**National Research University Higher School of Economics**

**Department of Psychology**

Course syllabus for the discipline

**“Internship”**

For the students of the MSc program ― **Cognitive Sciences and Technologies: from Neuron to Cognition**

(specialization 37.04.01 ― Psychology)

Approved by

MP Academic Council,

Protocol №2.6-06/7 29/08/2019

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| ECTS units | 12 (6+6) ECTS units (credits).  |
| Duration | The internship lasts 4 weeks and amounts to 6 credits for each year.  |
| Year  | 1-2 |
| Type of internship | *production internship* |
| Class of internship | *production internship* |

# general provisions

##  Learning Objectives

The internship is a kind of practical student sessions that is a mandatory part of the master programme. The important value of internship for a student is working side by side with specialists in the field.

The goal of internship is to acquire of basic research skills and work experience. The purpose of the practice is to consolidate and develop professional competencies in research, organizational and analytical activities. During the internship, student deepens his/her theoretical knowledge, acquire and improve the practical skills in accordance to the competencies, and

also start to work as an independent researcher under the internship adviser’s supervision.

The objectives of the internship are

- consolidation of theoretical knowledge obtained during training;

- acquisition of initial practical (technical) skills in solving specific tasks in research field and (or) applied work

- the formation of students' attitudes toward the reflexive acquisition of the skills, according to the educational standard of professional competencies;

- developing students' skills in presenting the results of their professional activities.

To successfully complete the internship, student:

Know:

1. how to search the information, collect and analyze data for relevant scientific research;

2. how to analyze psychological and neurophysiological processes;

Can:

3. use modern neuroimaging techniques;

4. apply neurodiagnostics techniques.

##  Place of the Course in the Program Structure "Cognitive Sciences and Technologies: from Neuron to Cognition"

As part of their internship program, students of the program "Cognitive Sciences and Technologies: from Neuron to Cognition" partake in research practice based at various research laboratories affiliated with the Department of Psychology, the Centre for Neuroeconomics and Cognitive Research and with other partner laboratories both at HSE and other scientific universities.

During the first-year, students familiarize themselves with various methodologies integral to any research process, such as the preparation of research tools, developing research techniques, and report design. They are also introduced to the technology for conducting pilot studies and modern methods of brain neuroimaging. In addition, students also become adept in the ethical principles of research and the standards for publishing results. The program takes into account students’ individual requests regarding their dissertation research, and aims to provide a solid ground for basic dissertation research.

In the second year, students work on the completion of their dissertation research. During practice they receive individual advice on the methods of statistical analysis of data and the interpretation of results, along with advice on writing dissertations.

The duration of the internship program is one module during the first year, and one module during the second year.

General introductory part of the integral research training is constituted by n number of courses provided within the scope of the program:

1. Quantitative and Qualitative Research Methods in Psychology is a general research course that reviews basic steps of research process and provides students with training of basic research skills.
2. Theory and Methodology of Modern Psychology is a general research course that builds on the previously learned general theories within the courses general psychology, cognitive psychology, experimental psychology.

The course introducing students to the latest developments and data in the field of Cognitive Psychology, provide/getting deeper knowledge of applied areas of Cognitive Psychology, studying methodological tools of Cognitive Psychology and Neuroscience.

Location: HSE laboratory, scientific unit or external organization - a stationery internship (Moscow).

Form of internship: The internship is carried out discretely by type of practice - by highlighting in the calendar of the study schedule a continuous period of time for 4 weeks.

# Internship outcomes

After completing the internship the student should have the following competences:

* Ability to use scientific methods of research;
* Ability to plan own projects;
* Ability to work in team;
* Ability to work in international environment.

 Aims:

In the first year

Practice to implement the skills of selecting and adapting of the measurement instruments for future research.

In the second year

Practice to implement the skills of statistical analysis of data for quantitative research (with the use of statistical packages, e.g. SPSS, AMOS, Mplus); the skills of qualitative and experimental data gathering and analysis.

