

<b>1. Title of subject/module/unit</b>		<b>Soiless Cultivation Systems</b>				
<b>2. Unit code</b>		<b>3. Number of ECTS credits</b>		5		
<b>4. Contact hours</b>		<b>Total</b>	<b>L</b>	<b>E</b>	<b>S</b>	<b>Other forms</b>
		25	15	10	0	
<b>5. Cycle</b>	Master's	<b>6. Year</b>	1 <sup>st</sup>	<b>7. Semester</b>	1 <sup>st</sup>	
<b>8. Study programme</b>		<b>International Master of Science in Horticulture</b>		<b>9. Branch of study</b>		
<b>10. Pillar of the programme</b>		<b>Optional</b>		<b>11. Language</b>	<b>English</b>	
<b>12. Special features</b>						
<b>13. Objectives and subject-specific competences</b>		To acquaint the student with the latest techniques of plant cultivation under cover. Student gets the knowledge about physical and chemical properties of growing medium for proper selection of a plant cultivation techniques. Student acquires the ability to prepare nutrient solution and adjust its composition to a stage of growth of plant.				
<b>14. Description of content</b>		Overview of soiless cultivation methods. Types and selection of growing medium. The chemical properties of water intended for fertigation. Collecting of samples of water and nutrient solution for chemical analysis. Methods for chemical analysis of water and nutrient solutions. Water treatment methods. Cleaning of the irrigation system. Fertilizers used on crops with fertigation. Preparation of nutrient solution. Preparation of glasshouse for cultivation in rockwool. Methods of nutrient solutions disinfecting.				
<b>15. Basic bibliography</b>		<p>Barker A.V., Pilbeam D.J. (eds.) 2007. Handbook of plant nutrition. Taylor&amp;Francis</p> <p>Marschner H. 1995. Mineral nutrition of higher plants. Academic Press Inc.</p> <p>Chmel H. 1994. Uprawa roślin ozdobnych. PWRiL.</p> <p>Chochura P. 2007. Podłoża ogrodnicze. Plantpress w-w.</p> <p>Pudelski T. (praca zb.) 1993. Uprawa warzyw pod osłonami. PWRiL W-wa.</p> <p>Pribyl J. 1990. Hydroponika dla każdego. PWRiL W-wa.</p> <p>Wysocka-Owczarek M. 2001. Pomidory pod osłonami. Hortpress W-wa.</p> <p>Wysocka-Owczarek M. 2007. Ocena wzrostu i aktywności roślin oraz ważniejszych parametrów klimatyczno-uprawowych. Hortpress Sp.z o.o.</p> <p>Uprawa ogórków pod osłonami (praca zb.). 1999. Wyd. Instytut Warzywnictwa w Skierniewicach.</p>				
<b>16. Envisaged learning outcomes</b>		<i>16.1 Knowledge and understanding</i>		Student describes various techniques of soiless cultivation, indicates their usefulness. Differentiates between growing medium and assigns them specific properties. Demonstrates general knowledge about irrigation systems. Demonstrates knowledge of cultivation, fertilization and fertigation of selected plant species.		

	<i>16.2 Application</i>	Student is able to collect nutrient solutions' sample for analysis and is able to determine their chemical composition. Student can choose optimal nutrient solution for selected plant species. Student knows the rules for determining the composition of the nutrient solution and the rules of selection of fertilizers.
	<i>16.3 Reflection</i>	Students understands the need to formulate the views on achievements in advanced technologies in horticulture and their influence on the environment.
	<i>16.4 Transferable skills – not tied to just one subject</i>	Teamwork, ability to present and defend personal opinions, responsibility for team realized projects.
<b>17. Methods of teaching and learning</b>	Lectures, laboratory practicals.	
<b>18. Conditions for inclusion or to undertake work required</b>	Pre-requisite is a basic course in nutrition of horticultural plants.	
<b>19. Methods of assessment and the assessment scale</b>	<ul style="list-style-type: none"> <li>- Written exam (60%)</li> <li>- Attendance at laboratory practicals and preparation of laboratory reports (40%)</li> </ul> Evaluation scale: Grades from 2.0 (worst) to 5.0 (best)	
<b>20. Method of evaluation of course quality</b>	Student questionnaire.	
<b>21. Curriculum compiler</b>	Dr. IwonaKowalska, University of Agriculture in Krakow MSc. Anna Konieczny, University of Agriculture in Krakow	