SYLLABUS (MODULE-ERASMUS+)

Course/module (as specified in the approved curriculum for the field of study) **Sustainable vegetable production-covers**		ECTS **6**	Catalogue number **HORT 8.2**
Name in Polish **Zrównoważona uprawa warzyw-osłony**			
Head of course/module **dr Jolanta Lisiecka**			
Unit(-s) providing the course/module (Institute/Department) **Department of Vegetable Crops**			
Field of study **Horticulture**	Level **II – Master studies**	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	
- practical total	30	- classes	
- laboratory practical		-	
- project based practical	15	-	
- Other – tutored	10	-	
- self-study	90	- Self-study	
Total number of hours:	150	Total number of hours:	

OBJECTIVE OF COURSE/MODULE

Expanding knowledge on vegetable cultivation under covers

TEACHING METHODS

Lectures supported by multimedia presentations, experiment + report (written and visual presentation prepared by students), farm trip

	LEARNING OUTCOMES	Reference to field outcomes	Reference to area outcomes
Knowledge	E1 – become familiar with an organic production in Poland and in the world E2 – know the role of vegetable grafting in a vegetable production E3 – be acquainted with a possibility of using organic waste materials in a vegetable production E4 – know the role of tomato pollination E5 – be acquainted with irrigation and fertigation systems in greenhouses E6 – know how to reduce greenhouse energy consumption	*not applicable*	*not applicable*
Skills	E7 – have the ability to graft tomato and cucumber E8 – know how to prepare biological heating layers used in vegetable production E9 – know differences between conventional and organic food E10 – learn to analyse a research work	*not applicable*	*not applicable*
Social competences	E11 – is able to work in a group E12 – understand the need to expand horticultural knowledge	*not applicable*	*not applicable*

Methods to verify learning outcomes	Outcome Reference Numbers
Written test Experiment report	E1, E2, E3, E4, E5, E6 E10, E11

TEACHING CONTENT

Content of lectures: Sustainable horticulture – definitions and terms. Organic production in Poland and in the world. Role of vegetable grafting in a horticultural production. Growing methods in a greenhouse vegetable cultivation. Organic waste materials used as substrates. Tomato pollination. Irrigation and fertigation in greenhouses. Reducing greenhouse energy consumption.

Content of classes: Tomato and cucumber grafting. Organic waste materials used as heating layers. Conventional food versus organic food. Farm trip.

Project: "Influence of selected biostimulants on the growth of vegetable seedlings" – an experiment carried out by students + experiment report (written and oral presentation)

Forms and criteria for passing of course/module	Percentage of final mark
Written test - passed from 51%	60%
Trip report	10%
Experiment report	30%

LIST OF LITERATURE

Basic literature

Balas, Marius, Calin Musca, i Sanda Musca. 2010. „The Passive Greenhouses". doi:10.5772/12910.

du Jardin P. 2015. Plant biostimulants: Definition, concept, main categories and regulation. Scientia Horticulturae 196: 3-14.

Harvesting the Sun – A Profile of World Horticulture. 2012. Scripta Horticulturae 14. Published by International Society for Horticultural Science.

Hunter 2016. Decoder Systems. Design Guide. www.hunterindustries.com

Hunter 2016. Irrigation System Design. www.hunterindustries.com

Juroszek P., Lumpkin T.A., Palada M.C. 2008. Sustainable Vegetable Production Systems. Acta Hort. 767: 133-149.

Kubota C. and McClure M.A. 2008. Vegetable Grafting: History, Use, and Current Technology Status in North America. HortScience 43(6): 1664-1669.

Lal R. 2008. Sustainable Horticulture and Resource Management. Acta Hort. 767: 19-42.

Lee J.M., Kubota C., Tsao S.J., Bie Z., Hoyos Echevarria P., Morra L., Oda M. 2010. Current status of vegetable grafting: Diffusion, grafting techniques, automation. Scientia Horticulture 127(2): 93-105.

Lee, Teang Shui, red. 2012. Irrigation Systems and Practices in Challenging Environments. InTech. doi:10.5772/1222.

Mazuela P., Urrestarazu M., Bastias E. 2012. Vegetable waste compost used as substrate in soilless culture. In: P. Sharma, V. Abrol (Eds.) Crop Production Technologies. In Tech Europe: 180-198. Available:www.iningerchopen.com/books/crop-production-Technologies/vegetablewaste418.Compost-used-as-substrate-in-soilless-culture.

Paulitz T.C., Belanger R.R. 2001. Biological control in greenhouse systems. Annual Review of Phytopathology 39: 103-133.

Rain Bird. 2016. Landscape Irrigation Design Manual. www.rainbird.com

Tilman D., Cassman K.G., Matson P.A., Naylor R., Polasky S. 2002. Agricultural sustainability and intensive production practices. Nature 418: 671-677.

van der Lans C.J.M., Meijer R.J.M., Blom M. 2011. A view of Organic Greenhouse Horticulture Worldwide. Acta Hort. 915: 15-22.

Villarreal-Guerrero, F., Kacira, M., Fitz-Rodríguez, E., Giacomelli, G.A., Kubota, C., Linker, R. and Arbel, A. 2012. Simulation of fixed and variable fogging rates in a naturally ventilated greenhouse: water and Energy savings and stability of climate. Acta Hort. 952: 37-44.