

Hydraulic Machinery Engineering 2025 Short Course

Date: September 1 to September 5, 2025

Organized by EPFL

To be held at the EPFL Technology Platform for Hydraulic Machines
Avenue de Cour 33 Bis, 1007 Lausanne, Switzerland

PROGRAM

Hydraulic turbomachines:

- Fundamentals;
- Hydrodynamics - Similitude – Cavitation.

Hydraulic turbomachinery engineering:

- Francis turbine runner;
- Pelton turbines;
- Centrifugal pumps.

Hydraulic turbomachines flow numerical simulations:

- Current and future tools;
- Industrial practice.

Model and Field Testing

- Reduced scale physical model instrumentation;
- Acceptance tests and specific tests;
- Hydroelectric power plant visit.

Operation Challenges

- Electricity market;
- Power system stability;
- Pumped storage power plants.

CONDITIONS

Short course:

- Duration: 40 hours, 16 lecture modules, 1 site visit, 5 days;
- Prerequisite: Degree in engineering or professional engineering experience in industry;
- Language: English
- Certificate of attendance: at the end of the Short Course.

The course session will be held week 36 if a minimum of 12 attendees are registered.

Registration

- Online at www.epfl.ch/labs/lmh/formation-continue/;
- By completing the attached form to be addressed to EPFL-PTMH attention to Mrs Nadia Kaiser, Avenue de Cour 33 Bis, 1007 Lausanne/Switzerland, E-mail: nadia.kaiser@epfl.ch, Tel.: +41 21 693 54 56.

Fees (VAT 8.1% not included)

- CHF 3'500.00* (per person, including technical documentation, technical visit, lunch and coffee break).
- CHF 3'000.00* for the second attendee of the same company or institute;
- **Cancellation fees*: 10% of the amount will be charged.
- Payment in advance by bank or postal transfer in Swiss Franc (CHF) to Swiss Post, Postfinance SA, Mingerstrasse 20, 3030 Bern-Switzerland
Swift/Bic [POFICHBEXXX](https://www.epfl.ch/labs/lmh/formation-continue/), Account no: [17-714571-6](https://www.epfl.ch/labs/lmh/formation-continue/), IBAN for Swiss Francs: [CH2709000000177145716](https://www.epfl.ch/labs/lmh/formation-continue/)
Reference: CC 0332 - Funds 111564 + invoice no. to be mentioned
- to be transferred before August 10.

Hydraulic Machinery Engineering 2025 Short Course Time Schedule

Week 36	Monday 01.09.2025	Tuesday 02.09.2025	Wednesday 03.09.2025	Thursday 04.09.2025	Friday 05.09.2025
07:30				Departure Visits	
08:00	Participants welcome				CFD in Hydraulic Machines
08:15					
08:30	Introduction to Hydraulic Turbomachines E. VAGNONI EPFL PTMH	Pelton Turbine Engineering	Hydraulic Turbine Engineering Design		
09:15	Cavitation M. FARHAT EPFL STI SCI MF	N. GERVAIS ANDRITZ HYDRO	Y. LAURANT GE VERNOVA	Bieudron Power Plant	S. LEGUIZAMON GE VERNOVA
10:15	Coffee Break (30 min)	Coffee Break (30 min)	Coffee Break (30 min)		Coffee Break (30 min)
10:45	Cavitation in Hydraulic Machines A. JUNG VOITH HYDRO	Hydro Energy Market M. MURET CITY WORKS OF LAUSANNE	Dynamic Phenomena F. DUPARCHY GE VERNOVA		Fluid-Structure Interaction in Hydraulic Machines M. FAHRAT & PhD Students EPFL SCI STI MF
12:45	Lunch (45 min)	Lunch (45 min)	Lunch (45 min)		Lunch (45 min)
13:30	Model Testing & On Site Measurements M. SUAREZ EPFL PTMH	Pump Design & Selection Criteria S. BERTEN SULZER PUMPS	Transient Phenomena In Hydroelectric Power Plant C. NICOLET POWER VISION	Grande Dixence Dam	Conclusion
15:00	Break (30 min)	Break (30 min)	Break (30 min)		End of the Short Course
15:30	Model Tests and Cavitation Tunnel Demonstrations EPFL PTMH & EPFL SCI STI MF	R&D with Numerical Simulations for Hydraulic Machines C.MÜNCH & colleagues (HES-SO)	The role of variable speed pumped storage in electric power systems C. MOREIRA INESCTEC		
17:15	Welcome Party				
19:00				Dinner	

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1. **HYDRAULIC TURBOMACHINES**
Dr. E. VAGNONI, EPFL-PTMH, Switzerland
2. **CAVITATION**
Dr. M. FARHAT, EPFL-SCI-STI-MF, Switzerland
3. **CAVITATION IN HYDRAULIC MACHINES**
Dr. A. JUNG, VOITH HYDRO, Germany
4. **MODEL TESTING & ON SITE MEASUREMENTS**
Ing. M. SUAREZ, EPFL-PTMH, Switzerland
5. **PELTON TURBINES ENGINEERING**
Ing. N. GERVAIS, ANDRITZ HYDRO, Switzerland
6. **HYDRO ENERGY MARKET**
Ing. M. MURET, SIL, Switzerland
7. **PUMP DESIGN AND SELECTION CRITERIA**
Dr. S. BERTEN, SULZER PUMPS (HQ), Switzerland
8. **NUMERICAL SIMULATION RESEARCH ACTIVITIES**
Dr. C. MÜNCH and Dr. S. ALIMIRZAZADEH, D. BINER, J. DECAIX, Dr. O. PACOT,
HES-SO Valais-Wallis, Switzerland
9. **HYDRAULIC TURBINE ENGINEERING DESIGN**
Dr. Ing. Y. LAURANT, GE HYDRO, France
10. **DYNAMIC PHENOMENA**
Ing. F. DUPARCHY, GE HYDRO, France
11. **SIMULATION OF TRANSIENT PHENOMENA IN
HYDROELECTRIC POWER PLANTS**
Dr. Ch. NICOLET, POWER VISION, Switzerland
12. **THE ROLE OF VARIABLE SPEED PUMPED STORAGE IN
ELECTRIC POWER SYSTEMS**
Prof. C. MOREIRA, INESC TEC, Portugal
13. **CFD IN HYDRAULIC MACHINES**
Ing. S.LEGUIZAMON, GE HYDRO, France
14. **FLUID-STRUCTURE INTERACTION IN HYDRAULIC MACHINES**
Dr. M. FARHAT and Doctoral Students, EPFL-STI-SCI-MF, Switzerland