

Module Title Indentation testing of biological tissues	Credits (ECTS) 6	IndentTest
Module Overseer: Ivan Argatov		Email: ivan.argatov@gmail.com
Module Description		

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:

1. Popov, V.L., 2010. Contact Mechanics and Friction. Springer, New York.
2. Johnson, K.L., 1985. Contact Mechanics. Cambridge University Press, Cambridge.
3. Fischer-Cripps, A.C., 2004. Nanoindentation. Springer, New York.
4. Fung, Y.C., 1981. Biomechanics—Mechanical properties of living tissues. Springer Verlag, New York.

4. Courses

Course Title	Classroom Format	Number of hours	ECTS credits	Language	Semester (WS / SS) Winter or Summer
1. Indentation testing of biological tissues	Lecture Lab	30 30	6	English	SS

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

Participation in lectures/classes: 60 h
Private study: 60 h
Tests and examination preparation: 60 h
Total: 180 h**
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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