The content of internship is defined by Internship Supervisor and the relevant organizations in accordance to the planned learning outcomes related to competencies. During the internship students may:

1. search the information, collect and analyze data for relevant scientific research;
2. analyze psychological and neurophysiological processes;
3. use of modern neuroimaging techniques;
4. apply neurodiagnostics techniques.
5. LIST OF PLANNED LEARNING OUTCOMES OF INTERNSHIP RELATED TO COMPETENCIES (ACCORDING TO THE EDUCATIONAL PROGRAM)

|  |
| --- |
| **2. General professional competencies**  |
| GPC-2 | Student is able to conduct written and oral communication in Russian (state) and a foreign language as part of the professional and scientific communication. |
| GPC-3 | Student is able to present results of his/her work in Russian and/or foreign language in format of scientific report and oral presentation using modern IC technologies. |
| GPC-4 | Student is able to search and analyze the information and professional databases, including through ICT. |
| **3. Professional competencies** |
| SPC-1 | The student is able to apply the methodology of psychological research; could identify and plan the aim, objectives and design of the study. |
| SPC-2 | The student is able to develop a program, plan and implement scientific psychological research, apply scientifically based methods to evaluate practice, interventions and other research and applied programs. |
| SPC-3 | The student is able to develop and choose adequate, reliable and valid assessment methods to solve scientific and applied problems |
| SPC-6 | The student is able to develop adequate, reliable and valid feedback on the basis of the research or diagnostics  |

# The content of internship

|  |  |  |  |
| --- | --- | --- | --- |
| # | Type of the task | Content | Competencies |
| 1 | Research activity | collection and processing of quantitative and qualitative data for scientific research; | SPC-1, SPC3 |
| 2 | preparation of scientific texts (articles, sections of monographs, reviews, abstracts etc.) for publication in scientific journals; | GPC-3, GPC-4, SPC-6 |
| 3 | Familiarize with neuroimaging and brain stimulation methods; develop the skills of data collection with the specific method (i.e. eye-tracking, EEG, MEG, fMRI, behavioral methods, TMS, tACS, tDCS etc.)  | SPC-1, SPC-2, SPC-3 |
| 4 | Familiarize with the particular software and methods of data analysis | SPC-2, SPC-3 |

# Internship report AND Assessment

Students must provide:

 - a report prepared by a student on the basis of his/her internship results, which should be signed by the internship supervisors on behalf of the relevant Faculty and the Organization (if any) (Appendix 1);

 - a review with respect to a student’s performance signed by the Organization’s Internship Supervisor (Appendix 2).

# Internship Assessment

The internship supervisor assesses the student on the base of all mandatory internship documents using the 10-grading system.

 The criteria of evaluation are following:

* accordance of the content of the internship to individual assignment;
* level of obtained competences;
* quality of student’s work;
* personal student qualities (responsibility, creativity, degree of personal involvement of student during internship)

Assessment of the internship report is guided by the following criteria:

1. Comment of the internship adviser:

* General work ethics and responsibility of student;
* Degree of personal involvement of student during internship;
* Quality of report;
* Tasks completed.
1. General quality of the student report.
2. Competencies met.

Assessment takes place during the exam week.

If student have not accomplished the internship projects and have not presented the internship report, he/she cannot be admitted to the final assessment procedure. In this case (or in case of failing the internship assessment) he/she should repeat the internship during the second academic year.

Negative score for the internship is considered an academic debt.

 The final grade (O) is obtained from the following formula:

О = 0,4\*О internship adviser + 0, 4\*Оstudent report + 0,2\*Оcompetencies met

|  |  |
| --- | --- |
| Grade (1-10) | Criteria |
| 8 – almost excellent9 – excellent10 – perfect | All the documents were properly completed and submitted. All the internships tasks are completed, competencies met and supported by comments of advisor. No negative feedback/comments from advisor.  |
| 6 – good7 – very good | All the documents were completed and submitted, but with minor issues (i.e. not properly confirmed). All the internships tasks are completed, competencies met and supported by comments of advisor. Minor negative feedback/comments from advisor.  |
| 4 – pass5 – highly pass  | All the documents were completed and submitted, but with minor issues (i.e. not properly confirmed). The internships tasks are partially completed, competencies met and supported by comments of advisor. Negative feedback/comments from advisor.  |
| 1 - very bad2 – bad3 – no pass | Not all the documents were completed and submitted / completed with major issues. The internships tasks are mostly not completed, or no competencies met which supported by comments of advisor. Major negative feedback/comments from advisor.  |

