



Study Guide

Master Programme *Crop Protection*
Wintersemester 2023/2024



GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN IN PUBLICA COMMODA
SEIT 1737

Master of Science Programme „Crop Protection“

Foreword

Dear students,

We welcome you to the Faculty of Agriculture of the University of Göttingen and especially to the Master Programme ‘*Crop Protection*’.

Founded in 1737, the University of Göttingen is internationally renowned for its long-standing research tradition and its remarkable range of disciplines. In 2007, it was recognized as one of the top nine universities of excellence in Germany for its future strategy and research potential. The Göttingen University campus comprises 13 faculties with 30.000 students of which about 3.000 come from more than 100 different countries.

The Faculty of Agriculture is one of the largest research-oriented agricultural faculties in Germany and offers a broad range of subjects in life and socio-economic sciences, excellent research facilities, an outstanding quality and diversity of study programmes, and a system-oriented approach in research and teaching in agricultural sciences embedded in a national and international network of education.

In accordance with one of the main targets of the University, which is to intensify internationalization, the Faculty of Agricultural Sciences offers competitive international education programmes on the MSc and PhD level with English as the language of instruction. These programmes are strongly demanded by students from all over the world. The Master Programme ‘*Crop Protection*’ was newly established in October 2010 stimulated by the century challenge to protect crop production from losses due to plant pathogens, insects and weeds at a time of continuing world population growth and concerns over global food security. Our Master Programme offers a concise education to develop, advance and apply modern crop protection techniques within crop production systems while observing the challenges of sustainability and natural resources conservation.

This study guide provides you with essential information about the study programme and gives an overview on all modules. More information at <http://www.uni-goettingen.de/en/135654.html>.

Assistance is available from the crop protection programme coordinator:

Dr. Susanne Weigand
Division of Plant Pathology and Crop Protection, Department of Crop Sciences
Grisebachstr. 6, 37077 Göttingen
Phone 0551-3923724; Email: cropprotection@uni-goettingen.de

On behalf of the Faculty of Agricultural Sciences, we welcome you very warmly on the Göttingen University Campus and we wish you a successful and pleasant stay in Göttingen.



Prof. Dr. Andreas von Tiedemann, Study Programme Director

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2. Master degree program Crop Protection

2.1 Program structure

The study program consists of modules. Modules are study units that may consist of thematically related, but different types of courses. Each Module has a credit value. The credit is given according to the ECTS-credit system (European Credit Transfer System) and 6 credits correspond to the workload of 4-hour lectures or 8-hour practicals per week for one semester (16 weeks teaching period) and the preparation for those lectures/practicals and the examination. Most modules in the program have 6 credits. The Master's thesis and the defense have in total 30 credits. A regular workload is 30 Credits per semester, i.e., 5 modules. The number of lectures a module has per week is called "Semester Wochen Stunden": SWS which means semester hours per week.

The two year MSc program comprises of four semesters during which 120 ECTS have to be completed. The courses of advanced study contribute 81 credits, an internship of 6 weeks including a written report and oral presentations 9 credits and the master thesis including the colloquium 30 credits. The training in concepts and practical skills is achieved through lectures, seminars, laboratory classes, field courses and project work.

In addition to the normal course work students have to carry out a six weeks internship in areas of crop protection, in agrochemical companies, in research or consulting institutions and experience the daily work situation. Specific knowledge of the respective area of work/research will be acquired, social abilities like work organization, teamwork, interdisciplinary work, flexibility will be practiced. The last semester consists of a research project for the master thesis - including experiments, data collection and evaluation, completion of the thesis. The thesis has to be defended in a colloquium.

Compulsory modules (30 ECTS):

Scientific working methods: I –III

Journal club

Scientific writing and presenting

Basic laboratory techniques

Internship, minimum of 6 weeks

Pesticides I

Pesticides II

Elective modules (54 ECTS):

Key competences (6 ECTS)

Practical Statistics and Experimental Design

Master thesis and defense (30ECTS)

2.2 Types of courses

Lectures: In lecture courses university professors talk on a specific topic providing a comprehensive overview or in depth knowledge on a specific subject. Students receive credits for passing the written or oral exam at the end of the semester.

Seminars: Seminars are an interactive form of learning and require active student participation. Oral presentations are provided by students and followed by discussion.

Colloquium: Students or invited speakers present their current scientific research, which then is discussed.

Laboratory practical: Students work in laboratories and learn to plan and execute experiments, acquire laboratory research techniques and analytical methods.

Excursions and field trips: An excursion (usually several days) or a field trip should show students new places and the actual situation in the field.

2.3 Master thesis

A written application for admission for the master thesis must be submitted to the examination office where the application forms can also be obtained. Requirements for admission for the master thesis include that students have earned at least 72 credits and among those all compulsory modules have been completed. The application should include: the topic of the thesis, name of first and second supervisor and signatures of confirmation by both supervisors. One of the supervisors must be a habilitated (qualified as a professor) and authorized examiner of the Agricultural faculty of Göttingen University. The master thesis must be written in English. The time period for writing the thesis is 23 weeks with the possibility for extension of 6 weeks in special cases if the supervisors also agree.

Colloquium to the master thesis/master thesis defense: The colloquium will usually take place within six weeks after submission of the thesis. It consists of an introductory presentation (about 30 minutes) and a discussion (about 30 minutes) of the master thesis. Its purpose is to prove that the examinee is able to cope with interdisciplinary and problem-specific questions on a scientific basis and is able to put them into the context of the field of crop protection.

3. Examination office and regulations

3.1 Examination officThe examination office is located at Büsgenweg 5, 37077 Goettingen.

There you can get forms and solve other academic/administrative matters. If you could not take an examination due to illness, you have to submit the sick leave note provided by the doctor within three days.

Opening hours of the examination office:

Monday to Thursday 10.00 a.m. to 4.00 p.m., Friday 10.00 a.m. to 1.00 p.m.

In case you have problems with FlexNow, registration/deregistration, or others, please contact Mrs. Anja Kalkau (paagr@uni-goettingen.de) or Dr. Susanne Weigand (cropprotection@uni-goettingen.de)

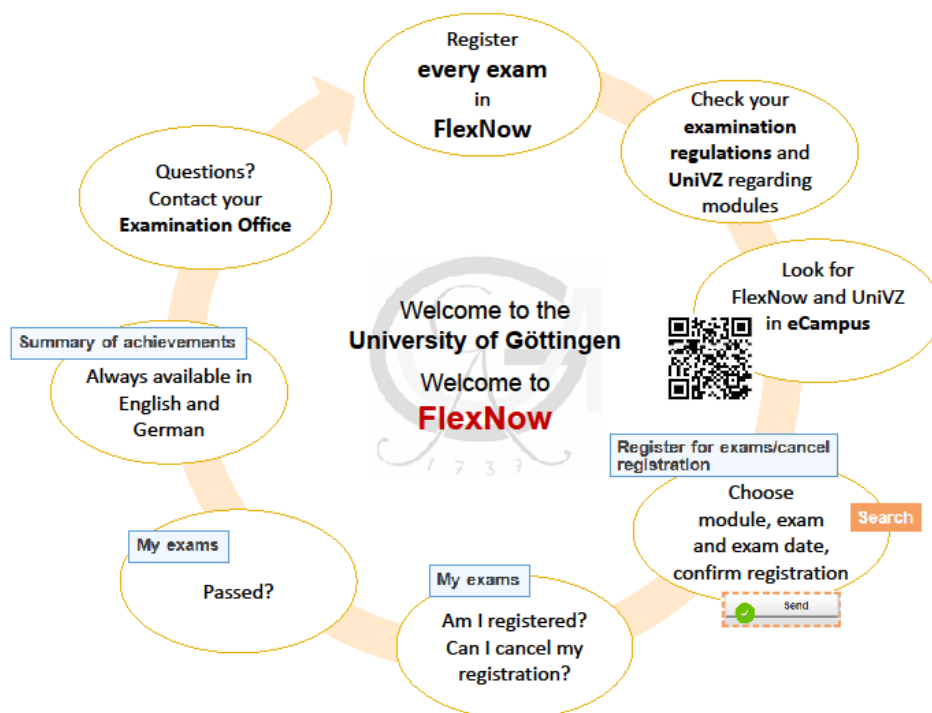
3.2 Examination periods and calendar

There are two examination periods per semester: One is within the first two weeks after the last day of lectures and one at the beginning of the following semester before the start of lectures. Students can choose to do the examination in the first or the second examination period. Examinations can be repeated twice (i.e. twice in total). In case of block seminars examinations can be offered outside the examination periods.

Examination dates are published in the Exams calendar of the Faculty of Agricultural Sciences in Göttingen:

<http://www.fakagrar.uni-goettingen.de/kalender/>

and in the FlexNow system.



Types of examinations are oral exams, written exams, giving a presentation and/or preparation of a written, project workpaper

3.3 Registration for examination: FlexNow

Registration for module examinations is done electronically by the students themselves in FlexNow:

You can only participate in an examination if you registered for the course at FlexNow during the respective registration period!

How to register on Flexnow

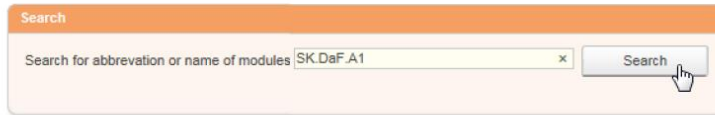
To register for an examination, go to

<http://www.uni-goettingen.de/en/45574.html> (☐ An-/Abmeldung).

- Choose *Prüfungsan- und -abmeldung* and register with your matriculation number and your usual password.
- Under “Crop Protection (Master of Science)” open *Module im Masterstudiengang*.
- Select the modul you want to register for.
- Example: If you you want to register for “Pesticides I”, select the module. It either offers one or two possible exam dates that may be chosen, or in case you cannot register yet, a sentence saying “Gegenwärtig sind für dieses Prüfungsfach keine Aktionen möglich” (=“At the moment, there are no actions possible for this module”) appears.
- Once the possibility to register is given, click on the preferred examination date and go to the end of the page. Enter your password.
- Please be sure to select the module from the compulsory or elective compulsory or key competence module block. **NOT DOUBLE DEGREE !!!!**
- To deregister, follow the same procedure; take out the check mark from the examination date and enter your password.



search module



choose module



Choose exam and exam date



Confirm registration



Schritt 3 von 4: Überprüfen Sie Ihre Auswahl. Durch Klick auf "Aus dem Prüfungskorb entfernen" können Sie eine Wahl rückgängig machen.
ACHTUNG: Erst nach einem Klick auf "Abschicken" sind Sie für die Prüfung an- oder abgemeldet!

