Course Syllabus

Please find the new course syllabus form below.

You can complete the online form in one sitting or in several sessions (after filling in the initial data fields marked with a red asterisk). To return to the form, scroll down to the bottom and hit "Submit". You will then receive an automatic email with a link for further editing.

Also, you are able to share this same link with others (e.g. a co-instructor or colleague) for assistance or filling in particular data fields.

Some users report problems with the form on Internet Explorer 11. You might want to use Google Chrome, Firefox, Safari or Microsoft Edge instead.

Should you have any questions, please contact us at b.kheyfets@skoltech.ru.

Contact Person: Ivan Bogdanov
Contact Person's E-mail: i.bogdanov@skoltech.ru
Course Title (in English): Industrial Immersion
Course Title (in Russian): Производственная практика "Погружение в индустрию"
Lead Instructor(s): Maria Pukalchik, Yuriy Gladush, Kseniya Letova, Dmitry Krasovsky, Dmitry Pogozhev, Andrey Potapov, Alexey Cheremisin, Vera Rybko.
Here's a structure of the form below:

1. Annotation
2. Structure and Content
3. Assignments
4. Grading
5. Basic Information
6. Textbooks and Internet Resources
7. Facilities
8. Learning Outcomes
9. Assessment Criteria
10. Additional Notes

1. Annotation

Course Description
The goal of Industrial Immersion is to provide for Skoltech students real hands-on work experience in industrial sector and develop the knowledge and skills for making impact through engineering and innovation. The Industrial immersion is performed in a company and it implies that internships at academic or research institutions (like universities etc.) are excluded. Duration of Industrial Immersion is 8 weeks. Project focuses on short-term development, manufacturing or operations challenges rather than long-term research problems and is co-supervised by the company and Skoltech. The internship is cooperatively planned: project assignment is provided by the company and subject for approval of the Industrial Immersion Program Coordinator (I.I.P.C.).

Course Academic Level
Master-level

2. Structure and Content
Please note the number of ECTS credits for your course. You can reference the appropriate curriculum plan:

Masters Programs:

1. Advanced Manufacturing and Materials
2. Biotechnology
3. Computational Science and Engineering
4. Data Science
5. Energy Systems
6. Materials Science
7. Mathematical and Theoretical Physics
8. Petroleum Engineering
9. Photonics and Quantum Materials
10. Space and Engineering Systems

PhD Programs: (in progress)

1. Computational and Data Science and Engineering
2. Engineering Systems
3. Life Sciences
4. Materials Science and Engineering
5. Mathematics and Mechanics
6. Petroleum Engineering
7. Physics

**Number of ECTS credits**

12

**ECTS Credit System – Reference Tool**

**Total Number of ast. Hours in Your Course**

324

(1 ECTS credit is equal to 27 ast. hours of workload: contact + noncontact)

(recommended to be no more than 50% of the course)

(recommended to be no less than 30% of the course)
Contact hours consist of lectures, labs and seminars:

(strongly recommended to be no more than 30% of the contact hours)

Please distribute lecture, lab and seminar hours among topics, using the reference tool (grey box above) for guidance. The remaining hours will be calculated toward student's independent study (non-contact hours).
### 3. Assignments

<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Assignment Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Project</td>
<td>Students’ teams work in companies over a period of eight weeks during summer term, typically in June – July. The project work is performed under close supervision of a company project leader and Skoltech industrial immersion supervisor. Following the end of the industrial immersion students are expected to fill in the on-line report form and submit it to the Education office within a week after the end of the internship. The report will then be approved by company project leader and Skoltech supervisor.</td>
</tr>
<tr>
<td>Assignment Type</td>
<td>Assignment Summary</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Poster</td>
<td>Together with individual reports students should also submit team project posters via Canvas. A poster comprises the following sections: 1)Project title; 2)Background of the Project Task; 3)Objectives; 4)Process; 5)Results; 6)Conclusions. Poster template is provided and should be used as mandatory to ensure a better visibility of all posters exhibited at the Industry Day.</td>
</tr>
<tr>
<td>Conference</td>
<td>All students should attend Skoltech Industry Day and exhibit their posters at a poster session during the event. The poster should be provisionally approved by company project leader and Skoltech Industrial Immersion supervisor.</td>
</tr>
</tbody>
</table>
4. Grading

