

<b>Module Name</b>	<b>Module Code</b>
Biocontrol Biotechnology	AEF-agrig014
<b>Module Coordinator</b>	
apl.-Prof. Dr. Ralf-Udo Ehlers	
<b>Organizer</b>	
Institute of Phytopathology - Plant Diseases and Crop Protection	
<b>Faculty</b>	
Faculty of Agricultural and Nutritional Sciences	
<b>Examination Office</b>	
Faculty of Agricultural and Nutritional Sciences - Examination Office	

<b>ECTS Credits</b>	6
<b>Evaluation</b>	Graded
<b>Duration</b>	one semester
<b>Frequency</b>	Only takes place during winter semesters
<b>Workload per ECTS Credit</b>	30 hours
<b>Total Workload</b>	180 hours
<b>Contact Time</b>	60 hours
<b>Independent Study</b>	120 hours
<b>Teaching Language</b>	English

<b>Recommended Requirements</b>			
Fundamental knowledge in plant protection, pests and diseases in agriculture and horticulture, zoology, microbiology			
<b>Module Courses</b>			
<b>Course Type</b>	<b>Course Name</b>	<b>Compulsory/Optional</b>	<b>SWS</b>
Internship	Projects in Biological Control	Compulsory	2
Lecture	Biotechnology in Biological Control	Compulsory	1
Lecture	Biology of Antagonists	Compulsory	1

<b>Examination(s)</b>				
<b>Examination Name</b>	<b>Type of Examination</b>	<b>Evaluation</b>	<b>Compulsory / Optional</b>	<b>Weighting</b>
Oral Examination: Biocontrol Biotechnology	Oral Examination	Graded	Compulsory	75
<b>Further Information on the Examination(s)</b>				
1.+2. period in winter semester 1. period in summer semester  examiner: Prof. Dr. Ehlers QIS: 91702 with number of Examination 91710				

<b>Course Content</b>
<p>Successful completion of this module will help you to understand the principles of biological control and its application in agri- and horticulture. It enables you to plan and execute biocontrol concepts including selection of biocontrol agents, mass production, downstream processing and formulation. Teaching at a company facility provides you with an insight into technical and social aspect of technology transfer and economies of scale. You will learn to use molecular tools for genetic improvement of biocontrol traits and application of biocontrol genes in transgenic plants. The module is a unique opportunity to experience exploitation of biodiversity for plant protection by fusing biology with classical and molecular biotechnological tools for development and production of environmentally friendly biocontrol products.</p>
<b>Learning Outcome</b>
<p>Microbial and macrobial biological biocontrol agents, biology, genetics, mass production, formulation, application, ecology, use of genes from biocontrol agents in transgenic crops, genetic improvement of marker-supported breeding of entomopathogenic nematodes, safety, registration, laboratory demonstrations in classic biotechnology up- and downstream processing, commercial aspects of biological control production and marketing, projects in biocontrol</p>
<b>Reading List</b>
<p>Ehlers, R.-U. 2001. Mass production of entomopathogenic nematodes for plant protection. <i>Applied Microbiology &amp; Biotechnology</i> 56, 623-633. Sumaya, N. H., Gohil, R., Okolo, C., Addis, T., Doerfler, V., Ehlers, R.-U. &amp; Molina, C. (2018) Applying inbreeding, hybridization and mutagenesis to improve oxidative stress tolerance and longevity of the entomopathogenic nematode <i>Heterorhabditis bacteriophora</i>. <i>Journal of Invertebrate Pathology</i> 151, 50-58. <a href="https://en.wikipedia.org/wiki/Biological_pest_control">https://en.wikipedia.org/wiki/Biological_pest_control</a></p>
<b>Additional Information</b>
<p>course blocked            Maximum number of participants: 10            Enrollment by E-Mail to ehlers@e-nema.de within workdays Monday through Friday in the 1st week of the 2. audit period of the preceding semester. Following information are necessary:            matriculation number            last name            first name            degree            study program            stu-Email</p> <p>The allocation of the places takes place in the 2nd week of the 2. audit period of the preceding semester. Acceptance of the place by students only through participation at the first day of the course. Students without a place can get a place at the first day of the course by move-up procedure.</p>

<b>Use</b>	<b>Compulsory / Optional</b>	<b>Semester</b>
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2013)	Optional	-
Master, 1-Subject, AgriGenomics, (Version 2017)	Optional	-
Master, 1-Subject, AgriGenomics, (Version 2010)	Optional	-
Master, 1-Subject, Dairy Science, (Version 2017)	Optional	-
Master, 1-Subject, Nutritional and Food Science, (Version 2013)	Optional	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2017)	Optional	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2013)	Optional	-