SYLLABUS (MODULE-ERASMUS+)

Course/module (as specified in the approved curriculum for the field of study) **Trends in indoor vegetable production**	ECTS **5**	Catalogue number **HORT 8.1**
Name in Polish **Trendy w produkcji warzyw w pomieszczeniach**		
Head of course/module **Dr inż Włodzimierz Krzesiński**		
Unit(-s) providing the course/module (Institute/Department) **Department of Vegetable Crops**		

Field of study **Horticulture**	Level	Profile **General academic**	Semester **summer**

TYPE OF CLASSES/LECTURES AND THE NUMBER OF HOURS
(organised classes/lectures and self-study)

Type of studies: full-time		Type of studies: extramural	
- lectures	15	- lectures	
		- classes	
- laboratory practical	15	-	
- project based practical	15	-	
- Other – tutored		-	
- self-study	80	- Self-study	
Total number of hours:	125	Total number of hours:	

OBJECTIVE OF COURSE/MODULE

Expanding knowledge on trends in indoor vegetable production

TEACHING METHODS

Lecture supported by multimedia presentation, exercises, calculations, discussion, presentation of case studies by students

	LEARNING OUTCOMES	Reference to field outcomes	Reference to area outcomes
Knowledge	E1 - Student has deep knowledge of biotic and abiotic factors of growth and development of vegetables crops and their control; E2 – Student has extensive knowledge of vegetable growing technology in the greenhouse production, construction greenhouse and plastic tunnels, equipment and use of vegetable growing facilities	*Not applicable*	*Not applicable*
Skills	E3 - Student has the ability to undertake activities solving problems greenhouse production of vegetable crops using information technology; E4 - The student independently and comprehensively identifies and analyzes phenomena affecting the state of the farming environment and can adapt them to the needs of vegetables		
Social competences	E5 - Student is able to correctly identifies and resolves dilemmas related to the activity of vegetable crops production E6 - The student is able to actions aimed at limiting the risk and anticipating the effects of the greenhouse vegetable production on the state of the environment		

Methods to verify learning outcomes	Outcome Reference Numbers
Test	E1, E2, E3, E4, E5, E6
Evaluation of project, protocol and discussions on exercises	E1, E2, E3, E4, E5, E6

TEACHING CONTENT

Content of lectures: automatization in indoor vegetable production, solar energy in greenhouse production, PID regulators, humidity and temperature strategy, climate computers, cogeneration, irrigation and fertigation, integration of different type production, news from horticulture production, modelling selected processes, Arduino
Content of exercises: calculation for different problems (energy and mass balance, light absorption by plants, modelling selected processes, irrigation and fertigation, cogeneration), example of using Arduino, computers lab
Project: Integration of different type production – energy and mass balance of selected factors

Forms and criteria for passing of course/module	Percentage of final mark
Lectures and exercises - written tests- passed from 51%	80%
Project - completion	20%

LIST OF LITERATURE

Basic literature

Adams C., Early M., Brook J., Bamford K. 2015. Principles of Horticulture: Level 2. Routledge.
Adams C., Early M., Brook J., Bamford K. 2015. Principles of Horticulture: Level 3. Routledge.
Proksch G. 2017. Creating Urban Agricultural Systems. An Integrated Approach to Design. Taylor & Francis
Viljoen A. Bohn K. 2014. Second Nature Urban Agriculture. Designing Productive Cities. Routledge.
Overman A.R., Scholtz III R.V. 2002. Mathematical Models of Crop Growth and Yield. Marcel Dekker, Inc.
Hunter 2016. Irrigation System Design. www.hunterindustries.com
Hunter 2016. Decoder Systems. Design Guide. www.hunterindustries.com
Rain Bird. 2016. Landscape Irrigation Design Manual. www.rainbird.com