ANMELDER: M.SIA.E11.Mj: Socioeconomics of rural development and food security

Prüfungsfach: Schwerpunkt 1: International Agribusiness and Rural Development Economics - Block A - M.SIA.E11: Socioeconomics of Rural Development and Food Security - ab WiSe 11/12

Prüfung, QAIM - Datum: 15.02.2016, 10:00 - 12:00, Raum: ZHG008

WS15/16 Termin: Regelmäßiger Termin

Prüfer:
[Prof. Dr. Ingrid Gammig] [Prof. Dr. Ingrid Gammig]

Ergebnis: Anmelden war erfolgreich

Schritt 4 von 4: Klicken Sie auf Abschicken um sich verbindlich für die gewählten Prüfung(en) an- oder abzumelden.

Direct feedback in FlexNow:

Green = successful

Red = not successful

Similar for confirmation and cancelation

Confirmation by mail - don't delete!



TransaktionsID: 14056375
Die TransaktionsID dient als Quittung für diese Transaktion.
Bei Rückfragen beim Prüfungsamt geben Sie bitte diese TransaktionsID an.
Bitte bewahren Sie diese E-Mail bis nach der Prüfung auf.

Sehr geehrte Frau Teststudent,

Folgende Anmeldungen wurden neu durchgeführt:

Sie haben sich zu der Prüfung **M.SIA.E11.Mj: Socioeconomics of rural development and food security** (Schwerpunkt 1: International Agribusiness and Rural Development Economics - Block A) erfolgreich angemeldet. **(Bemerkung: Anmelden war erfolgreich.)**

Prüfungsfach: M.SIA.E11: Socioeconomics of Rural Development and Food Security(ab WiSe 11/12)
Bezeichnung des Prüfungsangebotes: QAIM - Datum: 15.02.2016, 10:00 - 12:00, Raum: ZHG008

Sie wollen sehen, zu welchen Prüfungen Sie aktuell angemeldet sind? Schauen Sie im eCampus/FlexNow im Menüpunkt Studierendendaten.

Diese E-Mail wurde automatisch generiert und versendet.

Absence does require de-registration! Otherwise the exam will be counted as failed!!

Standard deadlines for registration and cancellation:

Written exams

Registration up to **7 days** before the examination, **cancellation until 24 hours** before the examination date

Oral examination

Registration and cancellation up to **7 days** before the examination date (exam date defined by examiner)

Practical examinations

Registration for the coming semester is possible until two weeks after the end of the course in the preceding seminar, cancellation until two weeks before course start.

Withdrawal because of illness

If you cannot take an exam because of illness you have to provide a medical attestation from a doctor, which has to be sent with a form, which you find under this link to the examination office:

<http://www.uni-goettingen.de/en/recognition-of-an-illness/581217.html>

In addition you may as well inform the respective Professor.

If you miss the exam without attestation, the exam will be counted as failed.

Repeating exams

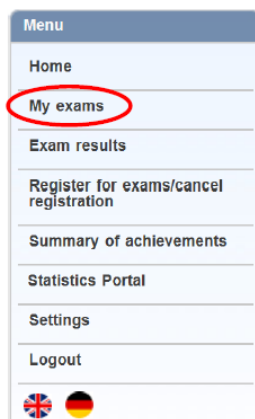
In case of failure the exam can be repeated. Only the new grade will count. You have a maximum of 3 attempts per course.

Successfully completed modules cannot be repeated to improve the grade.

Detailed information can be found here:

<http://www.uni-goettingen.de/de/438960.html>

Cancel registration



Type of exam	End of registration	End of cancellation
Written exam	7 days prior (23:59)	24 hours prior (exact time)
Oral exam	7 days prior (23:59)	7 days prior (23:59)
Papers	0 hours prior	0 hours prior

Subscribed exams

Prüfungsfach: Mikroökonomik I [B.WIWI-OPH.0007]
? Teilprüfung: B.WIWI-OPH.0007.Mp: Mikroökonomik I

WS16/17 – LV-Nr. 801086; BERGER - Datum: 23.02.2017, 12:15 - 13:45 UniVZ

Abmeldung möglich bis 22.02.2017, 12:15

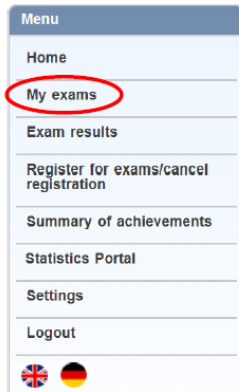
unsubscribe

How to find your grades on Flexnow

To find your grades, go to

<http://www.uni-goettingen.de/en/45574.html>

“My exams“



Am I registered?



What are my results?



- ? Result open
- ✓ Passed
- ✗ Failed

- Choose *Leistungsnachweis* and register with matriculation number and your usual password.
- There is a menu on the left side, where you choose *Studierendendaten*.
- Click now on *Abgelegte Prüfungen (zum Öffnen bitte hier klicken)* and open *Studiengang: Crop Protection (Master of Science)*.
- Here you find all passed, failed and registered exams and your grades.

In FlexNow, it is additionally possible to generate the record of performance (Log-in on

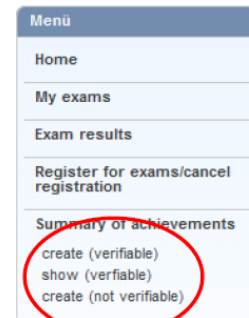
<http://www.uni-goettingen.de/en/45574.html>

under *Leistungsnachweis*, then ⇒ *Leistungsnachweis* ⇒ *erzeugen* ⇒ enter any future date and indicate language ⇒ click on *erzeugen*).

Summary of achievements



- Create summary of achievements on your own
- verifiable



Optional: Choose expiration date (up to 6 months)

Optional: Set name of printout

Optional: Choose format
1) Successful passed exams only
2) All exams, incl. failed

language: German or English

Create PDF

3.4 E-campus, UniVZ, StudIP, FlexNow and Self Service functions, Email

Under **E-campus** students find all relevant information for their studies and links to UniVZ, StudIP, FlexNow, self service functions and email.

<http://ecampus.uni-goettingen.de/ecampus/> (also available in English language)

Log in with your username (firstname.lastname) and your usual password.

The **UniVZ** is the internet based information system of the university. It contains a lot of information and functions.

- List of all modules offered at the University of Goettingen including location, times, lecturer, contents.
- Module description
- Directory of institutes, rooms/facilities, and staff
- Individual schedule planner

<http://univz.uni-goettingen.de> (also available in English language)

Since June 2022 the UniVz is being replaced by a new system: **HISinOne EXA**

StudIP is the central learning management platform of the university and helps you to manage and participate in your classes. It provides information, material and resources on classes online and is an interactive tool. You can:

- Up and download course specific information
- Register for courses
- Manage schedules
- Take part in discussions
- Receive and write messages

To be able to make full use of StudIP's full functions you have to register and login to the system. The university provides a username and password for each student. This username and password is the same you use for your student e-mail-account or when you register for examinations.

When picking up the student ID card at the Chipkartenstelle students also get log-in data for StudIP and email account with a personalized address (name.familyname@stud.uni-goettingen.de). Please check this email account regularly, because all emails and notifications by the university are sent **ONLY** to this account.

<http://www.goettingen.studip.de> (also available in English language).

To enter the **self-service functions** of the University click on "Self-service functions for students" <https://www.uni-goettingen.de/en/14632.html>

and log in with your matriculation number or your user name and your usual password.

You can:

- change your contact details (*Kontaktdaten ändern – Anschriften, Telefon, Fax und E-Mail*)
- get new TAN-numbers (*TANs anfordern*)
- re-register (*Rückmeldung*)
- change pin or password (*PIN/Passwort ändern*)
- print enrolment certificates (*Bescheinigung ausdrucken*)- **Please download the enrolment certificate in the beginning of the semester !!** Once you re-register for the next semester you cannot access the form of the previous semester
- exmatriculate (*Exmatrikulation*)

To leave the self-service functions, use the button *Abmelden*.

You have an **email account** from the University of Goettingen, which can be checked here:

<http://webmail.uni-goettingen.de>.

4. SUB

The library (Niedersächsische Staats- und Universitysbibliothek Göttingen, SUB) is one of the five largest scientific libraries in Germany. The central library (Zentralbibliothek) can be found here:

Platz der Göttinger Sieben 1,
37073 Göttingen

<http://www.sub.uni-goettingen.de/index-e.html>

Opening hours:

Monday – Friday 07.00 a.m. to 01.00 a.m.

Saturday – Sunday 09.00 a.m. to 10.00 p.m.

There is a lot of room for reading and studying. The copy machines may be used with coins or with a copy-card, which can be bought for € 5 (100 copies) in the counter (Monday to Wednesday and Friday 9.00 a.m. to 16.00p.m., and Thursday from 9.00 a.m. to 18.00 p.m.). The computers in the SUB can be used with the usual student log-in. Furthermore, you can connect your personal laptop to the University's W-LAN network.

5. Counselling Service and Improvement Suggestions

If you have any questions regarding your studies, you can get advice. You can get help with the organization of your studies, if you have questions about the program or module combinations, and also for specific questions e.g. about the ECTS-credit system. For an appointment, please contact:

- Dr. Susanne Weigand (cropprotection@unigoettingen.de), Tel. 0551-39-23724)

Likewise, If you have any ideas, suggestions or criticism to bring in for the improvement of the study guide or even the study program, please tell or email them also to Dr. Susanne Weigand.

