UNIVERSITY OF HOHENHEIM

WINTER SEMESTER 2025/26

CURRICULUM

Crop Sciences

Master of Science

Faculty of Agricultural Sciences | As of August 2025

Preamble

This curriculum provides applicants and students as well as teaching and administrative staff with comprehensive information about the M.Sc. program "Crop Sciences". It contains information on the program structure and summarizes the most important exam regulations (issued the 13th May 2025).

The information presented reflects the current situation. Titles and contents of compulsory and optional modules are sometimes subject to change. For administrative reasons, such changes can only be included in printed materials with a delay. For this reason, we do not accept liability for the correctness of the information provided.

If in doubt, please contact the coordinator of the program (ivan.guzman@uni-hohenheim.de) to obtain up-to-date information. For up-to-date module descriptions please refer to the website at uni-hohenheim.de/en/module-catalogue. Time schedules and lecture halls for all courses are displayed in the Course Catalog of the University of Hohenheim, available at the beginning of each semester online on the University's homepage: uni-hohenheim.de/en/course-catalog

Imprint

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1 PROGRAM OBJECTIVES

The goal of Crop Sciences is to develop crops and cropping systems with the highest possible efficiency in converting light and supplemental resources into food, feed, and fiber. Biological, physiological, molecular, genetic and biometric principles are applied, and graduates are prepared to develop cropping systems that are profitable and ecologically sustainable.

Students must choose between the two majors **"Plant Breeding and Seed Science"** and **"Plant Nutrition and Protection"**. The title of the chosen major will be reported in the transcript of records.

The full program is composed of 4 semesters each with 30 ECTS credits. The language of instruction is English, and the program can be started in October (winter semester) each year.

2 DEGREE AND CAREER PERSPECTIVES

After successful completion of all modules as well as the thesis, the student is awarded the degree "Master of Science" (M.Sc.) in Crop Sciences, the degree certificate mentioning the chosen major. This degree entitles the student to continue with a Ph.D./doctoral program if the total grade is above average.

Graduates acquire in-depth knowledge in their field of study, develop critical thinking skills, and are able to conduct cutting-edge research. Potential areas of employment are:

- Plant cultivation and seed companies
- Grain and greenhouse companies
- Chemical-pharmaceutical industry
- Service industry and consulting
- Non-governmental organizations
- Ministries
- Public and private research facilities
- Agrochemical companies

Examples of Crop Sciences graduates can be found here: uni-hohenheim.de/cropsciences-alumni

In the "**Study Compass**" you will find a comprehensive compilation of important information for your studies.

Information about modules, examinations, master's thesis, plan of blocked modules, AIDAHO program, additional offers, and much more is available there.

Make sure to consult the Study Compass and get familiar with the regulations!

3 PROGRAM DESIGN - MAJOR: PLANT BREEDING AND SEED SCIENCE

	1st Semester	2nd Semester	3rd Semester	4th Semester
6 Credits	3502-440 **Methods of Scientific Working** (for Crop Sciences)	3402-450 **Advanced Statistical Methods for Metric and Categorical Data**	Elective module	**Master's Thesis** (30 credits)
6 Credits	3502-450 **Population and Quantitative Genetics**	3501-450 **Breeding Methodology**	Elective module	
6 Credits	3501-470 **Selection Theory**	3504-460 **Seed Testing**	Elective module	
6 Credits	Elective Module	3501-490 **Planning a Research Project in Plant Breeding**	Elective module	
6 Credits	Elective Module	Elective module	Elective module	

The major "Plant Breeding and Seed Science" consists of seven compulsory modules (42 credits) spread over the first two semesters. The remaining 48 credits required for the degree must be added with elective modules.

