<table>
<thead>
<tr>
<th><strong>Course Title (in English)</strong></th>
<th>Materials Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Title (in Russian)</strong></td>
<td>Химия материалов</td>
</tr>
<tr>
<td><strong>Lead Instructor(s)</strong></td>
<td>Stevenson, Keith</td>
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</tbody>
</table>

**Is this syllabus complete, or do you plan to edit it again before sending it to the Education Office?**
The syllabus is a work in progress (draft)

<table>
<thead>
<tr>
<th><strong>Contact Person</strong></th>
<th>Keith Stevenson</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact Person's E-mail</strong></td>
<td><a href="mailto:k.stevenson@skoltech.ru">k.stevenson@skoltech.ru</a></td>
</tr>
</tbody>
</table>

### 1. Annotation

**Course Description**
The goal of this course is to provide a survey of materials chemistry and their characterization techniques with an emphasis on chemical, electrical, optical and magnetic properties. Further emphasis will be placed upon application of materials chemistry to energy storage and conversion processes (batteries, fuel- and solar-cells).

Upon completion of this course the students will be able to master:

1. Classes of Materials
   - crystalline solids: ionic, covalent, metallic, polymers
   - 3-D structures, polymorphism, importance of defects, effect of nanoscale phase diagrams, transformations, glasses, composites

2. Property of Materials
   - Electrical
   - Optical
   - Magnetic

3. Materials Chemistry Analysis Methods
   - Surface Sensitivity and Specificity
   - X-ray Photoelectron Spectroscopy
   - Ultraviolet Photoelectron Spectroscopy

Course Prerequisites / Recommendations

Undergraduate Math, Chemistry, Physics

2. Structure and Content

Course Academic Level

Master-level course suitable for PhD students

Number of ECTS credits

6

3. Assignments

4. Grading

Type of Assessment

Graded

Grading Scale

A: 86

B: 76
5. Basic Information

Maximum Number of Students

<table>
<thead>
<tr>
<th></th>
<th>Maximum Number of Students</th>
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<tbody>
<tr>
<td>Overall:</td>
<td>30</td>
</tr>
<tr>
<td>Per Group (for seminars and labs):</td>
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</table>

Course Stream
- Science, Technology and Engineering (STE)

Course Term (in context of Academic Year)
- Term 2

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>
</tr>
</thead>
<tbody>
<tr>
<td>Materials Science</td>
<td>Materials Science and Engineering</td>
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</tbody>
</table>

Course Tags
- materials science

6. Textbooks and Internet Resources
### Recommended Textbooks

<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>ISBN-13 (or ISBN-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Materials Chemistry</td>
<td>Harry R. Alcock</td>
<td>978-0-470-29333-1</td>
</tr>
<tr>
<td>Materials Chemistry</td>
<td>Fahlman, Bradley D.</td>
<td>978-94-007-0693-4</td>
</tr>
<tr>
<td><a href="http://www.chem.qmul.ac.uk/surfaces/scc/">http://www.chem.qmul.ac.uk/surfaces/scc/</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Web-resources (links)

<table>
<thead>
<tr>
<th>URL</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.chem.qmul.ac.uk/surfaces/scc/">http://www.chem.qmul.ac.uk/surfaces/scc/</a></td>
<td>Introduction to surface chemistry</td>
</tr>
</tbody>
</table>

### 7. Facilities

### 8. Learning Outcomes

### 9. Assessment Criteria

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