

**Course name:**  
**Sustainable horticulture systems**

|   |  |
|---|--|
| ECTS  | 3  |
| Course status                                   | facultative  |
| Course final assessment /evaluation of outcomes | The grade based on Student's work                              |
| Prerequisite                                    | <i>basics of soil science, plant cultivation and nutrition</i> |

**Main field of study:**

Agriculture and Horticulture, Biology and Biotechnology (Erasmus+)

|                                     |  |
|-------------------------------------|--|
| Educational profile                 | <i>general academic</i>                          |
| Code of studies and education level | bachelor/engineer (SI) or master of science (SM) |
| Semester of studies                 | <i>summer or winter</i>                          |
| Language of instruction             | <i>English</i>                                   |

**Course offered by:**

|  |   |
|--|---|
| Name of faculty offering the course    | Faculty of Biotechnology and Horticulture     |
| Name of department offering the course | Department of Plant Biology and Biotechnology |
| Course coordinator                     | Agnieszka Lis-Krzyżcin Ph.D., D.Sc.           |

**Learning outcomes:**

| Symbol of outcome                                | Description of the learning outcome   | Reference to main field of study outcomes | Area symbol* |
|--|---|---|--------------|
| <b>KNOWLEDGE – student knows and understands</b> |   |   |              |
| SHS_W1   | principles, concepts and techniques of organic and sustainable production of crops and can explain the difference between biodynamic, organic and integrating farming systems | EPB2_W03                                  | R            |
| SHS_W2   | the methods of limiting the harmful effects of agriculture  | EPB2_W03                                  | R            |
| SHS_W3   | development and soil and water management in sustainable horticulture systems   | EPB2_W03                                  | R            |
| SHS_W4   | agronomic practices affecting plant crop (tillage, crop rotation, fertilization, irrigation, weed control, etc.) as well as cite organic and inorganic fertilizers            | EPB2_W03                                  | R            |
| SHS_W5   | the process of analysis of plant nutrient requirements, types of inorganic and organic fertilizers and strategy of their usage  | EPB2_W03                                  | R            |
| SHS_W6   | the effect of agronomic practices on food quality and safety and the decorative value of ornamental plants  | EPB2_W03                                  | R            |
| <b>SKILLS – student is able to</b>               |   |   |              |
| SHS_U1   | take soil and plant material samples for analysis   | EPB2_U01<br>EPB2_U06                      | R            |
| SHS_U2   | assess the basic chemical properties of the soil (soil pH, EC, nutrient concentration) and the content of organic matter and interpret the obtained results                   | EPB2_U01<br>EPB2_U06                      | R            |
| SHS_U3   | determine selected nutrients in plant material and interpret the  | EPB2_U01                                  | R            |

|  |   |                      |   |
|--|---|----------------------|---|
|  | results of the analysis   | EPB2_U06             |   |
| SHS_U4                                     | determine the dose and form of mineral fertilizers for the physic-chemical properties of the soil and the nutritional requirements of the plant | EPB2_U01<br>EPB2_U06 | R |
| SHS_U5                                     | explain the nutritional value of fruits and vegetables and the decorative value of ornamental plants.   | EPB2_U01<br>EPB2_U06 | R |
| SOCIAL COMPETENCIES – student is ready to: |   |                      |   |
| SHS_K1                                     | work individually and in a team, respect their own work and the work of others. Takes responsibility for group tasks                            | EPB2_K02             | R |
| SHS_K2                                     | assess the risk and environmental, economic and social effects of the known farming systems   | EPB2_K04             | R |
| SHS_K3                                     | take responsibility and assess the responsibility of agricultural producers for the quality and safety of produced plant materials              | EPB2_K05             | R |

### Teaching contents

|   |   |  |  |
|---|---|--|--|
| Lectures  | .20.. hours   |  |  |
| Topics  | Sustainable agriculture – concepts, principles, challenges. Farming systems: biodynamic, integrating and organic.<br>The environmental factors affecting horticulture plant crop.<br>Agrotechnical factors – tillage, crop rotation, irrigation.<br>Soil quality and fertility management. Plant nutrient requirements.<br>Inorganic and organic fertilizers and application strategies.<br>Food quality and safety (from field to table). Decorative value of ornamental plants.<br>Environmental sounds of agricultural practice. |  |  |
| Accomplished learning outcomes                          | <i>SHS_W1-W6, SHS_K2</i>  |  |  |
| Means of verification, rules and criteria of assessment | <i>test, presentation (50% share in the final assessment)</i>   |  |  |
| Classes:  | ...10... hours  |  |  |
| Topics  | Soil sampling. Methods of assessing physical soil properties (texture, structure, water capacity, density)<br>Chemical analysis of soil (organic matter, macro- and microelements, pH, EC)<br>Plant material analysis (dry matter, macro- and microelements)<br>Interpretation of soil and plant analysis results.<br>Interpretation of physic-chemical analysis results. Determination of doses of inorganic fertilizers<br>Field classes – a visit to the greenhouse horticulture farm.   |  |  |
| Accomplished learning outcomes                          | <i>SHS_U1-U5, SHS_K1-K3</i>   |  |  |
| Means of verification, rules and criteria of assessment | <i>problem task, class reports (50% share in the final assessment)</i>  |  |  |

### References:

|               |   |
|---------------|---|
| Basic         | <i>Læg Reid M., Bøckman O.C., Kaarstad O. 1999. Agriculture, Fertilizers and the Environment. CABI Publish.</i> |
|               | <i>Marshner H. 1995. Mineral Nutrition of Higher Plants. Academic Press Ltd.</i>                                |
| Supplementary | <i>Barker A.V., Pilbeam D.J. 2006. Handbook of Plant Nutrition. Francis and Taylor.</i>                         |
|               | <i>Krishna K.R. 2002. Soil Fertility and Crop Production. Science Publishers Inc.</i>                           |

**Structure of learning outcomes**

|  |     |         |
|--|-----|---------|
| Area of academic study: R – Agricultural, forestry and veterinary sciences | 3,0 | ECTS ** |
| Area of academic study: T – technological sciences                         |     | ECTS**  |

**Structure of student activity**

|                              |     |      |      |        |
|------------------------------|-----|------|------|--------|
| Contact hours                | 40  | hrs. | 1,6  | ECTS** |
| Including:                   |     |      |      |        |
| lectures                     | 20  | hrs. |      |        |
| classes and seminars         | 10  | hrs. |      |        |
| consultations                | 5   | hrs. |      |        |
| participation in research    | ... | hrs. |      |        |
| obligatory traineeships      | ... | hrs. |      |        |
| participation in examination | 5   | hrs. |      |        |
| e-learning                   | ... | hrs. | .... | ECTS** |
| student own work             | 35  | hrs. | 1,4  | ECTS** |

\*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts

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