

ENG-649

Thin Film Lubrication and Gas-Lubricated Bearings

Invited lecturers (see below), Schiffmann Jürg Alexander

Cursus	Sem.	Type
Energy		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Project report
Workload	60h
Hours	34
Courses	28
Project	6
Number of positions	15

Frequency

Only this year

Remark

The course will take place from Tuesday June 10th to Friday June 13th, 2025 at Microcity (Neuchâtel campus). Deadline to register : May 16th, 2025 at 5pm. One time only.

Summary

This course introduces thin film lubrication and its applications to gas-lubricated bearings, including rotordynamics to enable the assessment of the operation of gas-bearing supported rotors.

Content

- Derivation of Reynolds equations
- Hydrodynamic slider bearing
- Infinite-length journal bearing
- Finite length slider
- Finite length aerodynamic bearing
- Dynamic grooved bearings
- Real gas effects
- Condensation
- Practical implementation of gas-lubricated bearings
- Rotordynamics

Note

Deadline to register: May 16th, 2025 at 7pm at the latest

Keywords

Thin film lubrication, gas-lubricated bearings, rotordynamics

Learning Prerequisites**Required courses**

Fluid mechanics, dynamical systems

Learning Outcomes

By the end of the course, the student must be able to:

- Select appropriately models to design gas-bearing supported rotors as a function of the operating conditions and applications.

Assessment methods

Students will have to prepare a short report about the numerical implementation of two problems chosen among the proposed ones. A presence of at least 75% of the lessons is requested together with the report to receive the credits.

Resources

Moodle Link

- <https://go.epfl.ch/ENG-649>