LBRES2104

2014-2015

Hydraulics of open irrigation channels

5.0 credits	30.0 h + 22.5 h	2q

Teacher(s) :	Javaux Mathieu ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	iCampus
Main themes :	- Theory of open channel hydraulics - Classification of flow : uniform and non-uniform flow ; steady state and gradually varied flow - Properties of open channels : energy and momentum principles - Velocity profiles. Specific energy, specific force - Hydrometrology : Venturi, Parshall, gauging, - Uniform flow theory - Gradually varied flow theory. Classification of hydraulic axes. Integration methods - Rapidly varied flow : hydraulic jump, fall, weirs - Types of irrigation systems : gravity, pressure or drip irrigation - Theory of water flow in pipes - Pressure irrigation networks : pumps, pipes, sprinklers; design of a network - Irrigation and salinity.
Aims :	Upon completion of the course and practicals, the student will be able: - to characterize different flow regimes in open channels ; - to apply the principle of energy conservation and momentum on flow in open channels ; - to characterize a velocity profile in an open channel; - to understand the functioning of discharge measurements; - to understand theory of uniform flow, gradually varying flow and rapid varying flow; -to understand the theory on flow in pipe; - to describe the principles that underlie the various irrigation techniques; - to design an irrigation management scheme and to evaluate its functioning; *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods :	The students will be evaluated on the basis of their reports on the practicals as well as through a final exam. The final exam will be oral with a written preparation, and will include problem solving as well as comprehension questions.
Content :	A general introduction to open-channel hydraulics and fluid flow in pipes will be given. We will then address the plant needs for irrigation. A brief description of the various irrigation techniques will follow. The course will focus on the different components of irrigation networks (water uptake, water transport sprinklers/drippers, '). The practicals will be used to perform experiments on the laboratory experimental channel, some field tests on irrigation and uniformity and to design an irrigation network.
Bibliography :	Support lecture notes, practicals on I-campus
Cycle and year of study :	> Master [120] in Agricultural Bioengineering > Master [120] in Environmental Bioengineering
Faculty or entity in charge:	AGRO