


4 credits

20.0 h + 22.5 h

Q2

Teacher(s)	Javaux Mathieu ;
Language :	French
Place of the course	Louvain-la-Neuve
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	a. Contribution de l'activité au référentiel AA (AA du programme) M1.2 ; M2.2 ; M2.3 ; M2.4 ; M4.5 ; M6.5 ; M6.8 <u>Irrigation:</u> Upon completion of the course and practicals, the student will be able to : <ul style="list-style-type: none"> <li>- Master the basic knowledge about the water requirements of plants</li> <li>- have the basic knowledge about water intake structures, conveyance, and regulation devices for irrigation water</li> <li>- estimate net irrigation water requirements and propose an irrigation schedule</li> </ul> 1 <ul style="list-style-type: none"> <li>- design an irrigation system under drip, pressure or gravity</li> <li>- Describe the principles underlying the different irrigation techniques</li> <li>- Design an irrigation management scheme and to evaluate its functioning</li> </ul> <u>Drainage :</u> At the end of the course and lab, the student will be able to: <ul style="list-style-type: none"> <li>- Master the theoretical concepts underlying the flow of water into drains and design techniques of drainage;</li> <li>- Assess the value of drainage on the basis of technical, economic and environmental considerations;</li> <li>- Dimension a parallel drainage network using the relevant equations.;</li> </ul> - - - - <i>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".</i>
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, plus three theoretical questions on the theory.
Teaching methods	- Classes, largely illustrated by photos and schematics - Practical work in laboratory - Exercise sessions - The practicals, to be carried out in a team, and report writing stimulate collective work and the development of skills related to professional communication;
Content	irrigation: - Plant water requirement - Chemical and hydraulic properties of soils for irrigation - Principles of irrigation planning, calculation of plant needs - intake and conveyance of water, control systems - Irrigation Types in the plot description, advantages and disadvantages: - Gravity irrigation - Pressurized irrigation - Drip irrigation drainage: - Functions of agricultural drainage in temperate and tropical regions - Structure of a drainage network : arrangement, drains, envelope ' - Calculation of a drainage network using the equations of Hooghoudt , de Zeeuw and Hellinga , Glover - Dumm . - Establishment of a network: principles and equipment

	<p>Practical work:</p> <ul style="list-style-type: none"> <li>- Exercises: water requirements of crops (1 and 2)</li> <li>- Exercises: Design of a gravity irrigation network</li> <li>- Exercises: design of an irrigation network under pressure</li> <li>- Exercises: Allocation Calculation sprinklers</li> <li>- Sprinkler irrigation field trial</li> </ul>
Inline resources	Moodle
Bibliography	<p>Ouvrage de référence :</p> <p>« Traité d'irrigations », Tiercelin.et al.</p> <p>Syllabus pour la partie drainage (sur Moodle)</p>
Other infos	This course can be given in English.
Faculty or entity in charge	AGRO

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Agricultural Bioengineering	BIRA2M	4		
Master [120] in Environmental Bioengineering	BIRE2M	4		