

# COMPUTATIONAL HYDRAULICS

## OBJECTIVES

Ref	19. Objectives of the curricular unit
O1	Develop ability to solve mathematical problems, without analytical solution, via numerical techniques applied to hydraulic.
O2	Develop ability to design and calibrate algorithms for hydraulic simulation (pipe flow and open channel flow).
O3	Develop ability to use modern engineering techniques and tools.

## SYLLABUS

Ref	20. Syllabus	Contact hours
CT1	Numerical Methods in Hydraulics: Computer Arithmetic; Numerical Integration; Ordinary Differential Equations; and Partial Differential Equations.	
CT2	Physical Modelling of Hydraulics.	
CT3	Pipe Flows Modelling: Transient Flow	
CT4	Open Channel Flow Modelling: Numerical Modelling of Steady Open Channel Flow; and Numerical Modelling of Unsteady Open Channel Flow.	
<b>Total (hours)</b>		
<b>ECTS</b>		

## BIBLIOGRAPHY AND OTHER REFERENCES

21. Main bibliography
Chanson, H. (2004). The Hydraulics of Open Channel Flow: An Introduction. 2nd Edition, Elsevier, MA.
Chapra, SC. (2008). Applied Numerical Methods with Matlab for Engineers and Scientists. 3rd Edition, McGraw-Hill, NY.
Chapra, SC., Canale, RP. (2010). Numerical Methods for Engineers. 6th Edition, McGraw-Hill, NY.
Chaudhry, MH. (1979). Applied Hydraulic Transients. Van Nostrand Reinhold Company, NY.
Chow, VT. (1959). Open-Channel Hydraulics. McGraw-Hill, NY.

22. Other references
Larock, BE., Jeppson, RW., Watters, GZ. (2000). Hydraulics of Pipeline Systems. CRC Press, Boca Raton.
Pina, H. (1995). Métodos Numéricos. McGraw-Hill, Lisboa.