## 1. Module title: Biophysics as Complementary Subject

## 2. Field / responsibility of: Faculty of Biology, Dean of Studies

## 3. Module contents:

Introductory topics of modern biophysics and structural biology will be discussed, focusing on physical foundations, concepts and procedures.

- Lecture and seminar / labs Biophysics I (physical methods to determine the structure of biomolecules)
- Lecture and seminar / labs Biophysics II (bioinformatics and modeling of unknown structures)
- Lecture Data Analysis and Machine Learning
- Lecture Fundamentals of Biological NMR Spectroscopy

## 4. Qualification objectives of the module / competencies to be acquired:

Teaching fundamental knowledge of the concepts and physical procedures in biophysics. This will enable students to classify biophysical problems and to solve them effectively. In addition, they will be able to analyze and interpret NMR and ESR spectra. In the area of machine learning, students will be able to program modern learning algorithms and to apply them to problems of data and image analysis.

## 5. Prerequisites for participation:

**a) Recommended knowledge:** None

**b) Prerequisite courses:** None

## 6. Module can be used for: Master in Physics

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

## 8. Module can be completed in: 2 semesters

## 9. Recommended semester of study: 1 to 2

## 10. Overall module workload / number of credit points:

1. Attendance: 12 credit hours
2. Independent study (including exam preparation / exam): 300 hours
Credit points: 16

The successful completion of all assignments listed in items 11 and 12 is a prerequisite for receiving the credit points mentioned in item 10.
## 11. Module components:

<table>
<thead>
<tr>
<th>No.</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-VE 08.1</td>
<td>Compulsory</td>
<td>Lecture Seminar Labs</td>
<td>Biophysics I</td>
<td>9</td>
<td>Written exam, seminar presentation</td>
</tr>
<tr>
<td>PHY-M-VE 08.2</td>
<td>Compulsory</td>
<td>Lecture Seminar Labs</td>
<td>Biophysics II</td>
<td>9</td>
<td>Written exam, seminar presentation</td>
</tr>
<tr>
<td>PHY-M-VE 08.3</td>
<td>Compulsory</td>
<td>Lecture Practical course</td>
<td>Machine Learning I or II with practical exercises</td>
<td>4</td>
<td>Written exam</td>
</tr>
<tr>
<td>PHY-M-VE 08.4</td>
<td>Compulsory</td>
<td>Lecture</td>
<td>Fundamentals of Biological NMR Spectroscopy</td>
<td>2</td>
<td>Written exam</td>
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</table>

## 12. Module exam:

<table>
<thead>
<tr>
<th>No.</th>
<th>Competence / topic</th>
<th>Type of exam</th>
<th>Duration</th>
<th>Time / notes</th>
<th>Weighting of module grade</th>
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</thead>
<tbody>
<tr>
<td>PHY-M-VE 08.5</td>
<td>Biophysics</td>
<td>Oral</td>
<td>30 minutes</td>
<td>Following the module components</td>
<td>1</td>
</tr>
</tbody>
</table>

## 13. Notes:

The complementary subject may only be used for a master in Physics if the module components have not yet counted towards the bachelor degree.