Module list for Master of Science „Crop Protection“

I. Compulsory modules

M.Cp.0002	Internship, 6 -8 weeks practical work and report	(9 C)
M.Cp.0017	Scientific Presenting, Writing and Publishing in Crop Protection	(3 C/ 2 h per sw)
M.Cp.0018	Journal Club on New Topics in Crop Protection	(3 C/ 2 h per sw)
M.Cp.0019	Basic Laboratory Methods	(3 C)
M.Cp.0006	Pesticides I: Mode of Action and Application Techniques, Resistance to Pesticides	(6 C/ 4 h per sw)
M.Cp.0007	Pesticides II: Toxicology, Ecotoxicology, Environmental Metabolism, Regulation and Registration	(6 C/ 4 h per sw)

II. a) Elective compulsory modules.

M.Cp.0004	Plant Diseases and Pests in Temperate Zones	(6 C/ 4 h per sw)
M.Cp.0005	Integrated Management of Pests and Diseases	(6 C/ 4 h per sw)
M.Agr.0009	Biological Control and Biodiversity	(6 C/ 4 h per sw)
M.Agr.0023	Interactions between Plants and Phytopathogens	(6 C/ 4 h per sw)
M.Cp.0008	Fungal Toxins	(6 C/ 4 h per sw)
M.Agr.0039	Molecular Techniques in Phytopathology	(6 C/ 4 h per sw)
M.Agr.0094	Basics of Molecular Biology in Crop Protection	(6 C/ 4 h per sw)
M.Agr.0045	Mycology	(6C/ 4 h per sw)
M.Cp.0010	Plant Pathology and Crop Protection Seminar	(3 C/ 2 h per sw)
M.Agr.0057	Plant Virology	(6 C/ 6 h per sw)
M.Agr.0058	Plant Herbivore Interactions	(6 C/ 4 h per sw)
M.Cp.0011	Agricultural Entomology Seminar	(3 C/ 2 h per sw)
M.Cp.0012	Weed Biology and Weed Management	(6 C/ 4 h per sw)
M.Agr.0056	Plant Breeding Methodology and Genetic Resources	(6 C/ 4 h per sw)
M.Agr.0010	Biotechnological Applications in Plant Breeding	(6 C/ 4 h per sw)
M.Cp.0014	Plant Nutrition and Plant Health	(3 C/ 2 h per sw)
M.Cp.0015	Molecular Weed Science	(6 C/ 4 h per sw)
M.Agr.0146	Nematology	(3 C/ 2 h per sw)
M.Cp.0023	Plant Pathogenic Bacteria	(3 C/ 2 h per ww)
M.Cp. 0024	Digital Techniques for Crop Monitoring	(6 C / 4 h per sw)
M.Cp.0025	Analytical Techniques for Foods and Agricultural Research	(6C/ 4 h per sw)

M.Agr.0174	Plant Health Management in Tropical Crops	(6 C/ 4 h per sw)
M.SIA.P22	Management of Tropical Plant Production Systems	(6C/ 4 h per sw)
P 07 SIA	Soil and Plant Sciences	(6 C/ 4h per sw)
P 03 SIA	Ecological Soil Biology	(6 C/ 4 h per sw)
P 15M SIA	Methods and Advances in Plant Protection	(6 C/ 4 h per sw)

II b). Key competences

M.Cp.0016	Practical Statistics and Experimental Design in Agriculture	(6 C/ 4 h per sw)
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III. Masterthesis / Presentation and Defense

For completion of the Masterthesis 24 credits are acquired.

For successful presentation and defense of the master thesis 6 credits are acquired.

Exemplary Study Plan Master Program „Crop Protection“

	Modul 1	Modul 2	Modul 3	Modul 4	Modul 5
Winter 1. Sem. 30C	M.Cp.0005 Integrated Management of Pests and Diseases 6 C	Compulsory: Scientific Working Methods M.Cp.0019 Basic Laboratory Techniques 3C	Compulsory: M.Cp.0006 Pesticides I Mode of Action and Application Techniques 6 C	M.Cp.0015 Molecular Weed Science 6C or M.SIA.P22 Management of Tropical Plant Production Systems	M.Agr.0045 Mycology Blockpractical 6 C or M.Agr. 0058 Plant Herbivore Interactions 6 C
Summer 2. Sem. 30 C	Key Competences M.Cp.0016 Practical Statistics and Experimental Design in Agriculture 6C	M.Cp.0004 Plant Diseases and Pests in Temperate Zones 6 C	Compulsory: Scientific Working Methods: M.Cp.0017 Scientific Writing and Presenting 3 C M.Cp.0018 Journal club 3 C	M.Cp.0012 Weed biology and Weed Management 6 C	M.Agr.0094 Basics of Molecular Biology in Crop Protection 6 C
9C	Compulsory M.Cp.0002 Internship (6 weeks) 9 C				
Winter 3. Sem. 24C	Internship Seminar M.Cp. 0014 Plant Nutrition and plant health 3C	M.Cp.008 Fungal Toxins 6C or M.Agr.0039 Molecular Techniques in Phytopathology 6C	Compulsory: M.Cp.0007 Pesticides II Toxicology Ecotoxicology, Environmental Metabolism, Regulation and registration 6 C	M.Agr.0023 Interactions between Plants and Pathogens 6C or M.Agr.0057 PlantVirology 6 C	M.Cp.0020 Ecotoxicological Risk Assessment for Plant Protection Products 3 C Or Plant Pathogenic Bacteria 3 C
Summer 4. Sem. 30 C	Master Thesis 24 C				Thesis Presentation and Defense 6 C

Total 120

MSc Crop Protection
First year, 1st semester – winter term 2023/2024

Day	Time	Module Code	Module	Lecturer	Type	Location
Mo	10:00-11:30	P22SIA	Management of Tropical Plant Production Systems	Rötter	L	L318
	14:15-15:45	M.Cp.0012	Molecular Weed Science	Wagner	L	L44
	16:15-17:45	M.Agr.0058	Plant-Herbivore Interactions	Rostas	L, S	L07
Tues	08:15-09:45	M.Agr.0057	Plant Virology	Varrelmann	L	L 44
	10:15-11:45	M.Agr.0023	Interactions between Plants and Phytopathogens	Koopmann, Varrelmann	L	L07
	12:15-13:45	M.Agr.0058	Plant-Herbivore Interactions	Rostas	L, S	MN06
	14:15-15:45	P22 SIA	Management of Tropical Plant Production Systems	Rötter	L	L318
	16:15-17:45		Seminar Plant Pathology	Koopman, v.Tiedemann,	S	L44
	16:00-17:30	M.Agr.0044	Molecular Diagnostics and Biotechnology in Crop Protection	Varrelmann	L	L07
Wed	08:15-09:45	M.Cp.0005	Integrated Management of Pests and Diseases	AvT,Balakrishnan, Dücker	L	L07
	13:15- 15:45	M.Cp.0015	Molecular weed Science Practical	Wagner	P	GP 0.121

	16:15-17:45		Kolloquium Phytomedicine	AvT, Rostas,	S	L 07
Thurs	10:15-11:45	M.Cp.0005	Integrated Management of Pests and Diseases	AvT, Balakrishnan, Dücker	L	L07
	14:15-15:45	M.Cp.0006	Pesticides I	AvT, Rostas	L	L44
	16:00-17:30	M.Agr.0044	Molecular Diagnostics and Biotechnology in Crop Protection	Varelmann	L	L07
Fri	10:30-12:00 Excursion 25/26 January	M.Cp.0006	Pesticides I 10.1.24 Application techniques block lecture 10:30 to 14:30 17.1.24 Application techniques block lecture 10:30 to 14:30	AvT, Rostas	L	L44
	14:15-15:45	M.Cp.0014	Plant Nutrition and Plant Health	Dittert	L	L02
		BLOCK	PRACTICALS			
Block	16- 20 Oct 2.-5- April	M.Cp.0016	Basic Laboratory Methods	Sirrenberg	P	GP 0.121
Block	4.-15 March	M.Cp.0008	Fungal Toxins	Al-Hussein	P	
Block	19 Febr- 1 Mar	M.Agr.0045	Mycology	v.Tiedemann, Koopmann	P	GP 0.121
Block	4.-8 March 11 -15 March	M.Agr.0023	Interactions between Plants and Phytopathogens	Koopman	P	Lab/Bib
Block	18-22 March	M.Cp.0020	Ecotoxicological Risk Assessment for Plant Protection Products	Weltje	P	GP 0.121
Block	12 -16 February	M.Agr.0057	Plant Virology	Varrelmann	P	0121

Block	25-28 March	M.Agr.0146	Nematology	Kiewnick	P	L07
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MSc Crop Protection
First year, 2nd semester – summer term 2024

Day	Time	Module Code	Module	Lecturer	Type	Location
Mon	8:15 – 9:45	M.Cp.0016	Practical Statistics and Experimental Design in Agriculture	Scholten, Sharifi Kluth	L	L 06
	14:15-15:45	M.Cp.0015	Weed biology and Weed Management	Wagner	L	L44
	14:15-15:45	M.Agr. 0056	Plant Breeding Methodology and Genetic Resources	Link	L, P	L 01
Tues	9.15 -10:45	M.Agr.0174	Plant Health Management in Tropical Crops	Rostas	S	L 07
	13:15-14:45	M.Agr.0094	Basics of Molecular Biology in Crop Protection	Sirrenberg Varrelman		
	16:15-17:45	M.Cp. 0010	Plant Pathology and Plant Protection Seminar	Koopmann, v.Tiedemann,	S	L 44
Wed						
	12:15-15:45	M.Cp.0016	Practical Statistics and Experimental Design in Agriculture	Scholten, Sharifi Kluth	L	L 06
Thurs	8:15-9:45	M.Cp.0017 /0018	Journal Club/Scientific Presentation	AvT, Weigand,Dücker,W agner	L,S	L 44

	14:15-15:45	M.Agr.0056	Plant Breeding Methodology and Genetic Resources	Scholten, Link	L, P	L 02
	16:15-17:45	M.Agr.0094	Basics of Molecular Biology in Crop Protection	Sirrenberg, Varrelmann	L	L 44
Fri	08:30-10:00	M.Cp.0015	Weed biology and Weed Management Field Trips	Wagner	P	
	10:00 – 12:00	M.Cp.0004	Plant Diseases and Pests in Temperate Zones	Koopman, Vosteen	L, P	L 07
	13:00-15:00	M.Cp.0004	Plant Diseases and Pests in Temperate Zones	Koopman Vosteen	L,P	L 07
			BLOCK	PRACTICALS		
Block	September 2 weeks	M.Agr.0039	Molecular Techniques in Phytopathology	Koopman	P	

MSc Crop Protection
Second year - winter term 2024/25

Day	Time	Module Code	Module	Lecturer	Type	Location
Mo	10:15 – 11:45	M.Cp.0023	Plant Pathogenic Bacteria	Kuzmanovic	L	L44
	16:15-17:45	M.Agr.0058	Plant-Herbivore Interactions	Rostas	L,S	L 07
Tues	8:15-9:45	M.Agr. 0057	Plant Virology	Varrelmann	L	L44
	10:15-11:45	M.Agr.0023	Interactions between Plants and Phytopathogens	Koopmann, Varrelmann,	L	L07
	16:15-17:45	Seminar Plant Pathology	Seminar Plant Pathology	Koopman, v.Tiedemann,	S	L44
	16:00-17:30	M.Agr.0044	Molecular Diagnostics and Biotechnology in Crop Protection	Varelmann	L	L07
Wed	16:15-17:45		Kolloquium Phytomedicin	AvT, Rostas, Karlovsky	S	L 07
	18:15-19:45	E 13M	Quantitative Methods in Agricultural Business Economics	Mußhoff	L	VG.3.108
Thurs	12:15-13:45	M.Agr.0058	Plant-Herbivore Interactions	Rostas	L,S	L07
	16:00-17:30	M.Agr.0044	Molecular Diagnostics and Biotechnology in Crop Protection	Varelmann	L	L07

