

## Syllabus

### **BI1295.1 Sustainable Plant Production - from Molecular to Field Scale, 15.0 credits**

#### **Hållbar växtproduktion från molekylär- till beståndsnivå**

The course is given Plant Biology for Sustainable Production - Master´s programme, Agriculture Programme - Soil/Plant, Agriculture Programme - Soil/Plant (270hec) and Forest Science - Master´s Programme

Version 1 in Slukurs. Corresponds to version 1 and 2 in Ladok

#### **Syllabus approved**

25 October 2017

The version applies to students admitted from autumn 2018 to autumn 2021

The version is not a module version

#### **Subjects**

Biology

#### **Education cycle**

Second cycle

#### **Modules**

<b>Title</b>	<b>Code</b>	<b>Credits</b>
Single module	0101	15.0

#### **Advanced study in the main field**

Second cycle, only first-cycle courses as entry requirements (A1N)

## Grading scale

5:Pass with Distinction, 4:Pass with Credit, 3:Pass, U:Fail

The requirements for attaining different grades are described in the course assessment criteria which are contained in a supplement to the course syllabus. Current information on assessment criteria shall be made available at the start of the course.

## Language

English

## Prior knowledge

Knowledge equivalent to 120 credits at basic level including

- 60 credits biology or
  - 60 credits Forest Sciences including 15 credits chemistry
  - 60 credits Horticultural Science including 15 credits chemistry
  - 60 credits Agricultural Science including 15 credits in chemistry
- and
- English 6

## Objectives

The course offers a synthesis and further deepening of the basic principles of sustainable production in agriculture, horticulture, and forestry. The factors and processes that affect the sustainability and multifunctionality of production systems are integrated, by considering the different scales from the molecular to the stand level. The course also provides knowledge of the associated relevant methodologies. The course presents a review of the relevant theoretical basis and a set of specific examples relative to selected plants and production systems.

On completion of the course, the student will be able to:

- describe the origin of cultivated plants, the basic breeding strategies for them, and their molecular and physiological features relevant for production
- discuss the effects of plant features and growing conditions on the production, yield and resource use efficiency of cultivated plants
- evaluate the impacts of different management solutions on the production and yield of cultivated plants, with reference to different criteria for sustainability and multifunctionality
- plan and execute the research activities necessary to answer specific research

questions in the subject area, under limited guidance  
- present the results of these research activities in a scientifically-appropriate way

## **Content**

The course offers a synthesis and further deepening of knowledge in plant production research, as well as the integration of different methodologies employed in, among others, plant physiology, plant breeding and process-based modeling. The course provides a solid foundation for research in the subject area, but also professional training. The course consists of lectures and compulsory seminars and exercises, as well as a group project. The lectures review the basics of the origin, breeding, physiology and production of cultivated plants, and link them to soil ecology and nutrient dynamics at the field level. The effects of disturbances on plant production and possible improvement strategies are also described, both qualitatively and quantitatively. These aspects are discussed at different organizational levels. In addition, the complexity and multifunctionality of production systems are explored with reference to different systems, focusing on sustainability and the inherent tradeoffs. The lectures provide also an overview of important tools and methods for research. The seminars and exercises train the ability to read scientific literature and extract key information, identify knowledge gaps, and present and compare different points of view. The group work trains the students in different research methods and offers the opportunity of practical applications of the knowledge acquired during the rest of the course. The seminars and exercises include compulsory activities.

## **Formats and requirements for examination**

Written and oral exam with passing grade; participation in the compulsory seminars and exercises; written report and oral presentation of the group project work.

- If the student fails a test, the examiner may give the student a supplementary assignment, provided this is possible and there is reason to do so.
- If the student has been granted special educational support because of a disability, the examiner has the right to offer the student an adapted test, or provide an alternative assessment.
- If changes are made to this course syllabus, or if the course is closed, SLU shall decide on transitional rules for examination of students admitted under this syllabus but who have not yet passed the course.
- For the examination of a degree project (independent project), the examiner may also allow the student to add supplemental information after the deadline. For more information on this, please refer to the regulations for education at Bachelor's and Master's level.

**Additional information**

The course is part of the Master program in Plant biology for sustainable production and the program in Agriculture – soil and plant science.

SLU is environmentally certified according to ISO 14001. A large part of our courses cover knowledge and skills that contribute positively to the environment. To further strengthen this, we have specific environmental goals for the education. Students are welcome to suggest actions regarding the course's content and implementation that lead to improvements for the environment. For more information, see webpage [www.slu.se](http://www.slu.se).

- The right to take part in teaching and/or supervision only applies to the course date to which the student has been admitted and registered on.
- If there are special reasons, the student may take part in course components that require compulsory attendance at a later date. For more information on this, please refer to the regulations for education at Bachelor's and Master's level.

**Responsible department**

Department of Crop Production Ecology

**Supplementary Information**

*Finalized by:* Vice dekan S-fak

*Biology Area:* Botany