Type of Assessment

Pass/Fail

Grade Structure

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Activity weight, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Project</td>
<td>70</td>
</tr>
<tr>
<td>Poster</td>
<td>20</td>
</tr>
<tr>
<td>Conference</td>
<td>10</td>
</tr>
</tbody>
</table>

Grading Scale

Grading scale used at Skoltech is A-E (A – the highest, E – the lowest). F – fail. Alternative scale – Pass/Fail.

A
Exceeding expectations. The work examined is outstanding and provides evidence of excellent performance demonstrating a superior understanding of the subject matter, a foundation of extensive knowledge, and a skillful use of concepts and/or materials. All Learning Outcomes are satisfied at a high level.

B
Good. The work is of high standard and provides evidence of comprehensive knowledge and good performance demonstrating capacity to use the appropriate concepts, a good understanding of the subject matter, and an ability to handle the problems and materials encountered in the subject. All Learning Outcomes are satisfied and a majority satisfied at a high level.

C
Satisfactory. The work examined is generally satisfactory and provides evidence of adequate performance demonstrating a sufficient understanding of the subject matter however with notable shortcomings. Majority of the learning outcomes are satisfied at an appropriate level.

D
Poor. The work examined is poor and provides evidence of very limited familiarity with the subject matter, insufficient knowledge and significant shortcomings. The evidence shows that only some of the learning outcomes were satisfied at an appropriate level.

E
Very poor. Minimally acceptable performance. The work examined is very poor, demonstrates serious deficiencies and provides little evidence of knowledge, understanding, and/or skills and familiarity with the subject matter. Very few (if any) of the learning outcomes are satisfied at an appropriate level.

F
Fail. The work examined is unacceptable and provides minimum (if any) evidence of knowledge and understanding of the subject matter. The evidence fails to show that any of the Learning Outcomes are satisfied at an appropriate level.

The universal scale are percents. Please customize mapping from letter grades to percentage below, or just accept the defaults.
5. Basic Information

Course Stream: Sector (Summer Term)

Course Term (in context of Academic Year): Summer Term

In the next question we ask you to define general categories of the course. What does your course teaches in broad terms?

Course Tags:
- Physics
- Biotechnology
- Programming
- Engineering
- internship, industry, immersion, data science, project, company.

6. Textbooks and Internet Resources

You can request at most two required textbooks. Additionally, you can suggest up to nine recommended textbooks.
<table>
<thead>
<tr>
<th>Recommended Textbooks</th>
<th>ISBN-13 (or ISBN-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product design and Development, Karl T. Ulrich, Eppinger, fifth edition.</td>
<td>9780073404776</td>
</tr>
<tr>
<td>Technology Entrepreneurship: Taking Innovation to the Marketplace Thomas N. Duening, Robert A. Hisrich and Michael A. Lechter.</td>
<td>9780124201750</td>
</tr>
<tr>
<td>Lean Customer Development: Building Products Your Customers Will Buy, Cindy Alvarez.</td>
<td>9781492023746</td>
</tr>
</tbody>
</table>
7. Facilities

Software
Provided by a host company if necessary

Equipment
Provided by a host company

8. Learning Outcomes

These last bits of information (§8 and §9) is critical to prepare Educational Programs for International Accreditation requirements.

