supervisor from IPC, which uses a standard internship agreement; ensure the documents are signed and submitted to the Programme Office
- complete, in full and on time, tasks approved by the internship supervisor for the internship assignment
- after completing the internship within the approved time frame, submit the reports (internship report and supervisor feedback) to the Programme Office.

2. List of Planned Learning Outcomes during the Internship

Competency Code	Competency	Description of competency developed during the internship (indicators)	Professional tasks that require this competency
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UC-1	Ability to learn, obtain new knowledge and skills, including in the fields outside the professional one	Ability to obtain new knowledge and skills in the area of the assigned task	All professional tasks
UC-5	Ability to work with information: find, assess, and use information from different sources, that is necessary to solve research and professional tasks (including based on the systems approach)	Ability to compile a review of existing methods for solving the assigned task	Preparation of research reviews, summaries, and bibliographies on the subject of ongoing research
UC-9	Ability to critically assess and reinterpret cumulative experience (your own and others) reflect on personal and professional activities	Ability to select a method for solving an internship task from among existing ones based on analysis and comparison	The study of new research results, research literature, and academic research projects related to the specialization of professional activities
PC-1	Ability to describe professional issues and situations using the language and tools of mathematics	Ability to set forth a formulation of tasks and their solutions within the scope of the assigned task	Research and the development of mathematical models and methods, algorithms, and software on the subject of ongoing research projects
PC-2	Able to develop and implement as a software module algorithm for solving a theoretical or applied problem based on a mathematical mode	Ability to develop software module algorithm for various professional purposes	All professional tasks
PC-3	Ability to understand, improve, and apply modern mathematical tools	Ability to apply the selected mathematical method to solve the assigned task	Development of mathematical methods for analysis and the construction of models on the subject of ongoing applied research activities or

			R&D works
PC-4	Ability to formalize and algorithmize the assigned task	Ability to formulate an algorithm to solve an assigned task	Development and research of algorithms, computational models, and data models to implement elements of new (or known) information technology systems
PC-5	Ability to write, format, debug, and optimize programming code	Ability to write a software implementation of the selected algorithm	Development of software

3. Contents and Structure of the Academic Internship

The overall credit load of the academic internship is determined by the working curriculum for Year 1 and totals 3 credits (114 academic hours). The general length of the academic internship is two weeks (14 calendar days) during the summer between July 1 and July 30.

By an agreement with the internship coordinator from IPC, the period for completing the academic internship may differ from the period established in the working curriculum, which should be reflected in the internship assignment through the submission of a student's application to the Data Science and Business Analytics Programme Office to change the timeframe for the academic internship.

The formats for completing the academic internship are diverse. Possible formats include:

No.	Internship format	Primary Activities
1	Academic research work under the supervision of a future student paper supervisor	<ul style="list-style-type: none"> ● Searching, reviewing, and analyzing literature related to a posed task ● Studying mathematical methods ● Developing an algorithm and its software implementation
2	Software project (or continuation)	<ul style="list-style-type: none"> ● Analyzing a statement of work (SoW) ● Developing an algorithm to solve the set task and searching for optimal solutions ● Writing and testing programming code
3	Instruction at a summer school in mathematics, programming, or	<ul style="list-style-type: none"> ● Developing tasks on the school's subject matter

	computer science	<ul style="list-style-type: none"> ● Solving tasks related to the school’s subject matter ● Preparing presentations ● Reviewing the literature, attending lectures, analyzing the studied material
4	Internship at a specialized organization	<ul style="list-style-type: none"> ● Analyzing the established SoW ● Completing individual, official tasks (instructions) issued by the internship supervisor with regard for the intern’s concentration

A student may propose other formats for completing the academic internship, which may be implemented only after an agreement with the internship co-supervisor.

4. Documents and Reports on the Academic Internship

Submission of the assignment for completing the academic internship is preceded by the mandatory submission of an application in LMS using the module “Internship Application”. The student must choose the form of internship from the drop-down menu, indicate whether the internship is planned at an organization located within the Russian Federation or abroad, and specify the primary state registration number (OGRN) of the organization (further information about the organization will be filled in automatically based on the OGRN). Information about the supervisor and the period for completing the internship must also be indicated. In the “Comment” field, specify the internship assignment.

The following documents must also be submitted:

Individual assignment for the student’s internship (Appendix 1. Academic Internship Assignment);

If the conditions of the internship include the signing of a Non-disclosure agreement (NDA), this must be specified in the internship assignment.

