**Course Title (in English)**
Technology Entrepreneurship Foundation

**Course Title (in Russian)**
Основы технологического предпринимательства

**Lead Instructor(s)**
Kulish, Dmitry
Nikolaev, Alexey

**Is this syllabus complete, or do you plan to edit it again before sending it to the Education Office?**
The syllabus is a final draft waiting for approval (once approved the syllabus will be published on the public web-site and other systems)

**Contact Person**
Dmitry Kulish

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**1. Annotation**

**Course Description**
“Technology Entrepreneurship Foundations” (TEF) is a project-based 6-ECTS E&I course designed to provide STE MS students with a hands-on experience of translating your favorite science or technology into the innovative project and product. The TEF course comprises the class and team activities that cover all stages of the innovation process. This work is performed in cross-disciplinary teams operating under time pressure thus creating real life experience of complex innovation project.

The TEF course is designed for the wide diverse MS student audience with dramatically different levels of familiarity with the innovation process:
- Those who are simply curious about innovation will receive the intensive introduction to modern innovative theories and practices;
- Those who seriously intend to found their own technology-driven business, will enter “Skoltech Startup funnel” defined by CEI as the chain of courses that culminates in December by submitting Skolkovo Foundation residence application with the support of Skoltech Business Development group.

The TEF course slogan is “Leave the building and find your most urgent customer!” The key course topics are:
1. Problem statement (a.k.a. “Customer development”) supported by end user and customer testimonies on the problem severity;
2. The tangible prototype manufacturing, technical description, and scientific validation;
3. Customer feedback on prototype demonstration and testimonies on the usage cases;
4. Long term vision of the project (a.k.a. “Business Model Canvas”);
5. Short-term planning of the project (a.k.a. “Gantt chart”);
6. Agile approach of defining your next sprint and delivering it through the SCRUM rituals.

WARNING! The TEF course will be very intensive in Sep 1-11. Enroll with caution, beware of danger of failing due to the excessive course load in Term 1a. No kidding! TEF students will be heavily burdened EVERY day Sep 1 to Sep 11. Then things will relax a bit. Please plan your September wisely.

| Course Prerequisites / Recommendations | None. The course is designed to be an introductory experience for the novice and development experience for the mature innovator. |

### 2. Structure and Content

<table>
<thead>
<tr>
<th>Course Academic Level</th>
<th>Master-level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ECTS credits</td>
<td>6</td>
</tr>
<tr>
<td>Topic</td>
<td>Summary of Topic</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------</td>
</tr>
</tbody>
</table>
| LEAN STARTUP FRAMEWORK WEEK | • Problem Statement & Customer Development  
• Prototype: Science, technology, validation.  
• Customer & End User feedback  
• Long-term vision: Osterwalder Business Model Canvas  
• Short-term vision: Gantt chart  
• Agile & SCRUM  
• Elevator Pitches | 6 | 6 | 30 |
| QUICK FAILURE WEEK | • Team sorting  
--- team composition requirements: 2 students from the same CREI max, two nationalities min, two genders min  
• Speed dating  
• Leadership & Teamwork  
• Team SCRUM meetings  
• Project activities: Cusdev and Prototype technical description  
• QUICK FAILURE presentation | 4 | 6 | 30 |
| DRY RUN WEEK | • Money and Osterwalder  
• Project activities: Prototype validation experiment and end user feedback, CusDev expansion  
• Team SCRUM meetings  
• DRY RUN presentation | 2 | 4 | 34 |
| THE FINAL CUT WEEK | • Project activities  
• Team SCRUM meetings  
• THE FINAL CUT presentation: prototype demonstration, end user feedback, final business model | 2 | 4 | 34 |