VI. EDUCATIONAL AND METHODOLOGICAL MATERIALS

# Reading List

* 1. **Required**
1. The Oxford Handbook of Cognitive Neuroscience, Volume 1: Core Topics. Edited by Kevin N. Ochsner and Stephen Kosslyn. Oxford University Press, 2013.  [http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199988693.001.0001/oxfordhb-9780199988693](https://mail2.hse.ru/owa/redir.aspx?C=ecT7CDpLQjmJJPk9QRXmQO6qIsnXmlPLC-ubfO59HYNzoJlmjIbWCA..&URL=http%3a%2f%2fwww.oxfordhandbooks.com%2fview%2f10.1093%2foxfordhb%2f9780199988693.001.0001%2foxfordhb-9780199988693)
2. Using multivariate statistics / B. G. Tabachnik, L. S. Fidell. – 5th ed. – Boston [etc.]: Pearson Education, 2007. – 980 p. – ISBN 978-0-205-46525-5.

<http://eds.b.ebscohost.com/eds/ebookviewer/ebook/bmxlYmtfXzE0MTgwNjRfX0FO0?sid=90e4a902-654f-402e-8ee2-c89d821d9260@pdc-v-sessmgr01&vid=0&format=EB&rid=1>

* 1. **Optional**

3)        C. M. Epstein, E. M. Wassermann, et al . Oxford Handbook of Transcranial Stimulation - Oxford University Press, 2012

<https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780198568926.001.0001/oxfordhb-9780198568926>

# VII. Special Equipment

1)      **Electroencephalography  (EEG)** is the recording of electrical activity along the scalp. EEG measures voltage fluctuations resulting from ionic current flows within the neurons of the brain. Electroencephalography is a safe and non-invasive method, which has a very good time resolution, but a poor spatial resolution. EEG is widely used in diagnostics and research, as well as in real-time applications (e.g. BCIs).

             EQUIPMENT:

            24-bit amplifier [p](https://mail2.hse.ru/owa/redir.aspx?C=8awQS5VedEs7aRahf7gdufLcF92e9JM6XHGZBJW2mhlzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2factichampeng)

           Active electrodes [actiCap](https://mail2.hse.ru/owa/redir.aspx?C=-jfyPYsmMF3RObaaFZIVFOz1F7tJNas8K_X1eVHupnNzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2facticapeng" \t "_blank)
           [CapTrak](https://mail2.hse.ru/owa/redir.aspx?C=J3VL5VDNpI5GSteMvnmu_a1BqjtKCjXfg1kTDEAIr99zoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fcaptrakeng" \t "_blank) (BrainProducts)

           [Shielded room](https://mail2.hse.ru/owa/redir.aspx?C=tAlmwCucLp_C8dbEPBRgw8aih_rzrwnHMDUviHYGK6FzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fshieldedroomeng)

2)      **Magnetoencephalography (MEG)** is a functional neuroimaging technique for mapping brain activity by recording magnetic fields produced by electrical currents occurring naturally in the brain, using very sensitive magnetometers. Arrays of SQUIDs (superconducting quantum interference devices) are currently the most common magnetometer, and SERF being investigated for future machines. Applications of MEG include basic research into perceptual and cognitive brain processes, localizing regions affected by pathology before surgical removal, determining the function of various parts of the brain, and neurofeedback.

           EQUIPMENT:   **Elekta Neuromag 306-channel MEG** system at [Centre for the neurocognitive research](https://mail2.hse.ru/owa/redir.aspx?C=k2kvAEpjVXPV1z9QtKyDJGauOYGHYM7F2ENty9Jiu8BzoJlmjIbWCA..&URL=http%3a%2f%2fxn--c1arkau.xn--p1ai%2fprojectpages%2findex%2f60) (MEG-Centre) at the Moscow Psychological and Pedagogical State University

3)      **Eye-tracking**  is a process of measuring either the point of gaze (where one is looking) or the motion of an eye relative to the head. An eye tracker is a device for measuring eye positions and eye movement. Eye trackers are used in research on the visual system, in psychology, in cognitive linguistics and in product design.

