Module title: Surface Science

Field / responsibility of: Physics / the faculty, the Dean of Studies

Module contents:
- Introduction and overview
- Vacuum
- Creation and preparation of surfaces
- Thermodynamics of clean surfaces and morphology
- Geometrical structure of surfaces, relaxations, reconstructions, superlattices
- Electronic characteristics, local work function
- Adsorbates on surfaces
- Vibrations and phonons on surfaces
- Diffusion, nucleation and growth
- Research methods

Qualification objectives of the module / competencies to be acquired:
Acquiring a fundamental knowledge of concepts and characteristics of surfaces. In addition, this module covers methods of preparing surfaces and growing layers. Experimental research methods will be discussed.

Prerequisites for participation:
a) Recommended knowledge: Solid-state physics, quantum mechanics I
b) Prerequisite courses: None

Module can be used for:
MSc. in Physics, MSc. in Nanoscience, MSc. in Comp. Science, MSc. in Chemistry; BSc.in Nanoscience, BSc. in Comp. Science

Module is offered: On a yearly basis

Module can be completed in: 1 semester

Recommended semester of study: Minimum: 1

Overall module workload / number of credit points:
Workload:
Total number of hours: 240
Allocation:
1. Attendance: 4 credit hours
2. Independent study (including exam preparation/exam): 180 hours
Credit points: 8

Module components:

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Req./req. elective</th>
<th>Form of teaching</th>
<th>Subject area / topic</th>
<th>Credit hours</th>
<th>Coursework</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY-M-VF 1.1</td>
<td>Required elective</td>
<td>Lecture</td>
<td>Surface science</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
## 13. Module exam:

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Competence / topic</th>
<th>Type of exam</th>
<th>Duration</th>
<th>Time / notes</th>
<th>Weighting for module grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY-M-VF 1.1</td>
<td>Surface science</td>
<td>Type of exam: Oral or written; duration: 20 min, or 105 min, 135 min or 210 min (if it consists of two parts); time: Lecture period to end of semester</td>
<td>1</td>
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### 14. Notes:

Further information will be provided by the instructors at the beginning of the course.