Faculty of Applied Sciences

AUCE1151   Statistical hydrology

[10h+15h exercises] 2 credits

This course is not taught in 2005-2006
This course is taught in the 1st semester
Language: French
Level: First cycle

Aims

Introduction to the object and the methods of hydrology, in order to approach elementary calculations and to understand more elaborate developments

Main themes

Introduction to the general free surface hydrology and initiation to the statistical hydrology applied to the predetermination of floods and the low water lev

Content and teaching methods

Free surface hydrology (7 hours) :
- Precipitation : precipitation mechanism : condensation, hydro-meteorological context, types of rains ;
rainfall data : rain measurement, duration-intensity-frequency curves, extension to a watershed ;
- Hydrologic budget : hydrologic cycle, evaporation, infiltration ;
- Streamflow : streamflow data and measurement, cumulative discharge curve, flow-duration curve : characteristic elements, parabola of Coutagne, shifted lognormal law of Galton-Gibrat, applications to navigable rivers and hydroelectric production ;
- Hydrographs : factors influencing the hydrograph shape, separation between base flow and net hydrograph ;
- Rainfall-discharge relation and hydrograph construction : unit hydrograph, rational method.
Statistical hydrology (8 hours) :
- Floods: definition and characterisation ;
- Extreme values probabilistic and statistical models :
- Estimation of model parameters and significance testing, average and maximum rainfalls : the exponential and shifted exponential distributions, maximum annual flow : the lognormal distribution (method of moments and method of maximum likelihood), Gumbel distribution (method of moments), Gamma (Pearson) distributions, minimum annual flow : Weibull distribution, concept of return period and geometrical distribution ;
- Concept of return period and geometrical distribution.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

- Reduced modulus of the area "hydraulics"
- Pedagogy : lectures, elementary exercises, in-situ measurements
- Examination : written (exercises and statistical hydrology theory), oral (general hydrology theory)