Knowledge
Knowledge of specific technology used in the company
Knowledge of project management
Knowledge of company’s structure
Knowledge of creating product value
<table>
<thead>
<tr>
<th><strong>Skill</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach area-specific information sources by using various databases. Collect and analyze data and interpret the results.</td>
</tr>
<tr>
<td>Present obtained information in a formal report and poster.</td>
</tr>
<tr>
<td>Technical skills in the specific field</td>
</tr>
<tr>
<td>Time and project management skills by completing the work objectives within the specific time limits.</td>
</tr>
<tr>
<td>Self-marketing skills in preparing student profile/interview with a company.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Experience</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Work individually or in a team in order to solve problems.</td>
</tr>
<tr>
<td>Assess practical implications of theoretical knowledge and improve skills acquired at the Institute.</td>
</tr>
<tr>
<td>Communicate within a real business unit of the organization, get industry insight and explore career options.</td>
</tr>
<tr>
<td>Obtain professional competences in a specific field.</td>
</tr>
</tbody>
</table>

**Do you want to specify outcomes in another framework?**

Knowledge-Skill-Experience is good enough

It is summarized [here](#). Please read the summary before specifying outcomes below.


It is summarized [here](#). Please read the summary before specifying outcomes below.

**Note:** some of the knowledge levels listed below might not apply to your course. You can leave them blank, but at least three out of six levels must be filled. It should help to prepare Educational Programs for International Accreditation requirements.
Sample verbs to use for this objective:

- define
- identify
- record
- name
- list
- retrieve
- repeat

Sample verbs to use for this objective:

- discuss
- report
- summarize
- restate
- tell
- recognize
- express
- locate
- extrapolate
- translate
- review
- explain
- describe
- interpret
Sample verbs to use for this objective:

- demonstrate
- practice
- apply
- use
- schedule
- sketch
- illustrate
- operate

Sample verbs to use for this objective:

- authenticate
- decipher
- itemize
- distinguish
- analyze
- differentiate
- appraise
- calculate
- experiment
- solve
- compare
- contrast
- criticize
- diagram
- inspect
- debate
- test
Sample verbs to use for this objective:

- compose
- design
- integrate
- construct
- organize
- plan
- manage
- appraise
- grade
- qualify
- measure
- score
- estimate
- create
- assemble
- set up
- formulate
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- arrange
- prepare
- judge
- evaluate
- rate
- compare
- choose
- assess

9. Assessment Criteria

Select Assignment 1 Type

Input or Upload Example(s) of Assignment 1:

- Input Example(s) of Assignment 1 (preferable)

Assessment Criteria for Assignment 1

The project is fully completed as per the task set by the company, the expected results are achieved. The report is submitted by a student in Canvas on time. The report is approved by company project leader and Skoltech supervisor as Pass/Fail.

Select Assignment 2 Type

Input or Upload Example(s) of Assignment 2:

- Input Example(s) of Assignment 2 (preferable)

Or Upload Example(s) of Assignment 2

Assessment Criteria for Assignment 2

Poster is created against the template and submitted via Canvas. The poster is approved by Company project leader and Skoltech Supervisor. Quality check includes:

1. Compliance of the presented information with the actual work performed;
2. Structuring of information and formatting of text as per the template - text is clear and to the point;
3. Effective use of graphics, color, and fonts;
4. Content.
Select Assignment 3 Type

Input or Upload Example(s) of Assignment 3:

**Assessment Criteria for Assignment 3**
Students attend the Skoltech Industry Day, exhibit posters at a poster session and answer questions about the content of the poster and project implementation.

Input or Upload Example(s) of Assignment 4:

Input or Upload Example(s) of Assignment 5:

**10. Additional Notes**

**Free Style Comments (if any)**
- A short list of companies and projects is prepared by Skoltech and offered to students for selection;
- Proposal for internship project within a certain company of a student's choice can arrive directly from a student but the project needs to be approved by Skoltech;
- Results of the internship stay inside the host company;
- The priority is for team projects.

**Status of this Syllabus**
The syllabus is a final draft waiting for form approval.