Fri	08:30-10:00	M.Cp.0007	Pesticides II	A. v.Tiedemann	L	L 318
	10:30-12:00	M.Cp.0007	Pesticides II	and special lectures“	L	L 318
	14:15-15:45	M.Cp.0014	Plant Nutrition and Plant Health	Dittert, Pawelzik	L	L 02
		BLOCK	PRACTICALS			
Block	October 2 weeks	M.Agr. 0010	Biotechnological Applications in Plant Breeding	Möllers, Ecke	P	
Block	1 week October	M.CP 0024	Digital Techniques for Crop Monitoring	Mahlein, Paulus	P	
Block	March 2 weeks	M.Agr.0057	Plant Virology	Varrelmann		
Block	2 week	M.Cp.0025	Analytical Techniques for Foods and Agricultural Research	Alhussein	P	
Block	October 2 weeks	M.Agr.0009	Biological Control and Biodiversity	Rostas	L/P/S	L07
Block	Febr/March 1 week	M.Agr.0023	Interactions between Plants and Phytopathogens	Koopman	P	L07
Block	March 2 weeks	M.Cp. 0008	Fungal Toxins	Al Hussein	P	

Module descriptions

Compulsory modules:

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Cp.0017 "Scientific Presenting, Writing and Publishing in Crop Protection"

<p>Contents, Objectives</p>	<p>3 C/2 H PER SW</p>
<p>Contents: Students will prepare a presentation including a written summary dealing with selected topics in crop protection, which will be presented to the participants and lecturers and discussed. The structure and design of scientific papers, preparation and submission of a manuscript for publication, design of scientific presentations (structure, way of presentation, rhetorics) will be shown.</p> <p>The practical includes laboratory safety, planning and recording of experiments, chemical calculations (concentrations in media and buffer), sterilization techniques, working in sterile conditions, pH, photometry, ELISA, PCR, preparation of experiments and writing protocols. Students learn to plan and execute safely experiments, to explain and use methods and equipment effectively..</p> <p>Objectives:</p> <p>Students write their own manuscript. Students are expected to be able to write scientific papers in English, to design graphics and tables, conduct a literature recherche, to prepare oral and poster presentations, to review manuscripts. Students know the process of paper publication, from writing to submitting and reviewing.</p>	
<p>Lecture and Seminar</p>	
<p>Examination : Written paper, maximal 10 pages,</p>	
<p>Examination prerequisite: Participation in the lectures and seminars</p>	
<p>Type of module</p>	<p>Entrance requirements#</p>
<p>Compulsory module</p>	<p>None</p>
<p>Frequency</p>	<p>Duration</p>
<p>Summer</p>	<p>one semester</p>
<p>Language</p>	<p>Number of students</p>
<p>English</p>	<p>20</p>
<p>Coordinators</p>	
<p>Prof. Dr. von Tiedemann, Dr. S. Weigand</p>	

Georg-August-University Göttingen

Master Program „Crop Protection

ModuleM.Cp.0018: Journal Club on New Topics in Crop Protection

3 C/2 H PER SW

Contents, Objectives

Contents: Methods will be presented how to collect and read scientific literature dealing with a specific topic. The composition and structure of scientific publications, methods and ways of presentation and proving ideas are studied using specific examples. Criteria for quality assessment are applied.

Objectives: Students learn how to assess and discuss a scientific subject in crop protection: They will be able to give written and oral presentations of a scientific paper and to critically judge the didactic, structure and scientific content and correctness of a scientific paper.

Type of Instruction and Examination:

Lecture and Seminar

Examination: Presentation (15 minutes) and written summary of a scientific topic, based on literature study (3 pages), participation in discussion

Examination prerequisite: Participation in the seminars

Type of module

Compulsory module

Entrance requirements#

None

Frequency

Summer

Duration

one semester

Language

English

Number of students

20

Coordinators

Prof. Dr. von Tiedemann, Dr. S. Weigand

Georg-August-University Göttingen Master Program „Crop Protection“		3 C/2 H PER SW
Modul M. Cp.0019. Basic Laboratory Techniques		
Contents, Objectives <p>Contents: The practical includes laboratory safety, planning and recording of experiments, chemical calculations (concentrations in media and buffer), sterilization techniques, working in sterile conditions, pH, photometry, ELISA, PCR, preparation of experiments and writing protocols. Students learn to plan and execute safely experiments, to explain and use methods and equipment effectively..</p> <p>Objectives: Students will get prepared for practical research, including basic chemical and microbiological techniques as well as responsible behaviour in the laboratory and operating of machines</p>		
Practical		
Examination: Written test 45 min		
Examination prerequisite: accepted lab protocol		
Type of module Compulsory module	Entrance requirements none	
Frequency Winter	Duration One semester.	
Language English	Number of students 10	
Coordinators: Dr. A. Sirrenberg		

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Cp.0002 „Internship“

Contents, Objectives Contents: Students will carry out practical work in areas of crop protection, in agrochemical companies, in research or consulting institutions and experience the daily work situation. Objectives: Specific knowledge of the respective area of work/research will be acquired, social abilities like work organization, teamwork, interdisciplinary work, flexibility will be practiced.		9 C/6 H PER SW Workload : 270 h Contact time: 240 h (6 weeks) Self study time: 30 h (Written paper and presentation)			
Type of Instruction and Examination <table border="1" data-bbox="207 952 1114 1120"><tr><td>Internship : 6 to 8 weeks</td></tr><tr><td>Examination: Written paper, max. 20 pages und seminar presentation (ca. 15 min.)</td></tr></table>		Internship : 6 to 8 weeks	Examination: Written paper, max. 20 pages und seminar presentation (ca. 15 min.)	<table border="1" data-bbox="1141 952 1356 1052"><tr><td></td></tr></table>	
Internship : 6 to 8 weeks					
Examination: Written paper, max. 20 pages und seminar presentation (ca. 15 min.)					
Type of module Compulsory	Entrance requirements none				
Frequency Semester vacations, every semester	Duration 6 – 8 weeks and one day seminar				
Language English	Number of students 20				
Coordinator: Prof. Dr. A. v. Tiedemann					

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Cp.0006 „Pesticides I: Mode of Action and Application Techniques, Resistance to Pesticides“

Contents, Objectives Contents: Mode of action of pesticides (fungicides, insecticides, acaricides, herbicides).The main chemical compounds, application techniques and technologies for control of diseases, pests and weeds will be discussed as well as the development of resistance. Objectives: Knowledge of pesticide compounds used in agriculture, their mode of action and application techniques; understanding resistance and designing resistance management strategies.		C/H PER SW 6 C/4 H PER SW Workload: 180 h Contact time: 56 h Self study time: 124 h
Type of instruction and examination Lecture, Excursion Examination: Written test ca. 90 min.		
Type of module Compulsory module	Entrance requirements none	
Frequency Winter	Duration One semester	
Language English	Number of students 30	
Coordinators Prof. Dr. A. v. Tiedemann		

Georg-August-University Göttingen

MasterProgram „Crop Protection“

Modul M.Cp.0007 „Pesticides II: Toxicology, Ecotoxicology, Environmental Metabolism, Regulation and Registration“

Contents, Objectives Contents: This module gives is unque and gives an overview of all aspects of pesticide science, presented by several specialist lecturers from outside. Topics are: --basic and applied toxicology of pesticides - ecotoxicology of pesticides - fate and metabolism of compounds in different environments - regulation of pesticide use and registration Objectives: Students will understand the basic and applied pesticide toxicology and ecotoxicology, and the regulatory framework of pesticides (Germany, EU).		C/H PER SW 6 C/4 H PER SW Workload : 180 h Contact time: 56 h Self study time: 124 h		
Type of instruction and examination <table border="1" data-bbox="207 992 1114 1137"><tr><td>Lecture</td></tr><tr><td>Examination: Written test ca. 90 min.</td></tr></table>		Lecture	Examination: Written test ca. 90 min.	
Lecture				
Examination: Written test ca. 90 min.				
Type of module Compulsory module	Entrance requirements none			
Frequency Winter	Duration One semester			
Language English	Number of students 30			
Coordinators Prof. Dr. A. v. Tiedemann and other lecturers				

Elective compulsory modules

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Cp.0004 „Plant Diseases and Pests in Temperate Climate Zones“

<p>Contents, Objectives</p> <p>Contents: The main diseases and pests (fungi, viruses, bacteria, nematodes, mites, and insects) of crops (arable crops, vegetables, fruit crops) in temperate climate zones will be presented. The symptoms, diagnosis, biology and life cycles, economic importance, possible control methods will be studied in lectures, practicals and field trips.</p> <p>Objectives: Students will be able to recognize and identify the main pests and diseases, understand the origin, distribution and dynamics of diseases and pests in the field as a basis for the development of control methods.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 56 h</p> <p>Self study time: 124 h</p>			
<p>Type of Instruction and Examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture, field trips, field and laboratory practicals</td> </tr> <tr> <td>Examination: Written test ca. 45 min.</td> </tr> <tr> <td>Examination prerequisite: Participation in practicals and field trips</td> </tr> </table>		Lecture, field trips, field and laboratory practicals	Examination: Written test ca. 45 min.	Examination prerequisite: Participation in practicals and field trips	
Lecture, field trips, field and laboratory practicals					
Examination: Written test ca. 45 min.					
Examination prerequisite: Participation in practicals and field trips					
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>none</p>				
<p>Frequency</p> <p>Summer</p>	<p>Duration</p> <p>One semester</p>				
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>30</p>				
<p>Coordinators</p> <p>Dr. B. Koopmann, Prof. Dr. M. Rostas</p>					