3.1 Compulsory modules of "Plant Breeding and Seed Science":

Sem	Code	Name of Module	Duration	Credits	Professor
1	3502-440	**Methods of Scientific Working** (for Crop Sciences)	1 Semester	6	Schmid
1	3502-450	**Population and Quantitative Genetics** *(AIDAHO methods[1])	1 Semester	6	Schmid
1	3501-470	**Selection Theory**	1 Semester	6	Würschum
2	3402-450	**Advanced Statistical Methods for Metric and Categorical Data** *(AIDAHO specialization)	1 Semester	6	Piepho
2	3501-450	**Breeding Methodology**	1 Semester	6	Würschum
2	3504-460	**Seed Testing**	1 Semester	6	Kruse
2	3501-490	**Planning a Research Project in Plant Breeding** *(old title: 3501-460 | Planning of Breeding Programs)*	1 Semester	6	Würschum

[1] For more information on the AIDAHO program, see chapter 5. Artificial Intelligence and Data Science in Hohenheim (AIDAHO)

3.2 Recommended elective modules for "Plant Breeding and Seed Science"

The elective modules can be chosen from the list below or from the modules of other Master's programs offered by the Faculty of Agricultural Sciences at the University of Hohenheim. On request to the examination board and with the approval of an academic counsellor or the program coordinator, modules can be chosen from other programs of the University of Hohenheim or other universities. With compulsory and elective modules together, at least 90 credits must be reached.

Sem	Code	Name of Module	Duration	Credits	Professor
1-4	3000-410	Portfolio-Module (Master)	Not defined	1 - 7.5	Kruse, M.
1-4	3000-560	German as a Foreign Language UNIcert® II (B2)	2 Semesters	6	Hölzle
1	3408-460	Plant Quality	1 Semester	6	Ludewig
1	3603-480	Entomology	1 Semester	6	Petschenka
1/3	3402-420	Quantitative Methods in Biosciences *(AIDAHO methods)	1 Semester	6	Piepho
1/3	4611-440	The Bacterial Genome, from Culture to Functional Reconstruction	blocked in March	7.5	Kube
1	5107-4X0	Principles of Data Science *(AIDAHO basic)	1 Semester	6	Dimpfl
2	3502-470	Plant Genetic Resources *(AIDAHO methods)	First half of semester	6	Schmid
2	3504-450	Saatguttechnologie	1 Semester	6	Kruse
2	3401-510	Three-Dimensional Modeling of Plant Architecture and Function *(AIDAHO application)	1 Semester	6	Graeff-Hönninger
2	4301-460	Fit for Innovation Support – Concepts, Methods and Skills	1 Semester	6	Knierim
2	4407-480	Introduction to Machine Learning in Python *(E-Learning)* *(AIDAHO basic)	e-learning Block in August	7.5	Stein
2	5703-510	Entrepreneurship	1 Semester	6	Kuckertz
3	3402-460	Advanced Statistical Methods for Metric and Categorical Data II *(AIDAHO methods)	1 Semester	6	Piepho
3	3411-420	From Genes to Transgenic Plants and Edited Genomes	1 Semester	6	Schmöckel
3	3504-430	Seed Research	1 Semester	6	Kruse
3	4302-420	Ethical Reflection on Food and Agriculture*	1 Semester	6	Bieling
2/4	4407-510	Intelligent Robotics for Agriculture *(AIDAHO application)	1 Semester	6	Stein

* Limited number of participants. Please register for participation in ILIAS

Blocked Modules *(might have significant time overlap with unblocked modules!)*

Sem	Code	Name of Module	Duration	Credits	Professor
2	3504-470	Applied Seed Physiology	Block 3, SS	7.5	Nagel

4 PROGRAM DESIGN - MAJOR: PLANT NUTRITION AND PROTECTION

	1st Semester	2nd Semester	3rd Semester	4th Semester
6 Credits	3502-440 **Methods of Scientific Working** (for Crop Sciences)	Elective module	Elective module	**Master's Thesis** (30 credits)
6 Credits	3402-420 **Quantitative Methods in Biosciences**	Elective module	Elective module	
6 Credits	3408-460 **Plant Quality**	Elective module	Elective module	
6 Credits	3411-420 **Crop Stress Physiology**	Elective module	Elective module	
6 Credits	3602-420 **Use of Pesticides and their Fate in the Environment**	Elective module	Elective module	

The major "Plant Nutrition and Protection" consists of five compulsory modules (30 credits), all offered in the first semester. The remaining 60 credits required for the completion of the degree must be added with elective modules.

