1. **Module title:** Low Temperature Physics

2. **Field / responsibility of:** Physics / the faculty, the Dean of Studies

3. **Module contents:**
   - Liquefaction of gases
   - Helium cryostats
   - Thermometry
   - Ultracold atomic gases
   - Bosons: Superfluid helium-4
   - Fermions: Helium 3
   - The 3He/4He dilution refrigerator
   - Ginzburg-Landau theory
   - Type II superconductors
   - Josephson junctions
   - High-temperature superconductors

4. **Qualification objectives of the module / competencies to be acquired:**
   - Acquiring a fundamental knowledge of low temperature physics as well as of quantum fluid characteristics

5. **Prerequisites for participation:**
   a) **Recommended knowledge:** Experimental physics IV: Thermodynamics
   b) **Prerequisite courses:** None

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

7. **Module is offered:** On a yearly basis

8. **Module can be completed in:** 1 semester

9. **Recommended semester of study:** Minimum: 1

10. **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

11. **The module is successfully completed when the requirements below have been met.**

12. **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>
</tr>
</thead>
<tbody>
<tr>
<td>PHY-M-VF 5 1</td>
<td>Required elective</td>
<td>Lecture</td>
<td>Low temperature physics</td>
<td>4</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 5 .1</td>
<td>Low temperature physics</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>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. Notes:

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