Remark
The course is held in an amended format giving more freedom to students to learn plan and perform research.

Summary
Advanced Bioengineering Methods Laboratories (ABML) offers laboratory practice and data analysis. These active sessions present a variety of techniques employed in the bioengineering field and matching a quantitative and technological based approach.

Content

Keywords
Atomic force microscopy (AFM), Lab on the chip (LOC), Brownian motion, Optical trapping, Surface Plasmon Resonance, bioanalytics, surface design, writing scientific papers

Learning Prerequisites
Required courses
Required background: Biophysics I, Biothermodynamics, Biomicroscopy I, + mandatory courses of M1

Expected student activities
Beyond the work requested during the supervised sessions (practice and analysis), the student will have to:

- Read the introduction of each topic before the corresponding practice, and summarize this information in his laboratory notebook.
- Review the data analysis tools needed for the analysis sessions and prepare the required calculations ahead of the corresponding analysis session.
- Fill the laboratory notebook progressively along the semester.
- Develop a research plan for the independent project
- Write the research paper

The workload varies widely with the capabilities of each student. However, we expect, for each of the 6 topics
investigated, an approximate working time of

- 2 h : Preparation of the practical session
- 4 h : Practical session

Resources

Bibliography

- Handouts given during the course.
- *Intermolecular and Surface Forces*, J. Israelachvili, Academic press
- *Surface Plasmon resonance Based Sensors*, J.Homola et al., Springer
- *Surface Design: Applications in Bioscience and Nanotechnology*, R. Forch, H. Schonherr, A.T. Jenkins, Wiley
- *Atomic Force Microscopy*, Peter Eaton and Paul West, Oxford University Press 2010

Ressources en bibliothèque

- Intermolecular and Surface Forces / Israelachvili
- Surface Plasmon resonance Based Sensors / Homola
- Surface Design: Applications in Bioscience and Nanotechnology / Forch
- Introduction to Error Analysis / Taylor
- Optical Trapping Review / Neuman
- Lab on a Chip Technology / Herold
- Atomic force microscopy/ Peter Eaton ; Paul West

Notes/Handbook

Can be downloaded from http://lben.epfl.ch/Teaching

Moodle Link

- https://go.epfl.ch/BIOENG-444