Agreement and/or addendum for the completion of a student’s internship at an outside organization (standard HSE University agreement) or a letter of consent from the organization offering a place for the student to do his/her internship. In cases where:

- students complete internships at legal organizations of the Russian Federation, CIS countries, or foreign companies with whom the Faculty of Computer Science does not have an agreement, an agreement and addendum must be drafted (if the organization refuses to conclude an agreement about the student’s internship, then it shall be conducted based on the letter of consent);
- students complete internships at organizations with whom the Faculty of Science has an agreement, only an addendum is required;

Student internship report, signed by the internship supervisor from the faculty or the internship supervisor from the specialized organization (if applicable) (Appendix 2. Academic Internship Report). The report is uploaded to LMS.

The report contains the following information:

- dates for completing the internship tasks;
- short description of the completed tasks;
- a statement that the student has been familiarized with the organization's health and safety regulations.

Supervisor feedback of the internship (Appendix 3), signed by the internship supervisor from the faculty or the internship supervisor from the organization (if applicable). The feedback is uploaded to LMS.

In cases where:

- the student completes the internship at a specialized organization, a signed and sealed feedback with the recommended grade by the internship supervisor from the specialized organization on the student's work at the internship site is required;
- the student completes an internship under the supervision of someone from among HSE University's academic staff, signed feedback with the final grade by the internship supervisor on behalf of HSE University on the student's work at the internship site is required.

5. Academic Internship Assessment

The internship assessment standard includes individual assignments in accordance with the internship tasks, student internship reports, and the internship supervisor feedbacks.

Students who have completed the internship and submitted the reports and feedbacks by the established deadlines are subject to assessment procedures according to their internship results.

The ongoing assessment represents itself weekly meeting with the internship supervisor and oral progress reports.

The form of the internship's final assessment is an exam. The exam is conducted as a defence of the project completed during the internship and the evaluation of the internship report by the internship supervisor on behalf of HSE University; the results of the exam are then recorded in the evaluation record sheet. If the internship was completed at a specialized organization, the grade recommended in the feedback by the internship supervisor from the specialized organization is factored into the final grade.

The grade for completing the academic internships takes into consideration:

- the thoroughness and quality of the work completed, as shown in the internship assignment
- the thoroughness and quality of the composed internship report.

Procedure for determining the academic internship grade:

- grade “8-10” – given to a student if he/she has completed the internship assignment fully and correctly and submitted the internship report, drafted as per the requirements, to the internship supervisor by the established deadline; within the report, all parts of the internship process are explained, in full
- grade “6-7” – given to a student if he/she submitted the internship report to the internship supervisor on time but received minor comments about the thoroughness and quality or composition of the completed internship assignment
- grade “4–5” – given to a student if he/she submitted the internship report to the internship supervisor on time but received substantial comments about the thoroughness and quality or composition of the completed internship assignment
- grade “0–3” – given to a student if he/she did not complete the internship, that is, either completed only a minor part of the internship assignment or failed to submit the internship report by the deadline.

Evaluation Tools Fund for the intermediate assessment of the internship.

The fund includes:

- Individual tasks;
- An approximate list of questions to be posed during the defence of internship report (see Appendix 4).

The resulting grade for the course shall be calculated according to the following formula:

$$O_{\text{final}} = 0.5 * O_{\text{report}} + 0.5 * O_{\text{defense}}$$

Students who have not completed the internship for a justifiable reason are given a second chance to complete the internship in their free time.

Students who failed to complete the internship without a justifiable reason or received an unsatisfactory grade are considered to have failed the assignment, and this failing mark must be removed during the winter retake period.

Students who have not completed programmes of approved internship forms during their senior years of study are not allowed to sit the final state certification.

6. Training and informational support for the internship

The main materials and software applications used to complete the internship are determined by the internship supervisor and must be sufficient for the students to successfully fulfil the established internship assignment.

List of academic literature and Internet resources necessary for conducting the internship:

No.	Name
Core Reading	
1	Альтшуллер Генрих. Найти идею: Введение в ТРИЗ - теорию решения изобретательских задач Alpina Publisher. ISBN: 978-5-9614-1494-3, 978-5-9614-2189-7. - основная
2	David Allen. Getting Things Done: The Art of Stress-Free Productivity. Penguin Books; Revised edition (March 17, 2015). ISBN-10: 0143126563
3	Newton Richard. Project management, step by step: how to plan and manage a highly successful project. ISBN 10:1408212269, 2006.

7. Supplies and Equipment for the Internship

While completing the internship at HSE University, students may use the PC classes, computer network, library, personal laptops, research equipment, and other HSE University equipment/facilities needed for the students to accomplish the internship assignment.

When completing an internship at a specialized organization, as per the agreement to conduct the internship, students may use laboratories, specially equipped classrooms, search engines, databases, libraries, technical and other documents, and computational equipment located at the organization where the internship takes places and which are needed for the students to accomplish the internship assignment.

