



## HYDRAULIQUE FLUVIALE

### RIVER HYDRAULICS

Lecturers: **Richard PERKINS**

| Lecturers : 16.0 | TC : 0.0 | PW : 4.0 | Autonomy : 0.0 | Study : 8.0 | Project : 0.0 | Language : AN

#### Objectives

---

For centuries rivers have been exploited in many ways (e.g. to provide water for domestic or irrigation purposes, for transportation, for power generation) but even today, major river floods can have devastating consequences. The aim of this course is to provide students with a comprehensive understanding of the fundamental processes in hydraulic engineering, through the development of suitable yet simple models.

**Keywords :** Rivers, Hydraulics, Free-surface flows, Specific energy, Specific force, Hydraulic jump, Surge waves, Sediment transport

---

#### Programme

1. Introduction  
Hydrological cycle - the river system - current issues in river engineering.
2. Uniform flow in open channels  
Wave speed - Critical depth - flow regimes - Specific energy - Specific force - Hydraulic jump.
3. Gradually-varied flow  
Flow resistance - Uniform flow and the normal depth - surface profiles

#### Learning outcomes

- Students should be able to calculate the surface profile for steady flow through a change in channel section.
- Students should be able to calculate the surface profile of a steady flow in an inclined channel, as a function of channel slope, channel roughness, flow rate and inlet or outlet conditions.
- Students should be able to calculate the propagation of a wave in an open channel.
- Students should be able to calculate the threshold of movement for given sediment properties.

#### Independent study

Objectifs :

Méthodes :

#### Core texts

HENDERSON, F. , *OPEN CHANNEL FLOW* , Macmillan  
RAUDKIVI, A.J. *LOOSE BOUNDARY HYDRAULICS* , Balkema  
VIOLETT, P.-L. et al *MÉCANIQUE DES FLUIDES APPLIQUÉE* , Presses de l'ENPC

#### Assessment

Written exam (2h): 40%; Lab reports and design exercises (3): 60%