3. Assignments
<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Assignment Summary</th>
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</thead>
<tbody>
<tr>
<td><strong>Presentation</strong></td>
<td>The 1st midterm TEF grade is the 1st (out of 4) TEF grade component that will account for the 10% of the final grade and be issued after and based on the “QUICK FAILURE” PROJECT PRESENTATION. Please see the detailed guidelines for the TEF team project presentation in the chapter 9.1 of this syllabus. The 1st midterm grade will be calculated as: The team grade for the “QUICK FAILURE” PROJECT PRESENTATION, multiplied by the personal Week 2 TEAM MUTUAL P2P ASSESSMENT SCORE, multiplied by the personal Week 1+2 ATTENDANCE SCORE. Each student in the TEF course will be required to weekly evaluate each of his or her fellow team members for their contribution to the team activities. It is compulsory. The confidential peer evaluation scores, using the Peer Evaluation Form, will need to be submitted by each student before midnight on Saturday following the end-of-sprint Presentation. Failure to submit a peer evaluation by Saturday 23:00 will lead to 0 (zero)% score for the corresponding week. The student ATTENDANCE SCORE will be calculated as an integrative score based on personal attendance of the TEF activities, and personal student feedback on the end-of-sprint presentations, and personal ELEVATOR PITCH score in the Weeks 1+2.</td>
</tr>
<tr>
<td><strong>Report</strong></td>
<td>The 2nd midterm TEF grade is the 2nd (out of 4) TEF grade component that will account for the 20% of the final grade and be issued after and based on the “DRY RUN” PROJECT PRESENTATION. Please see the detailed guidelines for the TEF team project presentation in the chapter 9.1 of this syllabus. The 2nd midterm grade will be calculated as: The team grade for the “DRY RUN” PROJECT PRESENTATION, multiplied by the personal Week 2 TEAM MUTUAL P2P ASSESSMENT SCORE, multiplied by the personal Week 3 ATTENDANCE SCORE. The student ATTENDANCE SCORE will be calculated as an integrative score based on personal attendance of the TEF activities, and personal student feedback on the end-of-sprint presentations.</td>
</tr>
<tr>
<td><strong>Report</strong></td>
<td>The 3rd midterm TEF grade is the 3rd (out of 4) TEF grade component that will account for the 30% of the final grade and be issued after and based on “THE FINAL CUT” PROJECT PRESENTATION. Please see the detailed guidelines for the TEF team project presentation in the chapter 9.1 of this syllabus. The 2nd midterm grade will be calculated as: The team grade for “THE FINAL CUT” PROJECT PRESENTATION, multiplied by the personal Week 2 TEAM MUTUAL P2P ASSESSMENT SCORE, multiplied by the personal Week 4 ATTENDANCE SCORE. The student ATTENDANCE SCORE will be calculated as an integrative score based on personal attendance of the TEF activities, and personal student feedback on the end-of-sprint presentations.</td>
</tr>
<tr>
<td><strong>Test/Quiz</strong></td>
<td>Personal student feedback on the end-of-sprint presentations.</td>
</tr>
<tr>
<td><strong>Homework</strong></td>
<td>P2P team mutual assessment and feedback. Each student in the TEF course will be required to weekly evaluate each of his or her fellow team members for their contribution to the team activities. It is compulsory. The confidential peer evaluation scores, using the Peer Evaluation Form, will need to be submitted by each student before midnight on Saturday following the end-of-sprint Presentation. Failure to submit a peer evaluation by Saturday 23:00 will lead to 0 (zero)% score for the corresponding week. Please be serious and responsible about failing or praising your team mates!</td>
</tr>
<tr>
<td><strong>Report</strong></td>
<td>The 4th (out of 4) TEF grade component will account for the 40% of the final grade and is the team grade for the TEF project FINAL REPORT, multiplied by the personal Week 4 TEAM MUTUAL ASSESSMENT SCORE, multiplied by the personal Week 4 ATTENDANCE SCORE. Please note that the FINAL TEF REPORT has nothing to do with the FINAL TEF PRESENTATION! Please see the detailed guidelines for the TEF team project report in the chapter 9.2 of this syllabus.</td>
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4. Grading

<table>
<thead>
<tr>
<th>Type of Assessment</th>
<th>Pass/Fail</th>
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<table>
<thead>
<tr>
<th>Grade Structure</th>
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<tbody>
<tr>
<td>Activity Type</td>
</tr>
<tr>
<td>Presentation</td>
</tr>
<tr>
<td>Presentation</td>
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<tr>
<td>Presentation</td>
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<tr>
<td>Report</td>
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</tbody>
</table>

Grading Scale

- Pass: 60

Attendance Requirements

- Mandatory

5. Basic Information

Maximum Number of Students

<table>
<thead>
<tr>
<th>Overall:</th>
<th>Maximum Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Group (for seminars and labs):</td>
<td>80</td>
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<tr>
<td>6</td>
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</table>

Course Stream

- Entrepreneurship and Innovation (E&I)

Course Term (in context of Academic Year)

- Term 1A (first four weeks)

Course Delivery Frequency

- Every year

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>
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</thead>
<tbody>
<tr>
<td>All Master Programs</td>
<td></td>
</tr>
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Course Tags

- E&I
### 6. Textbooks and Internet Resources

#### Required Textbooks

<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>ISBN-13 (or ISBN-10)</th>
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#### Recommended Textbooks

