1. **Course Goals**

In-depth study by students of mathematical models used to describe material deformation under indentation. Skills to develop specific mathematical models for indentation testing of biological tissues, their analytical implementation, and analysis of results of mathematical modeling.

Competencies provided by module (%)
- specialized knowledge 60
- methodological competence 35
- system knowledge 5
- social competence 0

2. **Contents**

- Elastic and viscoelastic materials; Biphasic material; Confined and unconfined compression tests;
- Frictionless flat-ended and spherical indentation; Thickness effect in indentation; Indentation of relatively thin elastic layers; Rebound indentation test; Dynamic indentation test; Vibration indentation test; Fung's quasi-linear viscoelastic model; Impact testing and Hunt–Crossley model; Multi-scale indentation testing.

3. **Literature**

Are printed scripts available? yes [ ], no [ ]
Are electronic scripts available? Yes [ ], no [ ]

**Literature:**

4. **Courses**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Classroom Format</th>
<th>Number of hours</th>
<th>ECTS credits</th>
<th>Language</th>
<th>Semester (WS / SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indentation testing of biological tissues</td>
<td>Lecture Lab</td>
<td>30</td>
<td>6</td>
<td>English</td>
<td>SS</td>
</tr>
</tbody>
</table>

5. **Teaching Format**

Lecture, practical training with the use of multimedia equipment
### 6. Prerequisites

a) obligatory: knowledge of mechanics and higher mathematics, possession of basic knowledge of mathematical models of contact phenomena (Indentation, Elastic deformation, Viscoelastic deformation)
b) desirable: elements of mathematical physics and analytical methods

### 7. Workload and Credits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in lectures/classes</td>
<td>60 h</td>
</tr>
<tr>
<td>Private study</td>
<td>60 h</td>
</tr>
<tr>
<td>Tests and examination preparation</td>
<td>60 h</td>
</tr>
<tr>
<td>Total</td>
<td>180 h</td>
</tr>
</tbody>
</table>

LP: 6

### 8. Examination Format

Oral or written test/exam

### 9. Module Duration

Achievable in 1 semester

### 10. Number of Students

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### 11. Course Registration

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