Instead of choosing five elective modules per semester (each 6 credits) as shown above, the major "Plant Nutrition and Protection" offers the possibility to choose four blocked modules (each 7.5 credits) offered by the Faculties of Agricultural Sciences and/or Natural Sciences during the second and/or the third semester. Choosing modules of the Faculty of Natural Sciences – codes starting with "1" or "2" - requires the approval of an academic counsellor or the coordinator and a request to the examination board. Most modules have a strictly limited number of participants; access is not guaranteed.

4.1 Compulsory modules of "Plant Nutrition and Protection"

Sem	Code	Name of Module	Duration	Credits	Professor
1	3502-440	**Methods of Scientific Working** (for Crop Sciences)	1 Semester	6	Schmid
1	3402-420	**Quantitative Methods in Biosciences** *(AIDAHO methods)	1 Semester	6	Piepho
1	3408-460	**Plant Quality**	1 Semester	6	Ludewig
1	3411-420	**Crop Stress Physiology**	1 Semester	6	Schmöckel
1	3602-420	**Use of Pesticides and their Fate in the Environment**	1 Semester	6	Gerhards

4.2 Recommended elective modules for "Plant Nutrition and Protection"

The elective modules can be chosen from the list below or from the modules of other Master's programs offered by the Faculty of Agricultural Sciences at the University of Hohenheim. On request to the examination board and with the approval of an academic counsellor or the program coordinator, modules can be chosen from other programs of the University of Hohenheim or other universities. With compulsory and elective modules together, at least 90 credits must be reached.

Sem	Code	Name of Module	Duration	Credits	Professor
1-4	3000-410	Portfolio-Module (Master)	open	1 – 7.5	Kruse, M.
1-4	3000-560	German as a Foreign Language UNIcert® II (B2)	2 Semesters	6	Hölzle
1/3	4611-440	The Bacterial Genome, from Culture to Functional Reconstruction	blocked in March	7.5	Kube
1	5107-4X0	Principles of Data Science *(AIDAHO basic)	1 Semester	6	Dimpfl
2	3408-430	Molecular Plant Nutrition	1 Semester	6	Ludewig
2	3408-490	Rhizosphere Processes - Nutrient Acquisition and Stress Adaptations of Higher Plants	1 Semester	6	Ludewig
2	3402-450	Advanced Statistical Methods for Metric and Categorical Data *(AIDAHO methods)	1 Semester	6	Piepho
2	3411-410	Understanding Stress Physiology to Increase Yield Stability *	1 Semester	6	Schmöckel
2	3502-470	Plant Genetic Resources *(AIDAHO methods)	First half of semester	6	Schmid
2	3602-460	Information Technologies and Expert Systems in Plant Protection *(offered every other year. 2026, 2028, …)* *(AIDAHO application)	partly blocked in June	6	Gerhards
2	3603-420	Crop Protection in Organic Farming	1 Semester	6	Petschenka
2	3401-510	Three-Dimensional Modeling of Plant Architecture and Function *(AIDAHO application)	1 Semester	6	Graeff-Hönninger
2	4301-460	Fit for Innovation Support – Concepts, Methods and Skills	1 Semester	6	Knierim
2	4407-480	Introduction to Machine Learning in Python * (AIDAHO basic)	e-learning blocked in August	7.5	Stein
2	5703-510	Entrepreneurship	1 Semester	6	Kuckertz
2/3	3409-480	Fertilization and Soil Fertility Management in the Tropics and Subtropics	e-learning 1 Semester	7.5	Müller, T.
3	3408-470	Methods in Molecular Transport Physiology	1 Semester	6	Ludewig
3	3103-410	Plant and Crop Modeling *(AIDAHO application)	In March	6	Priesack
3	3408-450	Plant Symbioses for Nutrient Acquisition	1 Semester	6	Ludewig
3	3603-480	Entomology	1 Semester	6	Petschenka
3	4302-420	Ethical Reflection on Food and Agriculture *	1 Semester	6	Bieling
3	4611-470	Current Infectious Diseases of Crops and Livestock	1 Semester	6	Kube
3	4613-410	Molecular Biology and Data Analysis in Microbiology	1 Semester	6	Camarinha da Silva
3	4905-420	Crop Production Systems	1 Semester	6	J. Silva
2/4	4407-510	Intelligent Robotics for Agriculture *(AIDAHO application)	1 Semester	6	Stein

