Course name:

IRRIGATION MACHINERY

ECTS	**4**
Course status	**basic,specialisation,optional, obligatory,facultatiy**
Course final assessement/evaluation of outcomes	**Exam / graded credit**
Prerequisites	**implementation of the Physics class module**

Main field of study:

field of study name (capital letters)

Profile of study	**General-academic**
The code of studies (education level)	**bachelor, master of thesis**
Semester of studies	**winter / summer**
Language of instruction	**English**

Course offered by:

Name of faculty offering the course	**Faculty of Production and Power Engineering**
Name of department offering the course	**Department of Bioprocess Engineering, Energetics and Automation**
Course coordinator	**Prof. Sławomir Kurpaska**

Learning outcomes of the course:

Symbol of outcome	Description of learning outcome	Reference to	
		main field of study outcomes	discipline#
KNOWLEDGE – student knows and/or understands:			
PPP_W5	issues related to the design and modeling of technical devices and processes using modern tools	ZIP1_W05	TZ
PPP_W10	technical and environmental factors affecting the functioning of technical systems	ZIP1_W10	TZ
SKILLS – student is able to:			
PPP_U1	perform observations, calculations and measurements as well as analyze and interpret their results	ZIP1_U01	TZ
PPP_U2	design and modify technical devices and production systems, and collate the required technical documentation	ZIP1_U04	TZ
SOCIAL COMPETENCE- student is ready to:			
PPP_K1	continuous acquiring knowledge and training in production engineering, and the result of preparing a self-improvement project	ZIP1_K01	TZ
PPP_K2	activities aware of the importance of the engineer's responsibility for the quality of raw materials used in the production of feed and food	ZIP1_K04	RR

Teaching contents:

Lectures		**15**	**hours**
Topics of the lectures	Fluid concept, fluidity and fluid continuity. Parameters describing the state of the fluid. Basic physical properties of fluids. Free and forced flows. Basic concepts of fluid kinetics. Differential equation of flow continuity. Bernoulli equation for perfect and real fluid. Fluid transport: pipelines, pipe connections, valves, valves, seals. Movement of liquids in open channels and channels. Groundwater movement. Mathematical and physical models of processes determining water demand of plants Water sources for plant irrigation: acquisition problems and requirements related to its quality Technical equipment for irrigation with control systems for the quantity and frequency of plant irrigation		

Accomplished learning outcomes	*PPP_W5 , PPP_W10, PPP_K1, PPP_K2*
Verification methods, rules and criteria of outcome assessment	*Credit in writing; for a positive grade at least 51% of the correct answers to the questions asked should be given. Participation in the final grade in the course: 75%*

Classes		**15**	**hours**
Topics of the classes	Team (2-3 people) project implementation in the field of estimating the irrigation needs of plants Team (2-3 people) project implementation in the field of plant irrigation		

Accomplished learning outcomes	*PPP_U1, PPP_U2, PPP_K1, PPP_K2*
Verification methods, rules and criteria of outcome assessment	*Team project (2 to 3 students) in the selection of heating devices in a greenhouse along with estimation of the amount of fuel. Participation in the final course evaluation: 25%*

References:

Basic	*Kurpaska Sławomir: Selected elements of water management in facilities under cover with cultivation of plants on an inert substrate, w: Creating a platform to address the techniques used in creation and protection of environment and in economic management of water in the soil / Pavel Máchal (red.), 2018, Mendel University, ISBN 978-80-7326-302-7, ss. 139-155* *Orzechowski Z., Prywer J., Zarzycki R., Mechanika płynów w inżynierii środowiska, PWN, 2001* *Kutilek M. Soil hydrology. Catena-Verlag, 1994.*
Supplementary	*Company catalogs of pumps, fans, blowers, compressors* *Company catalogs of hoses, couplings, valves, hydraulic and pneumatic accumulators.* *Polish Standard PN-92 / B-01706, Water supply installations. Requirements in design, PKNMiJ, 1992* *Katalogi firmowe przewodów, złączek, zaworów, akumulatorów hydraulicznych i pneumatycznych.* *Polska Norma PN-92/B-01706, Instalacje wodociągowe. Wymagania w projektowaniu, PKNMiJ, 1992*

Structure of learning outcomes:

Discipline: TZ	*3*	ECTS**
Discipline: RR	*1*	ECTS**

Structure of student activities:

Contact hours		40	hours	4	ECTS**
including:	lectures	15	hours		
	classes and seminars	15	hours		

	consultations	5	hours	
	participation in research	…	hours	
	mandatory trainerships	…	hours	
	participation in examinations	5	hours	
e-learning			hours	ECTS**
student own work		5	hours	ECTS**

*** where 10 hours of classes = 1 ECTC (in case of 15 h → 2 ECTS)**

** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes

academic discipline code: RZ - animal science and fishery, PB - biological sciences, etc.