ME-484

Numerical methods in biomechanics

Terrier Alexandre

Cursus	Sem.	Type
Biomedical technologies minor	E	Opt.
Mechanical engineering minor	E	Opt.
Mechanical engineering	MA2, MA4	Opt.
Robotics	MA2, MA4	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Content

- Use of numerical methods in biomechanics through some examples (tissue engineering, mechanical biology, artificial organs, external lectures from academics and industry)
- Partial Differential Equations reviewed in this context
- General physics (solid, fluid, heat, transport) reviewed and extended through examples
- Finite Element Method explained through practical examples.
- Multi-physics and coupling problems
- Importance of Verification, Validation and Uncertainty Quantification
- Practical examples discussed in classroom
- Weekly exercises in different fields of biomechanics
- Group projects

Assessment methods

- Midterm test or report (1/3)
- Oral presentation of project (1/6)
- Written rapport of project (1/6)
- Written exam (1/3)

Resources

Ressources en bibliothèque

- Find the reference at the Library

Moodle Link

- https://go.epfl.ch/ME-484