Syllabus: Introduction to Biomechanics

TU Berlin Summer University 2020 Term 4

Week 1 August 17th- 21st

	17	18	19	20	21
	Monday	Tuesday	Wednesday	Thursday	Friday
9:00 - 10:30	Welcome Day! Orientation and 1st session First session-Introduction to biomechanics (2 hours)	Biomechanics of Bone	Challenges in mechanical testing of soft tissues	Biomechanics of Movement	Practical session: Introduction to Matlab Project
11:00 - 12:30		Biomechanics of Ligaments and Tendons	Viscoelastic modelling of soft tissues	Cardiovascular Biomechanics	Practical session: Matlab coding/movement Kinematics
13:30 - 15:30		Biomechanics of Muscle Practical session: bone & bone fracture tutorial	Cultural Program	Fieldtrip: Visit to the gait lab	Practical session: Matlab coding/movement kinetics
16:00 +					Cultural Program

Week 2 August 24th- 28th

	24	25	26	27	28
	Monday	Tuesday	Wednesday	Thursday	Friday
9:00 - 10:30	Biomechanics of Knee	Biomechanics of Fracture and Fracture fixation	Tissue Engineering	Exam	Ergonomics and Rehabilitation Biomechanics
11:00 - 12:30	Biomechanics of Hip	Orthopaedic Biomaterials	Mechanics of Cells	Exam	*In vivo, in vitro* or *in silico*?
13:30 – 15:30	Biomechanics of Spine	Practical session: knee-hip-spine tutorial	Cultural Program	Field trip: Visit to the Biomechanics lab	Imaging Techniques
16:00 +	Cultural Program				**Certificates Ceremony**

Key

Lecture	Field Trip or Practical	Assessment	Cultural Program activity*

*The cultural program timetable will be emailed to you shortly before your course starts. For more information about the cultural program, and for examples of previous schedules, head here: https://www.tu-berlin.de/menue/summer_university/cultural_program/

Assessment information

You will be assessed in the following ways (see yellow sessions in schedule, if applicable):

- Written Exam on 27.08.2020
- Matlab Project, due 25.08.2020 at 23:59
- Practical Sessions and fieldtrips

Your assessments will be weighted as follows:

- Written Exam 40%
- Matlab Project 35%
- Participation in fieldtrips and Practical sessions 25%

Grading information

All participants of the TU Berlin Summer & Winter University are required to select their grading option at the time of registration. The two options available are (i) graded or (ii) pass/fail.

All participants who select option (i) graded, will receive a grade under the German grading system. The following table provides an overview of the grading system and equivalent scores for international credit transfers:

Total mark	German grade	English description
More or equal to 95	1,0	Excellent
More or equal to 90	1,3	Very good
More or equal to 85	1,7	Good
More or equal to 80	2,0	Good
More or equal to 75	2,3	Good
More or equal to 70	2,7	Satisfactory
More or equal to 65	3,0	Satisfactory
More or equal to 60	3,3	Satisfactory
More or equal to 55	3,7	Sufficient
More or equal to 50	4,0	Sufficient
Less than 50	5,0	Failed

Credit Points

ECTS is a point system and European standard developed by the Commission of the European Community. ECTS stands for European Credit Transfer System. The aim is to provide common procedures and guarantee academic recognition of studies abroad. The credit system is based on student workload. All lectures, seminars, excursions and homework count towards the workload. One point is awarded for the equivalent of 25-30 hours of workload.

Reading list

All sources below are available either open source, in the TU Berlin library, or will be provided to you directly by your lecturers, during the course.

To search resources available in the TU Berlin library, check here: https://www.ub.tu-berlin.de/en/searching-for-resources/

1. Electronic lecture notes provided by the lecturers
2. Matlab course on YouTube (https://www.youtube.com/watch?v=T_ekAD7U-wU)
3. Y. C. Fung. Biomechanics: Mechanical Properties of Living Tissues (http://www.gaitlab.ir/books/gaitlab_ref_22_Biomechanics:_Mechanical_Properties_of_Living_Tissues.pdf)
4. J. D. Bronzino; Donald R. Peterson. Biomedical engineering fundamentals, 4th ed., Boca Raton, Florida : CRC Press, 2015
5. R. Zdero. Experimental methods in orthopaedic biomechanics, Amsterdam : Elsevier Academic Press, 2017
6. M. Gladys Scott. Analysis of human motion: a textbook in Kinesiology, 2nd ed., New York: Appleton-Century-Crofts, 1963