* Limited number of participants. Please register for participation in ILIAS

Suggestions for a semester package of **blocked elective modules** including one module offered by the **Faculty of Natural Sciences.**

Sem	Code	Name of Module	Duration	Credits	Professor
2	3601-410	Molecular Phytopathology	Block 1, SS	7.5	Vögele
2	4905-430	Integrated Agricultural Production Systems	Block 2, SS	7.5	J. Silva
2	4905-470	Biodiversity and Genetic Resources	Block 2, SS	7.5	Martin
2	3504-470	Applied Seed Physiology	Block 3, SS	7.5	Nagel
2	4907-430	Crop Production Affecting the Hydrological Cycle	Block 3, SS	7.5	Asch
2	4907-420	Ecophysiology of Crops in the Tropics and Subtropics	Block 4, SS	7.5	Asch
2	1916-400	Pathogens, Parasites and their Hosts, Ecology, Molecular Interactions and Evolution**	Block 4, SS	7.5	Mackenstedt

*** EuroLeague Summer School: 8 places for UHOH-students!*

5 ARTIFICIAL INTELLIGENCE AND DATA SCIENCE IN HOHENHEIM (AIDAHO)

The program is designed for students of all faculties. The aim of AIDAHO is to increase the expertise of its participants in the fields of Artificial Intelligence (AI), Data Science and Scientific Computing. Students can enroll in the certificate in addition to their main course of study: **aidaho.uni-hohenheim.de/en**.

How to achieve the certificate

To successfully complete the program, students must pass at least five AIDAHO modules (30 ECTS).

- There are **three mandatory basic modules** that all participants must complete. The courses of these modules teach basic programming skills and statistical methods.
- In the **two semi-elective specialization modules** students can either deepen their *methodological skills* or choose to work on data projects in *application* seminars.

For better planning, modules which are part of the AIDAHO program, are marked across the curriculum with an asterisk.

6 KEY CONTACTS FOR THE CROP SCIENCES PROGRAM

6.1 Crop Sciences program director

Prof. Dr. Uwe Ludewig, University of Hohenheim
Department of Nutritional Crop Physiology (340h)
Email: u.ludewig@uni-hohenheim.de
Web: crop-physiology.uni-hohenheim.de/uwe-ludewig

6.2 Professors responsible for the majors

Plant Nutrition and Protection: **Prof. Dr. Uwe Ludewig**, Email: u.ludewig@uni-hohenheim.de
Plant Breeding and Seed Science: **Prof. Dr. Karl Schmid**, Email: karl.schmid@uni-hohenheim.de

6.3 Academic counseling

Academic counsellors advise students on their choice of modules to design their individual study profile and to support smooth and focused study progress. If a student wants to select modules offered by a faculty other than the Faculty of Agricultural Sciences, they must be approved by the academic counsellor or the program coordinator beforehand. Students can contact these counsellors at any time and ask for an appointment.

Academic counselors for Crop Sciences and their respective research focus:

- **Prof. Dr. Ludewig**, program director (Nutritional Crop Physiology), u.ludewig@uni-hohenheim.de
- **Prof. Dr. Schmid** (Crop Biodiversity and Breeding Informatics, in charge of the major "Plant Breeding and Seed Science"), karl.schmid@uni-hohenheim.de
- **Dr. Tobias Schrag** (Plant Breeding), tobias.schrag@uni-hohenheim.de
- **Prof. Dr. Vögele** (Phytopathology), ralf.voegele@uni-hohenheim.de
- **Prof. Dr. Petschenka** (Applied Entomology), georg.petschenka@uni-hohenheim.de

6.4 Crop Sciences program coordinator

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