Georg-August-University Göttingen

MasterProgram „Crop Protection“

Modul M.Cp.0005 „Integrated Management of Pests and Diseases“

Contents, Objectives Contents: The integrated pest management concept and its main components are presented with regard to the management of fungal plant pathogens (A.v. Tiedemann) and insect pests (B. Ulber) in temperate zones: preventive methods, focused use of pesticides, effect of cultural methods (sowing date, soil preparation, fertilization, crop rotation, varieties) on occurrence, distribution and damage of plant pathogens and insect pests. Diagnosis and quantification of damage symptoms, prognosis systems are discussed. Objectives: Students will be able to understand and develop plant protection strategies for plant pathogens and insect pests taking into consideration crop production and cultural methods.		C/H PER SW insgesamt 6 C/4 H PER SW Workload : 180 h Contact time: 56 Self study time: 124
Type of instruction and examination Lecture Examination: Oral examination ca. 20 min.		
Type of module Elective module	Entrance requirements none	
Frequency Winter	Duration One semester	
Language English	Number of students 30	
Coordinators Prof. Dr. A. v. Tiedemann, Prof. Dr. M. Rostas		

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Agr. 0009 „Biological Control and Biodiversity“

Contents, Objectives Contents: Biological control of pests and weeds. The main antagonists and their importance in biological control are discussed. Theory and practice of different biological control methods are presented. Steps of a classical biological or inundative control are explained and illustrated by practical examples of biological control projects. Biodiversity and the contribution of an ecosystem to the agro-ecosystem, plant-herbivore-predator interactions and the principles of population dynamics are presented. In the seminar students will give a presentation on recent research results, which will be discussed in context with the topics of in the lecture. Objectives: Students gain an understanding of what biological control is and how it can be used effectively as part of an IPM system and how biodiversity contributes to the control of pest populations and other ecosystem services.		C/H PER SW 6 C/4 H PER SW Workload : 180 h Contact time: 56 h Self study time: 124 h
Type of instruction and examination Lecture 38 h , seminar 18 h Examination: Written test ca. 45 min., seminar presentation 20 minutes Grade composition: Written Test 67%, presentation 33%		
Type of module Elective module	Entrance requirements none	
Frequency Winter	Duration One semester	
Language English	Number of students 12	
Coordinators Prof. Dr.M. Rostas		

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Agr. 0023 „Interactions between Plants and Phytopathogens and Viruses“

<p>Contents, Objectives</p> <p>Contents: Lecture Different aspects of interactions between plants and phytopathogenic fungi, bacteria, and viruses. The infection by fungi, bacteria and viruses is described (spore germination, invasion of the host plant and spreading of pathogens, virus replication and distribution). Types of plant resistance, i.e. preformed and induced resistance, their importance and possibilities of inactivation through the pathogens as well as induced and systemically acquired resistance(SAR) are presented. The pathosystem Agrobacterium tumefaciens/ dicotyle plants is described and discussed. The gen for gen hypothesis and its experimental proof will be presented and discussed and well known genes of resistance will be described. Practical Phytoalexine extraction in oilseed rape and analysis by HPLC or TLC bioassay.</p> <p>Objectives: Students will acquire knowledge of complex interactions between plants and pathogens and will be able to formulate scientific questions and to critically evaluate methods used.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 56 h</p> <p>Self study time: 124 h</p>	
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture 28 h , practical 28 h</td> </tr> <tr> <td>Examination: Oral examination ca. 20 min.</td> </tr> </table>		Lecture 28 h , practical 28 h	Examination: Oral examination ca. 20 min.
Lecture 28 h , practical 28 h			
Examination: Oral examination ca. 20 min.			
<p>Frequency</p> <p>Winter</p>	<p>Duration</p> <p>One semester</p>		
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>36</p>		
<p>Coordinators</p> <p>Dr. B. Koopmann</p>			

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Georg-August-University Göttingen

MasterProgram „Crop Protection“

Modul M.Cp.0008 „Fungal Toxins“

<p>Contents, Objectives</p> <p>Contents: The most important mycotoxins will be presented and described, concepts to determine the toxicity and procedures to develop legal maximum values will be discussed, and the risk for consumers and animals will be judged. The ecological importance of mycotoxins will be discussed, methods of mycotoxin identification will be explained and methods to reduce the mycotoxin contents of plant products will be presented. Selected phytoalexins and phytohormones playing a role as a factor of virulence or pathogenicity in plant diseases will be introduced. In the practical students will process plant material and use different methods for analysis of mycotoxins.</p> <p>Objectives: Students will realize the importance of secondary metabolites produced by fungi in plant production. They will be able to compare and rate the significance of natural toxins and anthropogenic substances and to classify different food contaminations according to their toxicology. In the laboratory students will acquire practical knowledge of chemical- analytical methods, so they will be able to select the optimum analytical method.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload: 180 h</p> <p>Contact time: 56 h</p> <p>Self study time: 124 h</p>	
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture, laboratory practical</td> </tr> <tr> <td>Examination: Written exam 60 minutes</td> </tr> </table>		Lecture, laboratory practical	Examination: Written exam 60 minutes
Lecture, laboratory practical			
Examination: Written exam 60 minutes			
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>none</p>		
<p>Frequency</p> <p>Winter</p>	<p>Duration</p> <p>One semester</p>		
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>12</p>		
<p>Coordinator</p> <p>Dr. M. Alhussein</p>			

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Agr. 0039 „Molecular Techniques in Phytopathology“

<p>Contents, Objectives</p> <p>Contents: Lecture Basic theoretical and practical knowledge of the chemistry nucleic acids and Proteins. Understanding techniques in molecular biology. Solutions for several scientific problems are demonstrated and discussed.</p> <p>Practical</p> <ul style="list-style-type: none"> - Isolation of plasmid and total DNA - Isolation of DNA-fragments from agarose gels - analysis of restriction - agarose-gel electrophoresis - cloning of PCR products (enzymatic modification, ligation) - transformation and in vivo amplification of plasmids - DNA blotting - non-radioactive marking of DNA probes (DIG-dUTP) - southern-hybridization and immunological detection of hybridized probes using chemoluminescent substrates - ITS-RFLP analysis of fungal pathogens of oilseed rape - real-time PCR diagnostic of mycotoxin producing fungi infecting cereals <p>Objectives</p> <ul style="list-style-type: none"> - Knowledge of methods to deal with nucleic acids. - ability to transfer and develop methods for solving scientific questions/topics - presentation and interpretation of scientific results 		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 56 h</p> <p>Self study time: 124 h</p>		
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture 28 h , practical 28 h</td> </tr> <tr> <td>Examination: Oral examination ca. 20 min.</td> </tr> </table>		Lecture 28 h , practical 28 h	Examination: Oral examination ca. 20 min.	
Lecture 28 h , practical 28 h				
Examination: Oral examination ca. 20 min.				
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>none</p>			
<p>Frequency</p> <p>Winter</p>	<p>Duration</p> <p>One semester</p>			
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>16</p>			
<p>Coordinator</p> <p>Dr. B. Koopmann</p>				

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Agr. 0094 „Basics of Molecular Biology in Crop Protection“

Contents, Objectives Contents: The use of biochemical and molecular techniques in agricultural research and diagnostics becomes more and more important. The lecture presents the basics necessary for understanding these methods and provides the basis for more advanced practicals and lectures. The following topics will be presented: Structure and function of macromolecules (proteins, DNA, RNA,carbohydrates) - function of enzymes - DNA- replication - transcription and translation - introduction to PCR - lipids and membranes - structure of cell walls of different groups of organisms and its significance in crop protection Objectives: Students will understand the basics of the main laboratory tests used in agricultural research like ELISA and PCR and gain basic knowledge of plant breeding and plant pest resistance at the biochemical and molecular level.		C/H PER SW 6 C/4 H PER SW Workload : 180 h Contact time: 56 h Self study time: 124 h		
Type of instruction and examination <table border="1"><tr><td>Lecture</td></tr><tr><td>Examination: Written test 45 min.</td></tr></table>		Lecture	Examination: Written test 45 min.	
Lecture				
Examination: Written test 45 min.				
Type of module Elective module	Entrance requirements none			
Frequency Summer	Duration One semester			
Language English	Number of students 20			

Coordinators:

Prof. M. Varrelman, Dr. A. Sirrenberg

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Agr. 0045 „Mycology“

Contents, Objectives		C/H PER SW
Contents: Lecture and practical - ecology and taxonomy of relevant pathogenic fungi - taxonomic classification - isolation of fungi, production of antagonists - detection of natural fungi in soil - seed disinfection - pathogenicity of biotrophic and necrotrophic fungi - identification of races in powdery mildew - fungicide resistance Objectives Students are able to identify phytopathogenic fungi, to plan and carry out experiments in a team and to evaluate and present experimental results		6 C/4 H PER SW Workload : 180 h Contact time: 80 h Self study time: 100 h
Type of instruction and examination		
Lecture 20 h , practical 80 h		
Examination: Oral examination ca. 20 min.		
Type of module	Entrance requirements	
Elective module	none	
Frequency	Duration	
Winter	One semester	
Language	Number of students	
English	14	
Coordinator		
Prof. Dr. A.v. Tiedemann		

Georg-August-University Göttingen

Master Program „Crop Protection“

Modul M.Cp.0010 „Plant Pathology and Plant Protection Seminar“

Contents, Objectives Contents: In this seminar scientific projects, targets of research and results of research projects will be presented and discussed by the MSc students and members of the research staff. Techniques of presentation and the ability to critically review and discuss research results will be practiced which will suggest and lead to new thoughts for further research projects. Objectives: Students will learn, to present, discuss and defend their own individual research project. They will be able to critically discuss scientific results and provide suggestions for improvement.		C/H PER SW 3 C/2 H PER SW Workload: 90 h Contact time: 28 h Self study time: 62 h			
Type of instruction and examination <table border="1"><tr><td>Seminar</td></tr><tr><td>Examination: Presentation, ca. 20 min.</td></tr><tr><td>Examination prerequisite: Participation in 12 seminars</td></tr></table>		Seminar	Examination: Presentation, ca. 20 min.	Examination prerequisite: Participation in 12 seminars	
Seminar					
Examination: Presentation, ca. 20 min.					
Examination prerequisite: Participation in 12 seminars					
Type of module Elective module	Entrance requirements none				
Frequency Every semester	Duration One semester				
Language English	Number of students 30				
Coordinators Prof. Dr. A. v. Tiedemann, Dr. B. Koopmann					

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.Agr. 0057 „ Plant Virology“

