

BIOENG-312

Fluid mechanics (for SV)

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| Cursus | Sem. | Type |
|---------------------------|-------------|-------------|
| Life Sciences Engineering | BA4 | Obl. |

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|----------------------------|-----------------|
| Language of teaching | English |
| Credits | 4 |
| Session | Summer |
| Semester | Spring |
| Exam | Written |
| Workload | 120h |
| Weeks | 14 |
| Hours | 4 weekly |
| Courses | 2 weekly |
| Exercises | 2 weekly |
| Number of positions | |

Summary

This introductory course on fluids mechanics presents the basics concepts in fluids statics, dynamics and kinematics. All the concepts required to take the cardiovascular track in the Bioengineering Master program are covered.

Content

1. Introduction. Basic characteristics of fluids.
2. Fluid statics.
3. Elementary fluid dynamics. The Bernoulli equation.
4. Fluid kinematics. The velocity field. Acceleration field. The Reynolds transport theorem.
5. Control volume analysis. Mass conservation. Momentum and moment-of-momentum equations.
6. Differential analysis of fluid flow. Inviscid flow. Potential flow. Viscous flow. Navier-Stokes equations. Simple solutions to viscous, incompressible flows.
7. Dimensional analysis.
8. Viscous flow in pipes.