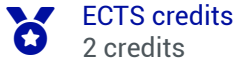


Fluid-structure interactions



ECTS credits
2 credits

In brief

➤ **Course language:** French

Presentation

Learning objectives

- * Acquire the knowledge necessary to identify situations that could potentially generate fluid-structure couplings and be in a position to propose palliative solutions when possible
 - * To know the main modes of coupling
 - * Know how to model, analyze and dimension a problem where a simple fluid-structure coupling occurs
 - * Know how to interpret experiments involving fluid-structure couplings
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Description of the programme

- * Examples of fluid-structure couplings in the fields of civil engineering, aeronautics, space and energy
 - * Reminder of fluid mechanics and elastodynamics
 - * Dimensional analysis of fluid-structure couplings
 - * Classification of fluid-structure interaction problems
 - * Structure immersed in a fluid at rest - added mass
 - * Aeroelasticity (aeroelastic coefficients and applications in aeronautics and civil engineering)
 - * Ballooning of fluids in tanks (Tuned Liquid Damper, POGO effect)
 - * Deformable pipes (applications in biomechanics and hydraulics)
 - * Introduction to the numerical study of fluid-structure couplings
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Generic central skills and knowledge targeted in the discipline

- * Know how to model and analyze fluid-structure couplings (C2)
- * Master the associated dimensioning methods (C2)

- * Be able to calculate aerodynamic forces on structures (C2)
- * Interpret experimental results (C2)

How knowledge is tested

Practical work: restitution of reports, 50%.

Project: report restitution, 50%.

Bibliography

E.H. Dowell, A modern course in aeroelasticity, Kluwer acad. publisher, 2004

1. Carmona, et J.-C. Foucriat, Comportement au vent des ponts, Presses des ponts et chaussées, 2002.
2. de Langre, Fluides et solides, Éditions de l'école polytechnique, 2001.
3. Païdoussis, Fluid-structure interactions, T1&2, Elsevier, 2004.

Teaching team

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Kevin LE PRIN, Project and R&D engineer, SEAL Engineering

Sylvain TRUCHE, Project and R&D engineer, SEAL Engineering

Sustainable Development Goal



Building Resilient Infrastructure



Sustainable cities and communities

Total des heures

		24h
CM	Master class	12h
TP	Practical work	12h

Useful info

Name responsible for EU

Lead Instructor

Olivier Boiron

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