Summary
Hydrology for Engineers is an introduction to the study of floods, droughts and a fair distribution of water. The course will introduce to hydrologic materials and methods: fluid mechanics, probability and statistics, surface and subsurface hydrological processes.

Content
1) Introduction. Hydrologic cycle. Hydrologic processes
6) Surface hydrology: Reservoir and streamflow routing.
7) Probability and statistics in hydrology. Return Period. Frequency analysis, risk
9) Floods: hydrologic and hydraulic design
10) Droughts: water scarcity, scenarios of climate change, vegetation stress
11) Towards a fair distribution of water: streamflow, principles of ecohydrology
12) Principles of hydrologic transport: residence time distributions, basin scale transport

Learning Prerequisites
Recommended courses
Elementary Fluid Mechanics; Hydraulics (in particular, Open Channel Flow)

Important concepts to start the course
The student should keep in mind the twofold aim of the course: explore the large engineering impact of hydrologic design; and appreciate the great scientific questions currently debated

Learning Outcomes
By the end of the course, the student must be able to:
• Structure hydrologic models
• Carry out hydrologic calculations
• Compute hydrologic extremes (elementary methods)
• Design return period for hydrologic events
• Prepare for advanced design of water resources engineering
• Explore limits and validity of hydrologic methods
• Compare hydrologic methods
Transversal skills

- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Set objectives and design an action plan to reach those objectives.

Teaching methods

Use of power point aids will be made, supported by supplementary reading material for clarity and completeness. Extensive use of the blackboard for all analytical developments. The additional reading is chosen purposely because it is the textbook employed in the ENV-221 Class in Water Resources Engineering, an international standard on the subject to which EPFL students are intended to be aligned. (Copies of the book to borrow are available, besides the Library ones, upon request to: anna.rothenbuehler@epfl.ch)

Expected student activities

Plan and carry out activities in a way which makes optimal use of available time
Set objectives and design an action plan to reach those objectives.
Use a work methodology appropriate to the task. Regular attendance to classes and exercise sessions and a moderate amount of homework should suffice to complete the class requirements in a satisfactory manner
Knowledge of Matlab is recommended. Programming will be required.

Assessment methods

Homework (20%)
Mid term exam (20%)
Final written exam (60%)
Homework supervision by the course assistants (Paolo Benettin (paolo.benettin@epfl.ch), Javier Perez-Saez (javier.perezsaez@epfl.ch), Damiano Pasetto (damiano.pasetto@epfl.ch)) is guaranteed. Teacher available in office hours and upon appointment (contact directly: andrea.rinaldo@epfl.ch)

Supervision

Office hours  Yes
Assistants  Yes
Forum  Yes

Resources

Bibliography

- Water Resources Engineering / Mays

Ressources en bibliothèque

- Water Resources Engineering / Mays

Notes/Handbook

Essentials for completion of the course will be self-contained in the Class notes -- uploaded weekly through the Moodle Platform

Moodle Link


Prerequisite for

Water Resources Engineering (ENV-424)