

Biomechanics and micro hydrodynamics



ECTS credits
2 credits

In brief

> **Course language:** French

Presentation

Prerequisites

none

Learning objectives

- Understand the complexity of the characteristics and functioning of living environments.
 - Predict and analyze mechanical phenomena in the living world to bring new insights from mechanics to health issues.
 - Know how to identify the key mechanisms and choose the right models according to the problem considered for living environments.
 - Acquire and master certain modeling and characterization tools for living environments.
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Description of the programme

The objectives of the program will be conceptualized during an introductory talk that will present the pedagogical motivations. Some examples of articulation: biological system, functioning, pathology, modeling, diagnosis, and therapy will allow the medical and mechanical contexts to be linked. The medical context will be addressed by a clinician experienced in clinical research activities. The courses on characterization, modeling of biological tissues and fluids, and fluid-structure interactions will be taught by teacher-researchers specializing in the field. They will be declined after explaining their contribution in relation to the examples of articulation. Within the framework of a project, various scientific articles directly related to the courses will be proposed to the students in order to allow them to apprehend the scientific research. Finally, a practical work that will be a concrete application of the courses will be proposed.

Generic central skills and knowledge targeted in the discipline

- Understand and simplify a complex biomechanical problem.
- Be able to propose appropriate solutions.
- Understand how to structure their work in a time.
- Be able to report on one's work both orally and in writing.

How knowledge is tested

CC : QCM at the beginning of each course, writing of TP reports, bibliographic analysis, proctored exams, 100%

Bibliography

1. Fung, Y. C. (1993). *Biomechanics: Mechanical Properties of Living Tissues, Second Edition* (2nd ed.). Springer.
2. Humphrey, J. D. (2002). *Cardiovascular Solid Mechanics: Cells, Tissues, and Organs* (2002nd ed.). Springer

Teaching team

Cécile Baron (CNRS-IRPHE)

Olivier Boiron (ECM)

Carine Guivier-Curien (AMU)

Valérie Deplano (CNRS-IRPHE)

A practicing clinician

Sustainable Development Goal



Access to health

Total des heures		24h
CM	Master class	16h
TD	Directed work	4h
TP	Practical work	4h

Useful info

Name responsible for EU

Lead Instructor

Daniel Mazzoni

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