EPFL

SGM
Section de Génie mécanique

STI School

Hydraulic Turbomachines

Dr. Elena Vagnoni

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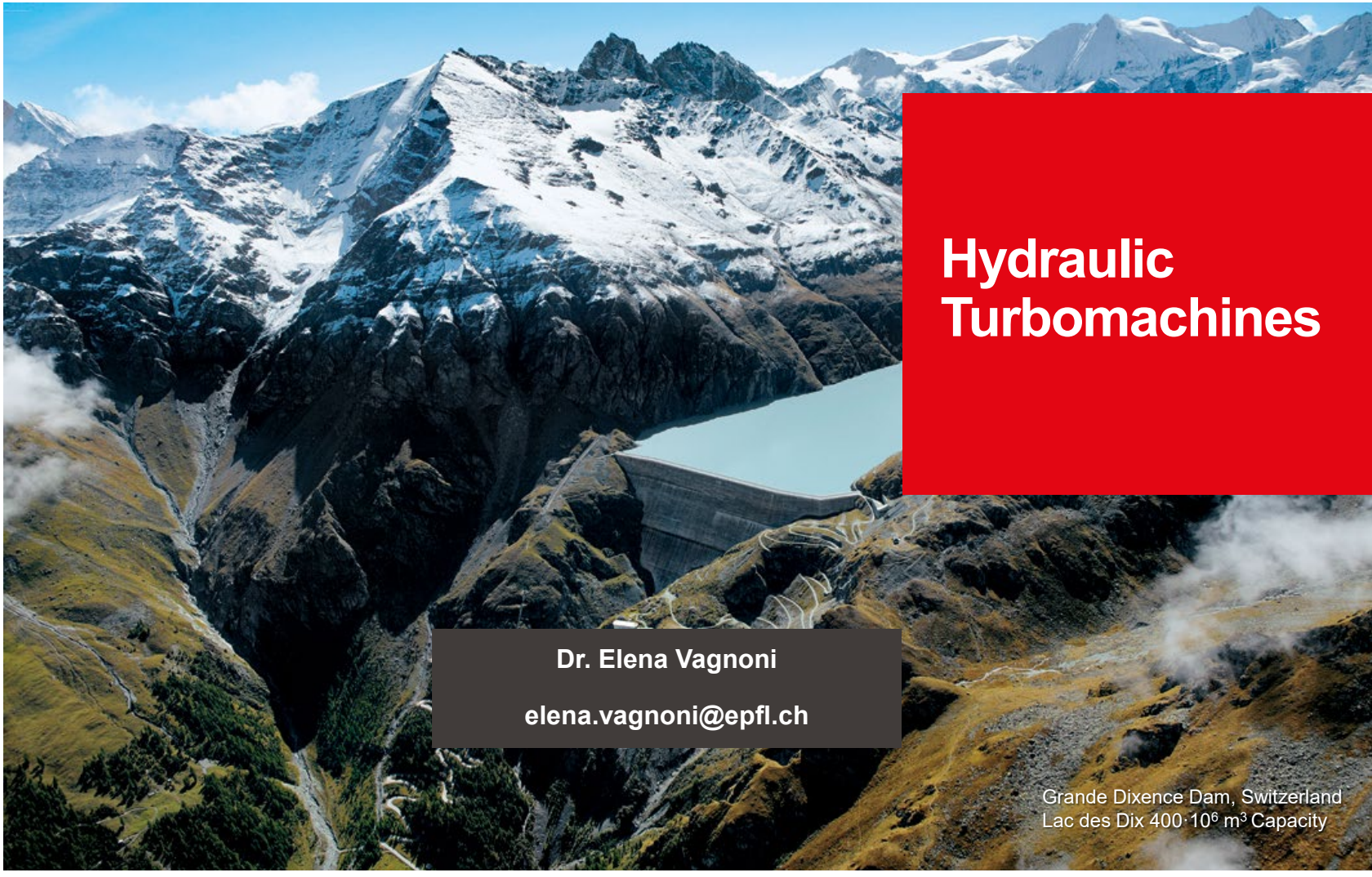

Grande Dixence Dam, Switzerland
Lac des Dix $400 \cdot 10^6$ m^3 Capacity

École polytechnique fédérale de Lausanne

Teaching Assistants

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Syllabus

- 08 Sept.: L1 – Hydraulic Machines Introduction and Fields of Applications
- 15 Sept.: L2 – Hydraulic Energy Conversion
- 29 Sept.: E1 – Exercises on energy conversion
  L3 – Velocity Triangles
- 06 Oct.: E2 – Exercises on velocity triangles
  L4 – Cavitation in Hydraulic Machines
- 13 Oct.: E3 – Exercises on cavitation
  L5 – Pelton Turbines
  (Nicolas Gervais, Andritz)
- 27 Oct.: E4 – Exercises on Pelton turbines
  L6 – Reaction Turbines

Syllabus

- 03 Nov.: E5 – Exercises on reaction turbines
  L7 – Francis Turbines Design
  (Thomas De-Colombel, GE Renewable Energy)
- 10 Nov.: Visit Hydropower Plant (Alpiq)
- 17 Nov.: E6 – Exercises on Francis turbines design
  L8 – Industrial Pumps
- 24 Nov.: L8 – Industrial Pumps
- 01 Dec.: E7 – Exercises on pumps
  L9 – Reversible Pump-Turbines
- 08 Dec.: E8 – Exercises on reversible pump-turbines
  L10 – Experimental techniques and model testing
- 15 Dec.: Q&A and mock exam

Bibliography

- Moodle

- DIXON S.L. and HALL C.A., Fluid Mechanics and Thermodynamics of Turbomachinery, 7th Edition, Elsevier, 2013
- FRANC, J.-P., AVELLAN, F., La cavitation: mécanismes physiques et aspects industriels, Presses universitaires de Grenoble PUG, 1995.

Exam

- Divided in 2 parts:
  - First part: multiple-choice questions
  - Second part: problems to solve (similar to what we solve during the exercise sessions)
- 3 hours in total:
  - 45 minutes first part
  - 15 minutes break
  - 2 hours second part
- First part is close book
- Second part is open book – all the material can be used, printed or on the laptop offline
- Score:
  - 40% first part
  - 60% second part

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