            EQUIPMENT:

            [**SMI RED-m**](https://mail2.hse.ru/owa/redir.aspx?C=osvyUUXkEWjXWFN0tde4hGDZHi1BUUcZkAIaAIWEDFRzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fsmiredmeng)

[**EyeLink 1000 Plus**](https://mail2.hse.ru/owa/redir.aspx?C=6ds7obbajI4sH9WuMUIp-ZvE_TonHevbpBTih-Fo2uRzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2feyelinkeng)**(SR Research)**

4)      **Transcranial Magnetic Stimulation (TMS)** is a non-invasive method to cause depolarization or hyperpolarization in the neurons of the brain. TMS uses electromagnetic induction to induce weak electric currents using a rapidly changing magnetic field; this can cause activity in specific or general parts of the brain with minimal discomfort, allowing for study of the brain's functioning and interconnections. The simultaneous recording of EEG, bipolar as well as peripheral signals opens up new scenarios in the investigation of the mechanisms underlying for example emotional behavior.

EQUIPMENT

          [**TMS MagPro X100**](https://mail2.hse.ru/owa/redir.aspx?C=DkDUmdGcS26Ev5hn6ZIxIyZOjW21eZh_vwYyIS5lBGxzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fmagproeng)

[**Localite TMS Navigator**](https://mail2.hse.ru/owa/redir.aspx?C=jkCWDIJQelqDzKy4U2a0SnlGCUf6EomD-X7MfrUycKlzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2flocaliteeng)

          [**BrainAmp DC**](https://mail2.hse.ru/owa/redir.aspx?C=xyzMTTSGKmSgf_PyEg6Uqrt1CZxSxBJ8__G-C-om8apzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fbrainampeng)

[**BrainAmp ExG**](https://mail2.hse.ru/owa/redir.aspx?C=Fu7p6wLUparW8C3vAJcW_9xpEv7IY5Oq4Xtc53Z2-5NzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fbrainampexgeng)

5)      **Transcranial electric stimulation (TES)** with low­ intensity (0,5 мА – 2 мА) **direct current (tDCS) or alternating current (tACS, tRNS)** is used to generate neuromodulations in spontaneous neuronal activity. Physiological studies have demonstrated that DC flows through the skull and the outer layers of the cortex, modifies neuronal crossmembrane resting potentials, influences the level of neuronal excitability, and modulates firing rates. Depending on the orientation of the cells with respect to the current, the membrane potentials can be hyperpolarized (anodal stimulation) or depolarized (cathodal stimulation) by several mV. This change in neuronal excitability effects several alterations in brain function, including motor, sensory, and high-level cognitive function. On the other hand, tACS demonstrate frequency-dependent and entrainment effects, presumably, interacting with endogenous oscillatory activity. This method is actively used in medicine and research.

EQUIPMENT

[**BrainSTIM**](https://mail2.hse.ru/owa/redir.aspx?C=kg_z2iOij4M8tnME-l-xaCZnorqBZz4WU9-U0ZTNn11zoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fbrainstimeng)

[**Starstim®**](https://mail2.hse.ru/owa/redir.aspx?C=PYL0fp55t3tfWxB1yLViO-h9xIsoSngak4Du5B2akQtzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fstartstimeng)

[**DS5**](https://mail2.hse.ru/owa/redir.aspx?C=ayrqf8bi_dhv_NoDTy1ksSaS0ljq_P5HVF1-GMGrISRzoJlmjIbWCA..&URL=https%3a%2f%2fwww.hse.ru%2fen%2fcdm-centre%2fds5eng)

***Appendix 1. Internship report (example)***

**The Government of the Russian federation**

**Federal State Autonomous Educational Institution of Higher Professional Education**

**National Research University – Higher School of Economics**

Faculty of Social Sciences, School of Psychology,

Master’s program

“Cognitive sciences and technologies: from neuron to cognition”

**Internship report**

Student group № \_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Last name, First name Middle name

Internship Adviser

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Position, academic degree

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Last name, First name Middle name

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature

Moscow 201\_

**Report Structure**

1. Description of the place where the internship is taken *(e.g. laboratory, scientific unit: its main project and goals)*.
2. General and detailed information about the work done *(description of the main types of the internship activities and results)*.
3. Self-analysis *(description of the most essential achievements and difficulties, internship resume)*.
4. Appendix (*any data that were processed during the internship projects*).
5. References.
6. Comment of the internship adviser.

**Student’s internship report**

During the internship student should prepare and present to the internship director *internship report*. Internship report should be forwarded to the internship director in 3 days period after the completion of the internship.

***Appendix 2. Scientific adviser comment (example)***

A comment from the scientific adviser

on **XXX XXX** internship (month, year)

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I suggest **grade X/10** for XXX XXX’s internship.

Adviser’s name Adviser’s signature

Adviser’s affiliation