



BIP at HUSS

Blended Intensive Program at the Hungarian University of Sports Science

The basics of musculoskeletal modelling and simulation-OpenSim

A blended intensive program in Biomechanics

Coordinator — Hungarian University of Sports Science (HUSS)

Course goal and overview — This course is for university students and professionals working and studying in the areas of biomechanics and motor control science with a special emphasis on sport performance, gait analyses, analyses of joint loads, workplace ergonomics, etc.

Musculoskeletal modelling and simulation are powerful methods to understand the biomechanics of human movements beyond what is possible to measure. Using these methods enables us to simulate movements and examine the resulting behaviour. For example, in handball players, where the risk of anterior cruciate ligament (ACL) injury is high, we can examine how different field surface or movement patterns impact ACL strain thus injury risk on an individual level. To achieve this, we feed the model with experimental data collected from the examined athlete.

During this course, the audience will learn the basics of the freely available OpenSim software to develop individual-specific musculoskeletal simulations, which will assist them to better understand the biomechanics of movements on levels which cannot be examined experimentally.

The course involves lectures and hands-on practical experiences. Local and international experts deliver the lectures. Participants receive in-person learning content in synchronous and asynchronous formats, written and video forms and on an interactive platform. Demonstrations will be supplemented with Matlab and Python scripts. The intensive educational activities (1-day lectures 4 days practice, 2x90 min each day) are combined with cultural immersion and sport programs on and off campus. Budapest is one of the most attractive of the European capitals. ERASMUS BIP mobility is available for HUSS partner universities supporting your travel and accommodation costs. A stipend will be available for you to defer costs while on campus. Enrollment is set at 15-20 participants.

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Krisztina Cseh (operative questions) – cseh.krisztina@tf.hu

PROGRAM DETAILS

Classes:

5 days on campus (1 day lectures, 4 days practice)

Venues:

Campus (HUSS)

On campus:

9-13 October 2023

Credits: 4 ECTS

For whom: Advanced bachelor, master, and doctoral students in the fields of biomechanics, sport and health sciences, kinesiology, exercise and human movement sciences, rehabilitation practitioners

Bring your own laptop (laptops will be provided in limited numbers)

All applicants apply for Erasmus support (Erasmus mobility for students, Erasmus training mobility for staff) from their own University to cover accommodation, etc.



HUNGARIAN UNIVERSITY
OF SPORTS SCIENCE
BUDAPEST

FACULTY

Course director:

Prof. Dr. Tibor Hortobágyi, PhD — Professor of exercise neuroscience, biomechanics.
Hungarian University of Sports Science; University of Pécs; Kaposi Mór Teaching Hospital,
Kaposvár, Hungary; University of Groningen, The Netherlands

Faculty and experts contributing to the course:

Dr. András Hegyi, PhD — Research fellow, specialized in biomechanics. Hungarian
University of Sports Science.

Dr. Annamária Péter, PhD — Research fellow, specialized biomechanics. Hungarian
University of Sports Science.

Prof. Dr. Arnold Baca — Professor, Head of Centre for Sport Science and University Sports,
Department of Sport Science, University of Vienna

Dr. Basílio Gonçalves, PhD — Postdoctoral research fellow, biomechanics, University of
Vienna

Dr. Hans Kainz, PhD. — Ass.-Professor, Head of Neuromechanics Research Group,
Department of Sport Science, University of Vienna