<p>Contents, Objectives</p> <p>Contents:</p> <p>Lecture: Methods for detection of plant viruses are the main topic of this module. Additionally in the lecture the classification of plant viruses, virus vectors and ways of transmission, symptoms caused by viruses in cultivated plants, the organization of the virus genom and gene expression of plant viruses will be presented. Selected methods of control will be discussed.</p> <p>Practical: Diagnosis and detection of plant viruses:Diagnosis by test plants, ELISA, Immunocapture-RT-PCR, separation of nucleic acids and total protein extracts, morphological description of viruses in electron micrographs. Electron micrographs of virus inclusion bodies</p> <p>Objectives: Knowledge of the classic and molecular plant virology; acquisition of practical detection methods of plant viruses using electronic microscopy, immunological techniques and molecular biological methods; Students will be able to formulate scientific questions and to critically judge methods based on their own practical experience in the laboratory.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 80 h</p> <p>Self study time: 100 h</p>		
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture 25 h , practical 55 h</td> </tr> <tr> <td>Examination: Written test 45 min.</td> </tr> </table>		Lecture 25 h , practical 55 h	Examination: Written test 45 min.	
Lecture 25 h , practical 55 h				
Examination: Written test 45 min.				
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>none</p>			
<p>Frequency</p> <p>Winter</p>	<p>Duration</p> <p>One semester</p>			
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>12</p>			
<p>Coordinator</p> <p>Prof. Dr. M. Varrelmann</p>				

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.Agr. 0058 „ Plant Herbivore Interactions“

Contents, Objectives Contents: Lecture: The module deals with the interactions between plants and herbivore insects. The diversity of the organisms concerned and the habitat will be presented. Different plant defense mechanisms including mechanisms of resistance to plant feeding insects are discussed. Sensory properties of insects for host plant recognition are described. Multiple interaction between plants, herbivore insects and their natural enemies and possible ways for use are discussed. The interactions between plants and pollinating insects will be presented. Seminar: Students present and discuss new research results in context with the topics dealt with in the lectures. Objectives: Knowledge of the complex interactions between plants and herbivore insects. Students will learn to develop, formulate and evaluate scientific problems and methods by preparing a seminar presentation on recent research topics.		C/H PER SW 6 C/4 H PER SW Workload : 180 h Contact time: 56 h Self study time: 124 h		
Type of instruction and examination <table border="1" data-bbox="209 1102 1121 1267"><tr><td>Lecture 38 h , practical 18 h</td></tr><tr><td>Examination: Written test 45 minutes , seminar presentation ca 20 minutes Grade composition: Written test 67%, presentation 33%.</td></tr></table>		Lecture 38 h , practical 18 h	Examination: Written test 45 minutes , seminar presentation ca 20 minutes Grade composition: Written test 67%, presentation 33%.	
Lecture 38 h , practical 18 h				
Examination: Written test 45 minutes , seminar presentation ca 20 minutes Grade composition: Written test 67%, presentation 33%.				
Type of module Elective module	Entrance requirements none			
Frequency Winter	Duration One semester			
Language English	Number of students 20			
Coordinator Prof. Dr. M. Rostas				

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.Cp.0011 „Agricultural Entomology Seminar“

<p>Contents, Objectives</p> <p>Contents: In this seminar scientific projects, targets of research and results of research projects in Agricultural Entomology will be presented and discussed by the MSc students. Techniques of presentation and the ability to critically review and discuss research results will be practiced which will suggest and lead to new thoughts for further research projects.</p> <p>Objectives: Students will learn, to present, discuss and defend their own individual research project. They will be able to critically discuss scientific results and provide suggestions for improvement.</p> <p>.</p>		<p>C/H PER SW</p> <p>3 C/2 H PER SW</p> <p>Workload : 90 h</p> <p>Contact time: 28 h</p> <p>Self study time: 62 h</p>			
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Seminar</td> </tr> <tr> <td>Examination: Presentation, ca. 20 min.</td> </tr> <tr> <td>Examination prerequisite: Participation in 12 seminars</td> </tr> </table>		Seminar	Examination: Presentation, ca. 20 min.	Examination prerequisite: Participation in 12 seminars	
Seminar					
Examination: Presentation, ca. 20 min.					
Examination prerequisite: Participation in 12 seminars					
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>none</p>				
<p>Frequency</p> <p>Summer</p>	<p>Duration</p> <p>One semester</p>				
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>30</p>				
<p>Coordinator</p> <p>Prof. Dr. M. Rostas</p>					

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.Cp.0012 „Weed Biology and Weed Management“

<p>Contents, Objectives</p> <p>Contents: The module deals with the biology of weeds and management of weed populations. The botanical weed characteristics and population biology will be presented. Important weeds of Europe and other parts of the world will be presented and the damage caused discussed. Different methods of control are presented: chemical, physical control as well as preventive cultural methods. Actual problems in crop production caused by weeds are discussed. Legal and international aspects of weed dissemination, damage caused and methods of control will be discussed. In the seminar part students will present recent research papers from literature and discuss these in context with the topics presented in the lecture.</p> <p>Objectives: Knowledge of the main weed species, their characteristics, ecology, competition and damage. Students will understand the dynamics and parameters of weed populations. Knowledge of weed control methods, their possibilities and limitations. Students will be able to formulate criteria for selecting suitable weed management techniques. They will know how to theoretically work on a topic in weed science and understand international aspects of weed dissemination, populations and weed management.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 60 h</p> <p>Self study time: 120 h</p>			
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture 40 h, seminar 20 h</td> </tr> <tr> <td>Examination: Oral examination ca. 20 min., seminar presentation, ca. 20 min.</td> </tr> <tr> <td>Grade composition: Oral examination 67%, seminar presentation 33%</td> </tr> <tr> <td>Examination prerequisite: Seminar presentation</td> </tr> </table>		Lecture 40 h, seminar 20 h	Examination: Oral examination ca. 20 min., seminar presentation, ca. 20 min.	Grade composition: Oral examination 67%, seminar presentation 33%	Examination prerequisite: Seminar presentation
Lecture 40 h, seminar 20 h					
Examination: Oral examination ca. 20 min., seminar presentation, ca. 20 min.					
Grade composition: Oral examination 67%, seminar presentation 33%					
Examination prerequisite: Seminar presentation					
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>none</p>				
<p>Frequency</p> <p>Summer</p>	<p>Duration</p> <p>One semester</p>				
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>20</p>				
<p>Coordinator</p> <p>Dr. Jean Wagner</p>					

<p>Contents, objectives Contents: Lecture: In the lecture the application of molecular methods in weed science and weed management is presented, focusing on the naturally occurring herbicide resistance in weeds. The genetic basis will be taught with regard to transgenic and non transgenic herbicide tolerance in cultivated plants. The possibilities of the use of molecular techniques for the detection of herbicide resistance in weeds will be discussed. New findings by the so called –omics (genomics, proteomics and metabolomics) on the interaction of weeds with their environment are of importance in the development of new herbicides and will be discussed as well as alternative transgenic approaches in weed management. Practical: A one week practical will be held after the lecture. In the practical actual resistance problems in weeds are presented. Resistance detection methods will be presented and carried out on the protein level (target assay) and on the genetic level (SNP-analysis’) and the possible use for a sustainable herbicide weed management will be discussed. Kompetenzen: Understanding the basic principles of the interactions between herbicides and the target plant and herbicide selectivity. Resistance mechanisms in weeds and mechanisms of tolerance in cultivated plants are understood, can be distinguished and practical consequences be drawn. Students have a fundamental understanding of the development and distribution of herbicide resistance in weeds.</p>		<p>C/H PER SW 6 C/4 H PER SW Workload: 180 h Contact time: 60 h Self study time: 120 h</p>		
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture (40h), Lab course (20h during the semester)</td> </tr> <tr> <td>Examination: Written exam, 45 min</td> </tr> <tr> <td>Examination prerequisite: Participation in the lectures and lab course</td> </tr> </table>		Lecture (40h), Lab course (20h during the semester)	Examination: Written exam, 45 min	Examination prerequisite: Participation in the lectures and lab course
Lecture (40h), Lab course (20h during the semester)				
Examination: Written exam, 45 min				
Examination prerequisite: Participation in the lectures and lab course				
<p>Type of module Elective module</p>	<p>Entrance requirements none</p>			
<p>Frequency Winter</p>	<p>Duration One semester</p>			
<p>Language English</p>	<p>Number of students 20</p>			
<p>Coordinator Dr. Jean Wagner</p>				

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.Cp.0014 „Plant Nutrition and Plant Health“

Contents, Objectives Contents: Nutrient uptake and transport in the plant; function of different nutrients in the plant especially with respect to plant health; mechanisms to increase nutrient efficiency and availability; characteristics of plant health, relation between plant nutrition and plant health; effect of nutrient imbalances on plant metabolism and production of plant harvest products and processing quality. Objectives: Understanding the relations between plant nutrition and plant health and their significance in the value-added chain.		C/H PER SW 3 C/3 H PER SW Workload: 90 h Contact time: 28 h Self study time: 62 h		
Type of instruction and examination <table border="1" data-bbox="207 1008 1114 1153"><tr><td>Lecture</td></tr><tr><td>Examination: Oral examination ca 20 min.</td></tr></table>		Lecture	Examination: Oral examination ca 20 min.	
Lecture				
Examination: Oral examination ca 20 min.				
Type of module Elective module	Entrance requirements none			
Frequency Winter	Duration One semester			
Language English	Number of students 25			
Coordinator Prof. Dr. Klaus Dittert				

Georg-August-Universität Göttingen Universität Master Program „Crop Protection Module M.Agr. 0146: Nematology	3 C 2 SWS
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Lernziele/Kompetenzen: Basic knowledge of nematode biology, importance as pests; basic methods with regard to their detection, identification and measures of control, use of beneficial nematodes in biological insect control programs; their role in regulation of processes in ecosystems.	Arbeitsaufwand: Präsenzzeit: 40 Stunden Selbststudium: 50 Stunden
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Lehrveranstaltung: Nematology (Praktikum, Seminar) <i>Inhalte:</i> The module deals with the biology of nematodes and their importance in plant protection. The most important taxa of nematodes are presented using permanent slides and living specimen; the most important morphological characters will be identified. Interactions between plant parasitic nematodes, their host plants and antagonistic microorganisms will be discussed. The use of nematodes for inundative biological control will be discussed as well. During the course, students will become familiar with different plant parasitic nematode species and will learn basic techniques for detection and identification. Plant parasitic nematodes will be used to demonstrate effects of different compounds on activity and viability.	2 SWS
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Prüfung: Written exam 45 min Prüfungsanforderungen: Basic knowledge of morphological characters of nematodes; species identification by DNA-barcoding ability to discriminate between different feeding types of nematodes; biological control of and biological control with nematodes; importance of nematodes for biodiversity	
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Zugangsvoraussetzungen: keine	Empfohlene Vorkenntnisse: Basic knowledge of molecular diagnostics
Sprache: Englisch	
Angebotshäufigkeit: Jedes WiSe	Dauer: 1 Semester
Wiederholbarkeit: zweimalig	Empfohlenes Fachsemester: 3. Semester
Maximale Studierendenzahl: 12	Modulverantwortlicher: Dr. Sebastian Kiewnick Dr. Birger Koopmann