<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>ISBN-13 (or ISBN-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bill Aulet, Disciplined Entrepreneurship: 24 Steps to a Successful Startup, 2013</td>
<td>Bill Aulet</td>
<td>978-1118692288</td>
</tr>
<tr>
<td>The Mom Test: How to talk to customers &amp; learn if your business is a good idea when everyone is lying to you.</td>
<td>Steve Blank</td>
<td>978-1492180746</td>
</tr>
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</table>

#### Papers

<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>DOI or URL</th>
</tr>
</thead>
</table>

#### Web-resources (links)

<table>
<thead>
<tr>
<th>URL</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><a href="https://www.udacity.com/course/how-to-build-a-startup--ep245">https://www.udacity.com/course/how-to-build-a-startup--ep245</a></td>
<td>on line course &quot;How to Build a Startup. The Lean LaunchPad&quot; by Steve Blank</td>
</tr>
<tr>
<td><a href="http://www.steveblank.com">www.steveblank.com</a></td>
<td>a lot of useful information</td>
</tr>
<tr>
<td><a href="http://www.edx.com">www.edx.com</a></td>
<td>on line courses by Bill Aulet on Disciplined Entrepreneurship approach</td>
</tr>
</tbody>
</table>

### 7. Facilities

### 8. Learning Outcomes
## Knowledge

The course provides students with knowledge and understanding of:

1. what “high potential” entrepreneurship is and how it is enabled by technologies and innovations;
2. how the confluence of tech innovations, marketing, market forces, business model innovation drives new technology ventures;
3. what is a rigorous “entrepreneurship process” (e.g. “Disciplined Entrepreneurship” and “Customer Development”) and how it increases odds for success through iterative and concurrent activities dealing with the opportunity identification, evaluation, validation and scaling.

## Skill

Upon completion of the course students should have developed the skills:

1. ability to predict and assess market opportunity (driven by technology, customer needs or other forces) in markets that may not yet exist;
2. ability to create and a three-fold strategy (marketing, technology, business) and plans integrating technology development with evolving customer/market needs and venture “architecture” (aka “business model") design;
3. ability to execute “entrepreneurship process” performing market analysis, technology viability assessment, competitive positioning, team-building, product life-cycle planning, marketing strategy, sales channel analysis, as well as other points crucial for a new venture success.

## Experience

During this hands-on course students will experience
- entrepreneurial mindset “in action”,
- team and project work,
- communication (external and internal),
- dealing with uncertainty
as well as other valuable experiences helping students be successful in starting a new venture.

## 9. Assessment Criteria

Input or Upload Example(s) of Assignment 1:

Select Assignment 1 Type  | Presentation

Input Example(s) of Assignment 1 (preferable)
There will be three (3) End-Of-Sprint presentations: Quick Failure, Dry Run, and The Final Cut. Each presentation is governed by the identical rules and assessment criteria hence we define them all together now. For each presentation the TEF teams should make use of a presentation software (usually Powerpoint), and submit slides on the day of presentation. Each of the three team presentations will be assessed by Skoltech’s faculty solely on the basis of the quality of the live presentation itself. Three key assessment criteria are aligned with the structure of the SPRINT presentations that must consist of 6 (min) to 10 (max) slides built as follows:

1. Problem statement supplied with the customer testimonies on the problem severity
   • 2-3 slides
2. Prototype scientific rationale, technical description and scientific validation experiment
   • 2-3 slides
3. Customer feedback on prototype demonstration and testimonies on usage cases
   • 1 slide
4. Business Model Canvas (a.k.a. Osterwalder)
   • 1 slide
5. Gantt for the next sprint with team roles and assignments
   • 1 slide
6. The project evolution during the previous iteration with particular replies to the 3 SCRUM questions: 1) what you learned during the previous print, 2) what you plan to achieve during the next sprint, 3) what makes you uneasy in the team TEF project.
   • 1 slide

The maximum length of presentation is 5 minutes, followed by 10 minutes Q&A. Each team member is mandated to speak during the presentation. It is recommended to assign each presentation topic as the particular team member responsibility both is executing and presentation.

Please note that the iterative nature of TEF learning requires that the evolution of each pillar of the Project since the previous iteration is emphasized both in team discussions and presentations. Such evolution will be the sizable component of the TEF team grade.

**Assessment Criteria for Assignment 1**

Comprehensiveness, clarity, depth.