During the internship, students may use information technology, including operating systems, computer simulations, tools for design automation and software development that are used at the organization where the internship is held, Internet technology, etc.

When completing the internship at HSE University, students may use different software products to complete their assignments, including OC Windows XP/7/8.1/10 and Microsoft Office Professional Plus 2010/2013/2016.

National Research University Higher School of Economics
 Faculty of Computer Science
 Field of Study 01.03.02 Applied Mathematics and Information Science
 HSE and University of London Double Degree Programme in Data Science and Business Analytics

**INDIVIDUAL ASSIGNMENT COMPLETED DURING THE
 INTERNSHIP**

Student of group _____, in Year ___ of full-time study

_____ (last name, first name, patronymic (if applicable))

Place where internship was conducted: <Name>, <Location>, <Subdivision>

Internship form: At organizations and manufacturing sites

Internship type: Academic

Internship timeframe: _____

Assignment summary: _____

Tasks to Solve

1. _____

2. _____

N. _____

Criteria for successful completion: Positive feedback from an internship supervisor

Reporting Format(s): Internship Report

Internship Supervisor

<degree, title, full name>	(signature)
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Assignment accepted and to be executed by

_____	(student's signature)
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Internship Co-supervisor

<full name>	(signature)
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Sample title page for internship report

National Research University Higher School of Economics
Faculty of Computer Science
Bachelor's Programme "HSE and University of London Double Degree Programme in Data
Science and Business Analytics"
01.03.02 Applied Mathematics and Information Science

Internship Report

Completed by student in group _____

(full name)

(signature)

Evaluated by:

(position, full name of supervisor from organization/HSE University)

(grade)

(signature)

(date)

Internship Feedback

student (s) _____
group _____
Degree Programme “Data Science and Business Analytics”
Faculty of Computer Science at HSE University
from _____ till _____
at _____

The following professional tasks were assigned to the student in the course of the academic internship:

1. _____
2. _____
3. _____
4. _____

Brief description of how accurately and thoroughly the internship assignment was completed.

Brief description of the thoroughness and quality of the submitted report.

During the internship, the student demonstrated (strengths, weaknesses, notes)

The student deserves a grade of ___ points out of 10.

I am familiar with the internship report submitted by the student(s).

date	position, title	supervisor's full name	signature
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Evaluation Tools Fund

Approximate question list for internship defence

1. Describe the task you received at your internship. Summarize the results.
2. What literary sources did you use during the internship?
3. Can you compare your results to any existing analogues? What are the advantages and disadvantages of your solution?
4. Justify your choice of the algorithm for solving the task.
5. What programming language/technology was used to solve the task?
6. Define the domain of the task.
7. What is the scientific and/or practical importance of your work?
8. What is the asymptotic complexity of the algorithms?
9. Specify the program's field of application and target users.
10. Were any of the HSE computational resources used for conducting the experiment or developing the software?
11. What knowledge obtained during your studies did you apply at the internship?
12. Have you gained any new knowledge or skills? What are they?

The questions that may be posed during the defence or upon submitting the Internship Report are not limited to this list.

National Research University
«Higher School of Economics»
Faculty of Computer Science
Educational Internship Schedule (Plan)

(Surname, Given Name, Middle Name if any)

Educational course (field of study) 01.03.02 Applied Mathematics and Computer Science

Educational programme Data Science and Business Analytics

Full-time format, Student Group # _____

Kind of practice At HSE at discretionary basis

Type of practice Educational

Internship period (start date – end date) _____

The Faculty's Internship Supervisor ¹

(Surname, Name, Middle Name, job title, academic title)

Organization²

Internship Supervisor from an organization

(Surname, Name, Middle Name, position)

№	Calendar period	Plan of work
1		1. Organizational (induction) meeting
2		2. Instructing on the requirements of labor protection, safety, fire safety and internal labor regulations
3		3. Fulfillment of Individual Assignment
4		4. Consultation
5		5. Preparation and submission of the Report

Student

(signature) / _____
(Last name/ Name)

Faculty's Internship Supervisor

(signature) / _____
(Last name / Name)

(signature) / _____
(Last Name / Name)

¹ For students completing the practice in companies – the Internship Supervisor from HSE is appointed

² Organization (company) is an outer organization (not HSE) where a student takes his internship within the scope of his field of stud

Moscow 20__
Training and on-the-job safety session validation

Student of the Federal State Autonomous Educational Institution of Higher education
«National Research University «Higher School of Economics» FCs,

Studying at:

__ - course of the educational program «____» (area ____ «____»),

Designated to complete the internship in *name of the organization*,

Was acquainted with:

- labor protection requirements,
- safety requirements,
- fire prevention arrangements
- rules of internal labor order of the *organization*.

Supervisor

office

_____/_____
signature

date