Bemerkungen:

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.Cp.0023: Plant Pathogenic Bacteria

<p>Contents, Objectives</p> <p>Contents Blended learning module; this module comprises general and specific part. The general part addresses the following topics: history of phytobacteriology; origin and evolution of phytopathogenic bacteria; diversity and taxonomy of phytopathogenic bacteria; general features of phytopathogenic bacteria, their cultivation and preservation; epidemiology and ecology of plant bacterial diseases, and economical significance; pathogenesis, host-pathogen interactions and symptomatology; diagnosis and management of plant bacterial diseases, including use of bacteriophages. The specific part is organized in separate lessons, according to the main bacterial taxa causing diseases on plants. In particular, it covers the most important phytopathogenic bacteria and diseases they cause, and includes sections on their distribution, economical significance, symptomatology, epidemiology, pathogen characteristics and disease management.</p> <p>Objectives: Students gain knowledge on the most important plant pathogenic bacteria, their biology, dissemination, life cycle, diagnosis and control, as well as on their molecular and taxonomic features. They are able to understand the theoretical background and to apply in practice gained knowledge. In particular, students are able to recognize plant bacterial diseases presented during this course and to make a preliminary diagnosis. They critically evaluate scientific and non-scientific publications on plant pathogenic bacteria, and know where to find relevant and reliable information. Students are able to prepare a scientific presentation according to the standards of international conferences and use interactive teaching material.</p>		<p>C/H PER SW</p> <p>3 C/2 H PER SW</p> <p>Workload : 90 h</p> <p>Contact time: 28 h</p> <p>Self study time: 62 h</p>
<p>Examination</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Written exam, 45 min 50% ; Student presentation with discussion, 50%</p> </div>		
<p>Type of module</p> <p>Lecture</p>	<p>Entrance requirements</p> <p>none</p>	
<p>Frequency</p> <p>Winter</p>	<p>Duration</p> <p>One semester</p>	
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>30</p>	
<p>Coordinator</p> <p>Prof. Dr. Andreas von Tiedemann Dr. Kuzmanovic; Dr. Susanne Weigand</p>		

Georg-August-Universität Göttingen Universität Master Program „Crop Protection“ Module M.Cp.0024: Digital Techniques for Crop Monitoring	6 C 4 SWS
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<p>Contents: In the course, selected topics on the use of digital technologies in field experiments for crop science are focused. The students are enabled to actively use optical sensors. In addition to data acquisition, the main content focuses on the processing of raw data, evaluation, and combination with reference data. Reference data is extracted with established tools from the plant sciences and geo-referenced in the field using GPS, in a way that an allocation to the optical measurement methods is possible. Data acquisition is carried out using digital carrier platforms (robot, drone, etc.). Another essential content is the summary of metadata of field trials in order to store trial data in such a way that they can be reused and used by third parties. The module is divided into two sub-aspects: (i) Theoretical basics as a lecture and (ii) hands-on exercises with digital technologies. While the practical handling is taught in the exercises, the theoretical lecture teaches the overall context, the differences between the sensors, as well as the analysis using sample data sets, and the application of complex evaluation algorithms</p> <p>Objectives: The module teaches basic principles for the use of digital tools in greenhouse and field experiments. It covers camera-based methods for single plant and plot scale (RGB, spectral, 3D) as well as the use of GPS for georeferenced measurements. Furthermore, the analysis of data, for single recordings and time series, is taught. Upon completion of the module, the students are able to independently carry out measurements with selected technologies of crop plants according to a measurement protocol, combine reference measurements, carry out analyses and compile results. Furthermore, they can plan complex measurement procedures for their own experimental projects and assess the effort involved. Finally they obtain skills to interpret sensor data with an agricultural meaning.</p>	<p>Work Load 180 h</p> <p>Contact time: 40 h</p> <p>Self study: 140 h</p>
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<p>Exam: Examination: Providing a technical video (5 Minutes). This professional video includes a structured introduction into the topic (sensors and measuring) Idea description and screenplay must be provided</p> <p>Exam requirements: Understanding of digital methods and sensor technologies and their application at different scales. Deep understanding of the planning of a digital survey in field testing. Knowledge of methods of evaluation, referencing and interpretation of optical sensor Data</p> <p>Examination prerequisites Regular participation in the block cours</p>	
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Language: English	Modulverantwortliche Prof. Anne-Katrin Mahlein, Dr. Stefan Paulus
Position in academic year: summer semester	Duration: one semester
Maximum options of exam repetition: twice	Recommended semester:
Maximum number of participants: 20	elective

Georg-August-Universität Göttingen Master Program Crop Protection Module M.Cp.0025: Analytical Techniques for Foods and Agricultural Research		6 C 4 SWS
<p>Contents: The module will include various topics related to chemical analysis methods in agricultural sciences. The analysis of plant primary and secondary metabolites (such as carbohydrates, amino acids, organic acids, phytohormones, phytoalexins, glucosinolates, and volatiles) will be discussed. Moreover, the analysis of mycotoxins, fungal secondary metabolites, and pesticide residues will be covered. The module will introduce the fundamental analytical chemistry methods, including sample preparation, separation techniques, detection methods, characterization, and quantification of metabolites using state-of-the-art chromatographic and mass spectrometric methods</p> <p>Objectives: This module aims to provide students with a comprehensive understanding of chemical analysis techniques employed in agricultural research through a combination of practical experiments and lectures, which will cover the analysis of major chemical groups in plants, fungi, and pesticide residues.</p>		Work Load 180 h Attendance time: 70 h Self-study time: 110 h
<p>Exam: Oral exam (30 min, 70%), Student presentation with discussion (ca. 20 min presentation + ca. 10 min discussion, 30%)</p> <p>Examination prerequisites Regular participation in the block cours</p>		
Language: English	Coordinator: Dr. Mohammad Alhussein	
Position in academic year: winter semester	Duration: one semester	
Maximum options of exam repetition: twice	Recommended semester:	
Maximum number of participants: 16	Type of Module: elective	

Georg-August-Universität Göttingen Universität
Master Program Crop Protection
Modul M.Agr.0174 : Plant Health Management in Tropical Crops”

<p>Contents: Blended learning module; presentation of the most important pests and diseases of the most important tropical crop plants: symptoms, life cycles and plant health management (eg. in rice, maize, cacao, coffee, bananas). Additional crops may be included according to students’ preferences and practical experience. Introduction to relevant international data banks and networks. Use of scientific videos on selected topics of crop protection in the tropics and basic training to create own videos.</p> <p>Objectives: Students are able to recognize pests and diseases of tropical crops as treated in this course. They critically evaluate scientific and non-scientific publications on crop protection in the tropics. Students are able to create a scientific presentation according to the standards of international conferences and use interactive teaching material; students know the scope and limits of their knowledge in the treated field, they know where to find relevant, reliable information. Appreciation of cultural diversity.</p>	<p>Time demand</p> <p>180 h</p> <p>Contact time: 36 h</p> <p>Self study: 144 h</p>
<p>Course Type: lecture, seminar with student presentations, excursion</p>	<p>4 SWS</p>
<p>Exam: Written exam, 45 min, 40% Student presentation with discussion, 60%</p> <p>Exam requirements: <u>Written exam:</u> main groups of causal agents, basic botany of the crop plants treated, basic biology of causal agents (life cycles etc.), recognition of symptoms, knowledge of control strategies. <u>Presentation:</u> appropriate according to the standard of international conferences: relevant and sound content, clear structure, style, language (written and spoken) and pronunciation, citation and use of sources according to good scientific practice.</p>	
<p>Entry requirements: none</p>	<p>Recommended prior knowledge: Basics of plant pathology, including basics of integrated pest management</p>
<p>Language: English</p>	<p>Modulverantwortliche[r]: Prof. Rostás, Prof. von Tiedemann, Dr. Weigand, Dr. Sirrenberg</p>
<p>Position in academic year: summer semester</p>	<p>Duration: one semester</p>
<p>Maximum options of exam repetition: twice</p>	<p>Recommended semester: 2</p>
<p>Maximum number of participants: 30</p>	<p>elective</p>

Georg-August-University Göttingen

Master Program „Crop Protection“

M.SIA.P22 “Management of Tropical Plant Production Systems”

Contents, Objectives Contents: Presentation of the most important crops with respect to: botany, morphology, origin, climatic and ecological requirements. Crop production, harvest significance in local farming systems, utilisation as food, feed, raw materials and as bioenergy source. Discussion of specific cropping systems in the tropics and subtropics und specific management systems for the sustainable improvement of productivity. Objectives: Knowledge of botanical, ecological and economical facts of crops and cropping systems. The students should be able to classify crops and cropping systems in relation to site conditions and undertake system-orientated evaluation of sustainable		C/H PER SW 6 C/4 H PER SW Workload : 180 h Contact time: 56 h Self study time: 124 h
Type of instruction and examination Lecture Examination: Written test ca. 90 min.		
Type of module Elective module	Entrance requirements none	
Frequency Winter	Duration One semester	
Language English	Number of students 30	
Coordinator Prof. Dr. R. Rötter		

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.Agr. 0056 „ Plant Breeding Methodology and Genetic Resources“

<p>Contents, Objectives</p> <p>Contents: Principles of breeding methodology: Response to selection, breeding methods for clonal, line, hybrid and population cultivars. Marker assisted selection for monogenic and polygenic traits. Use of plant genetic resources: wild species, <i>ex-situ</i> and <i>in-situ</i> conservation, on-farm management. Breeding for marginal environments, demonstrated with examples from temperate and tropical regions.</p> <p>Objectives: Students learn to combine classical and molecular techniques to solve present problems in plant breeding. Students learn to draw critical conclusions from recent research papers and to clearly communicate these to scientists and students in their own seminar presentations.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 56 h</p> <p>Self study time: 124 h</p>		
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture 44 h , seminar 12 h</td> </tr> <tr> <td>Examination: Written test 90 minutes, seminar presentation-20 minutes Grade composition: Written test 80%, presentation 20%.</td> </tr> </table>		Lecture 44 h , seminar 12 h	Examination: Written test 90 minutes, seminar presentation-20 minutes Grade composition: Written test 80%, presentation 20%.	
Lecture 44 h , seminar 12 h				
Examination: Written test 90 minutes, seminar presentation-20 minutes Grade composition: Written test 80%, presentation 20%.				
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>Basic knowledge (B.Sc. level) in genetics and plant breeding</p>			
<p>Frequency</p> <p>Summer</p>	<p>Duration</p> <p>One semester</p>			
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>25</p>			
<p>Coordinator</p> <p>Prof. Dr. Scholten</p>				