**Input or Upload Example(s) of Assignment 2:**

**Select Assignment 2 Type**

Report

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

The final TEF task is the largest (40%) component of the final grade so please pay attention to this assignment description. ATTENTION! The final TEF report has NOTHING to do with the project presentation. It is NOT THE DESCRIPTION of your project, but the story of your team and project journey with discussion of lessons learned and plans conceived.

The written report is produced and submitted by the team and includes the three (3) main components:

1) The STORY of your team’s Project from the first iteration (“Quick Failure” Friday) of the Technological Innovation Scheme to the third iteration of the Technological Innovation Scheme (“The Final Cut” Friday)

2) Discussion of the LESSONS that your team has learned from doing the TEF Project
3) Statement and explanation of the THE NEXT STEPS that need to be made by the team, going forward after the end of the TEF.

Each team should submit one single team report to the appropriate team-assignment location on Canvas. Only one person from each team needs to submit the report to Canvas. There is no required minimum or maximum length for the report. You may include as many appendices (tables, charts, diagrams, supporting data, photographs, etc.) as you like.

There is no standard expected format for the assignment, and your team is free to be creative in its design and form of expression for the report. However, it is important that the report is comprehensive in its coverage of your team’s Technological Innovation Scheme (a.k.a. The TEF project) and that it effectively describes the evolution of the various iterations of the Scheme. It is also important that you provide empirical evidence for the main claims and propositions contained in the final iteration of your Scheme. As you describe the evolution of your Technological Innovation Scheme, make sure that you properly articulate the evolving relationship between its four key elements, namely: the practical problem, the practical solution to the practical problem, the technical problem generated by the practical solution, and the technical solution to the technical problem.

After you have completed documenting the story of how your team evolved through multiple iterations of your Technological Innovation Scheme, you must identify some lessons learned as a result of doing the Project and from reflecting about the process of doing the Project. Your lessons might concern, for example: new insights about the nature of technological innovation; observations about leadership and team work; a fresh understanding of the relationship between business and science; a new understanding of how to connect technology with business planning; lessons about how to communicate technological ideas; enhanced perception of what it takes to mobilize new technology to help solve practical problems; or, new insights about the nature of problems. Many other insights are also possible.

Finally, you should articulate what strategic decision, or decisions, your team would need to make to move to the next stage in your project (i.e., after the end of the TEF). For example, should you move ahead to establish a start-up to commercialize the ideas embedded in your Technological Innovation Scheme? Or, should you work together as a team to go through several more iterations before your Scheme is ready for commercialization? Or, should you completely abandon your idea and work on something quite different? Or do you need to solve some technical problems before embarking on a start-up? Or, should you work in the lab for several months to develop a technical “solution” that could be licensed to another company? In other words, you should articulate what is the way forward for the future of your Project (should you wish to continue with it beyond the end of the TEF).

After you have identified the strategic decision, or strategic choice, that you need to make you should explain WHY that decision or choice is appropriate. In other words, explain why your team ought to move forward in the way you have articulated. The team report is an opportunity for you and your fellow team members to pull everything together to make a unified expression of your work in the Project.

Assessment Criteria for Assignment 2

Comprehensiveness, clarity, depth.
10. Additional Notes

PLEASE NOTE TWO CRUCIAL ASPECTS OF THE TEF GRADING:

• Each student in the TEF course will be required to weekly evaluate each of his or her fellow team members for their contribution to the team activities. It is compulsory. The confidential peer evaluation scores, using the Peer Evaluation Form, will need to be submitted by each student before midnight on Saturday following the Friday Presentation. Failure to submit a peer evaluation by Saturday 23:00 will lead to 0 (zero)% score for the corresponding week.

• ATTENDANCE component of the TEF grade: TEF attendance metric is clearly not the measure of innovation ability, however, discipline and attendance are so reflective of the TEF participation and correlated with TEF learnings, that they will be an important component of the student IW grade. Students absent without permission will be penalized accordingly, and the penalties will be serious enough to potentially prevent a student from passing the course. The attendance component will be the multiplicator of the final TEF grade. Therefore, those students who missed the critical share of the IW classes will receive 0% grade irrespectively of their project and team assessment scores.

WARNING! There are three specific features of the TEF course of which students must be aware:

1. it is 6-credit course taught in 4 weeks so it is going to be very intensive. Enroll with caution, beware of danger of failing due to the excessive course load in T1a.

2. the course starts with intensive workshop: you will be heavily burdened EVERY day September 1 to September 11. No kidding! Every day Sep 1-11! Then things will relax a bit. Please carefully plan your early September.

3. You will work in semi-random cross-disciplinary cross-cultural teams. You will not be able to fully build and define your team.