# Course Title (in English)
Research

# Course Title (in Russian)
Научно-исследовательская работа

# Lead Instructor(s)
Skvortsov, Mikhail
Research advisor

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1. **Annotation**

## Course Description

The course is aimed at developing students’ independent research skills and aims at conducting research towards a MSc thesis. It includes such standard elements of a scientist's work as literature review, analysis of available approaches and selection of the most optimal one, drawing up a work plan, conducting experimental and/or numerical studies according to the approved plan, collecting, analyzing, and processing results, and preparing a report on completed research. The task statement, research support, choice of the final report format and evaluation of the report is carried out by the MSc student’s supervisor.

2. **Structure and Content**

## Course Academic Level
Master-level

## Number of ECTS credits
6
<table>
<thead>
<tr>
<th>Topic</th>
<th>Summary of Topic</th>
<th>Lectures (# of hours)</th>
<th>Seminars (# of hours)</th>
<th>Labs (# of hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature analysis</td>
<td>Analysis of papers on the particular research direction, compilation of a literature review.</td>
<td></td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Developing a work plan</td>
<td>Analysis of possible methods for solving the problem and selection of the most appropriate ones. Development of a work plan.</td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Conducting research</td>
<td>Performing research on the selected topic in accordance with the adopted work plan.</td>
<td></td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>Report</td>
<td>Analysis, processing and systematization of the results obtained, preparation of the report.</td>
<td></td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

3. Assignments

<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Assignment Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report</td>
<td>Oral or written (up to the Research advisor) Report on obtained results.</td>
</tr>
</tbody>
</table>

4. Grading

<table>
<thead>
<tr>
<th>Type of Assessment</th>
<th>Graded</th>
</tr>
</thead>
</table>
Grade Structure

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Activity weight, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report</td>
<td>100</td>
</tr>
</tbody>
</table>

Grading Scale

A: 80
B: 65
C: 55
D: 45
E: 35
F: 0

Attendance Requirements

Optional

5. Basic Information

Course Stream

Science, Technology and Engineering (STE)

Course Term (in context of Academic Year)

Term 1
Term 2
Term 3
Term 4

Students of Which Programs do You Recommend to Consider this Course as an Elective?

<table>
<thead>
<tr>
<th>Masters Programs</th>
<th>PhD Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photonics and Quantum Materials</td>
<td></td>
</tr>
</tbody>
</table>

Course Tags

Physics

6. Textbooks and Internet Resources
7. Facilities

**Equipment**

Equipment available at Skoltech laboratories.

**Software**

Wolfram Mathematica, COMSOL, etc.

**Labs for Education**

- Hybrid Photonics Laboratory
- Laboratory of Nanomaterials

8. Learning Outcomes

**Knowledge**

Knowledge of modern research topics and approaches in Photonics and Quantum Materials

**Skill**

- Ability to independently conduct experimental and/or theoretical research in the field of physics.
- Ability to apply modern research methods to solving research problems.

**Experience**

- Participation in the research project.
- Analysis of results obtained and report preparation.

9. Assessment Criteria

**Input or Upload Example(s) of Assignment 1:**

**Select Assignment 1 Type** Report
<table>
<thead>
<tr>
<th>Input Example(s) of Assignment 1 (preferable)</th>
<th>Up to Research Advisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Criteria for Assignment 1</td>
<td>Up to Research Advisor</td>
</tr>
</tbody>
</table>

Input or Upload Example(s) of Assignment 2:

Input or Upload Example(s) of Assignment 3:

Input or Upload Example(s) of Assignment 4:

Input or Upload Example(s) of Assignment 5:

10. Additional Notes