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.Agr. 0010 „ Biotechnological Applications in Plant Breeding"

Contents, Objectives Contents: Students will gain advanced knowledge in theory and practice of the application of biotechnology and molecular genetics in plant breeding. The main topics in the lecture and practical are: - application of in vitro propagation - production and use of haploids - interspecific sexual and somatic hybridization - direct and indirect gene transfer - biochemical and molecular characterization of transgenic plants - present use in gene technology and risk assessment - quality and use of different types of markers in plant breeding In the seminar the application of biotechnology in plant breeding and agriculture today will be presented and critically discussed. Objectives: Students are able to use their knowledge of biotechnological methods to solve present problems. They learn to critically analyze, evaluate and report complex scientific papers.		C/H PER SW 6 C/4 H PER SW Workload : 180 h Contact time: 56 h Self study time: 124 h			
Type of instruction and examination <table border="1"><tr><td>Lecture 28 h , practical 22 h, seminar 6 h</td></tr><tr><td>Examination: Written test 90 minutes</td></tr><tr><td>Prerequisite for the examination: Seminar presentation 20 minutes</td></tr></table>		Lecture 28 h , practical 22 h, seminar 6 h	Examination: Written test 90 minutes	Prerequisite for the examination: Seminar presentation 20 minutes	
Lecture 28 h , practical 22 h, seminar 6 h					
Examination: Written test 90 minutes					
Prerequisite for the examination: Seminar presentation 20 minutes					
Type of module Elective module	Entrance requirements none				
Frequency Summer	Duration One semester				
Language English	Number of students 12				
Coordinator Dr. C. Möllers					

Georg-August-University Göttingen

Master Program „Crop Protection“

Module M.SIA:E13M: Microeconomic Theory and Quantitative Methods of Agricultural Production"

Contents, Objectives Contents: Part I : Microeconomic Theory of Agricultural Production Consumer theory, producer theory, markets, monopoly situations, risk and uncertainty, economics of technical change, farm household models, sharecropping contracts. Objectives: Students are familiar with microeconomic approaches and can apply them to analyze issues related to agriculture and rural development. Part II: Quantitative Methods in Agricultural Business Economics Budgeting, accounting, annual balance sheets, linear programming, finance, investment analysis Objectives : Students are familiar with quantitative methods used for the analysis and planning of farms and enterprises in the agricultural sector. Instructor : Prof. Dr. O. Mußhoff		C/H PER SW 6 C/4 H PER SW Workload : 180 h Contact time: 56 h Self study time: 124 h		
Type of instruction and examination <table border="1"><tr><td>Lecture 56 h</td></tr><tr><td>Examination: Written exam 120 minutes</td></tr></table> Examination requirements: Consumer theory; producer theory; risk; technological progress; farm household models; budgeting and accounting; linear programming; finance; investment analysis		Lecture 56 h	Examination: Written exam 120 minutes	
Lecture 56 h				
Examination: Written exam 120 minutes				
Type of module Elective module	Entrance requirements Basic knowledge in agricultural economics			
Frequency Winter	Duration One semester			
Language English	Number of students 40			
Coordinator Prof. Dr. O. Musshoff				

<p>Contents, Objectives</p> <p>Contents: Fundamentals of soil science: Physical properties (texture, soil water, pore space), chemical properties (buffering, exchange capacity, nutrients), biological properties (organic matter, edaphon), soil formation and classification</p> <p>Plant nutrition: Role of major and minor elements in plants, nutrient availability and nutrient mobilisation, plant nutrients and food quality</p> <p>Plant breeding and genetics: plant morphology, genetics and breeding: principles of plant domestication and use, characterization and evaluation, use of genetic resources in plant breeding, genetic basis for plant breeding</p> <p>Plant protection: principles of plant pathology and entomology, genetics of plant diseases, epidemiology, plant defense mechanisms; insect physiology and ecology.</p> <p>Objectives: Bridging module for students lacking basic knowledge in some agronomy disciplines. With the help of lectures and reading materials students will be enabled to fill in gaps and get updated on state-of-the art knowledge with a special focus on questions pertinent to organic agriculture. Students, having taken this module, will be able to follow advanced courses in the above fields.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 60 h</p> <p>Self study time: 120 h</p>		
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture 50 h , seminar 10 h</td> </tr> <tr> <td>Examination: Written or oral test</td> </tr> </table>		Lecture 50 h , seminar 10 h	Examination: Written or oral test	
Lecture 50 h , seminar 10 h				
Examination: Written or oral test				
<p>Type of module</p> <p>Bridging , elective module</p>	<p>Entrance requirements</p> <p>none</p>			
<p>Frequency</p> <p>Winter</p>	<p>Duration</p> <p>One semester</p>			
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>30</p>			
<p>Coordinator</p> <p>Prof. Dr. M. R. Finckh</p>				

<p>Contents, Objectives</p> <p>Contents: Introduction to-and application of important up-to-date methods in soil-microbiology to determine the activity, biomass and community structure of soil-microorganisms. The complete operational sequence of a research project is simulated: (1) sampling, (2) sample preparation, (3) measurements and data collection (application of methods), (4) data processing, (5) statistics and (6) drafting a manuscript. Up-to-date literature is presented and discussed by the students.</p> <p>Objectives: Students learn to use microbiological methods and to interpret the obtained data. Students develop a consciousness for the complexity of soil fertility and soil quality and see the difficulties in diagnosing it.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 60 h</p> <p>Self study time: 120 h</p>			
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture 8 h, Seminar 8 h, Excursion 4 h, Practical 40 h</td> </tr> <tr> <td>Examination: Written work report</td> </tr> <tr> <td>Examination prerequisite: two project presentation, 20 min</td> </tr> </table>		Lecture 8 h, Seminar 8 h, Excursion 4 h, Practical 40 h	Examination: Written work report	Examination prerequisite: two project presentation, 20 min	
Lecture 8 h, Seminar 8 h, Excursion 4 h, Practical 40 h					
Examination: Written work report					
Examination prerequisite: two project presentation, 20 min					
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>Basic knowledge in biology, chemistry, and soil sciences</p>				
<p>Frequency</p> <p>Winter</p>	<p>Duration</p> <p>One semester</p>				
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>30</p>				
<p>Coordinator</p> <p>Prof. Dr. R.G Jörgensen</p>					

Georg-August-University Göttingen/University of Kassel

Master Program „Crop Protection“

Modul P 15M SIA „ Methods and Advances in Plant Protection“

<p>Contents, Objectives</p> <p>Contents: Advanced course in plant pathology and entomology. Methodology and evaluation methods in plant protection. Case studies of specific plant protection issues in organic farming in the form of lectures, seminars and practical courses.</p> <p>Objectives: Students are able to critically evaluate published results and apply this knowledge to actual problems in the field. They are also able to deal with problems in the field: Identification and measurements, design of experimental and analytical approaches to problems.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Workload : 180 h</p> <p>Contact time: 60 h</p> <p>Self study time: 120 h</p>				
<p>Type of instruction and examination</p> <table border="1" style="width: 100%;"> <tr> <td>Lecture 30 h, Excursion 10 h, Practical 20 h</td> </tr> <tr> <td>Examination: Written or oral test and work report or presentation</td> </tr> <tr> <td>Grade composition: written or oral test 70%, work report or seminar presentation 30 %</td> </tr> <tr> <td> </td> </tr> </table>		Lecture 30 h, Excursion 10 h, Practical 20 h	Examination: Written or oral test and work report or presentation	Grade composition: written or oral test 70%, work report or seminar presentation 30 %		
Lecture 30 h, Excursion 10 h, Practical 20 h						
Examination: Written or oral test and work report or presentation						
Grade composition: written or oral test 70%, work report or seminar presentation 30 %						
<p>Type of module</p> <p>Elective module</p>	<p>Entrance requirements</p> <p>Introductory course in plant protection (entomology and pathology, at least 6 ECTS or equivalent) or bridging module Soil and Plant Science</p>					
<p>Frequency</p> <p>Winter</p>	<p>Duration</p> <p>One semester</p>					
<p>Language</p> <p>English</p>	<p>Number of students</p> <p>20</p>					
<p>Coordinator</p> <p>Prof. Dr. M. R. Finckh</p>						

Georg-August-University Göttingen

Master Program „Crop Protection“

„Free module“

Key Competences:

Georg-August-University Göttingen

Master Programm "Crop Protection"

M.Cp.0016 „Practical Statistics and Experimental Design in Agriculture"

<p>Contents, Objectives:</p> <p>Contents:In the beginning of the course, students are introduced to the basic concepts of statistics like frequency distributions, the normal distribution and hypothesis testing. They are also introduced to software packages like SAS, that are used for the practical exercises. Regression and correlation analysis are then introduced. Different experimental designs like randomized block, latin square, and split plot are described and analyzed by one-way analysis of variance or as factorial experiments. Generalized Linear Models will be used and multivariate data will be analyzed by cluster and principal component methods. A large amount of examples and exercises constitute an important aspect of the course, enabling the students to understand and assimilate the theoretical content. Practical analyses of example data sets also provide the students with the required experience and skills for future statistical tasks in the context of Mastertheses.</p> <p>Objectives: The aim of the course is to familiarize students with the basic concepts of statistics and their application in agricultural science. The second goal is to learn the use of software packages like SAS.</p>		<p>C/H PER SW</p> <p>6 C/4 H PER SW</p> <p>Arbeitsaufwand: 180 h</p> <p>Präsenzzeit: 56 h</p> <p>Selbststudium: 124 h</p>		
<p>Type of instruction and examination: Lecture and Practice (56h)</p> <table border="1" style="width: 100%;"> <tr> <td>Examination: Written 90 min</td> </tr> <tr> <td>Examination prerequisite: none</td> </tr> </table>		Examination: Written 90 min	Examination prerequisite: none	
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Examination prerequisite: none				
<p>Entrance requirements: none</p>	<p>Recommended knowledge: Mathematics, statistics</p>			
<p>Language: English</p>	<p>Number of students: 20</p>			
<p>Frequency: Summer</p>	<p>Duration: One Semester</p>			
<p>Type of module: Key Competence</p>				
<p>Coordinator: Dr. Sharifi, DR. Kluth</p>				

