

## A Begründung

- Akkreditierungsauflagen
- Folgenovelle
- Sonstiges

## B Änderungsbeschluss

### **Achter Beschluss**

### **zur Änderung der Speziellen Ordnung der Bachelor- und Masterstudiengänge des Fachbereichs 09 – Agrarwissenschaften, Ökotrophologie und Umweltmanagement**

Aufgrund von § 44 Abs. 1 Nr. 1 des Hessischen Hochschulgesetzes vom 14. Dezember 2009 hat der Fachbereichsrat des Fachbereichs 09 – Agrarwissenschaften, Ökotrophologie und Umweltmanagement – am 3.5.2017 die nachstehenden Änderungen beschlossen:

### **Art. 1 Änderungen**

Die Spezielle Ordnung für die Bachelor- und Masterstudiengänge des Fachbereichs 09 vom 26.11.2014, zuletzt geändert durch Beschluss vom 25.1.2017, wird wie folgt geändert:

- I. Aufnahme des Master-Studiengangs „Insect Biotechnology and Bioresources“ in die Prüfungsordnung; Die Spezielle Ordnung erhält folgende Fassung:**

#### **§ 21 Bewertung des schriftlichen Teils der Bachelor-Thesis**

(3) Die Bachelor-Thesis wird von zwei Prüfern gem. § 18 Abs. 2 HHG bewertet. Eine/r der Prüfer/innen muss Professor/in sein. Der Kandidat kann hierzu einen Vorschlag machen. Bei der Bewertung der Thesis muss als Prüfer beteiligt sein, wer das Thema gestellt und die Arbeit betreut hat.

#### **§ 25 Master-Studiengänge**

Es werden neun Studiengänge mit dem Abschluss Master of Science angeboten:

1. Agrar- und Ressourcenökonomie
2. Agrobiotechnology (Unterrichtssprache Englisch)
3. Ernährungsökonomie
4. Ernährungswissenschaften
5. Insect Biotechnology and Bioresources (Unterrichtssprache Englisch)
6. Nutzpflanzenwissenschaften
7. Nutztierwissenschaften
8. Ökotrophologie
9. Umweltwissenschaften

#### **§ 26 Aufbau der Master-Studiengänge**

(1) Die Studiengänge können im Winter- oder Sommersemester begonnen werden; die Studiengänge Agrobiotechnology und Insect Biotechnology and Bioresources können nur zum Wintersemester begonnen werden.

(2) Das Master-Studium umfasst 120 CP und besteht

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a) bei den Studiengängen 1 und 3 bis 9 aus:

1. Kernkompetenz (8 Module),
2. Profilbildung (8 Module) und
3. Master-Thesis (1 Modul).

**§ 27 Kernkompetenz**

(5) Die Kernkompetenz wird im Studiengang Insect Biotechnology and Bioresources durch folgende Module vermittelt:

1. Biostatistics and Experimental Design
2. Natural Products Chemistry
3. Entomology I
4. Integrated Pest Management
5. Entomology II
6. Food Technology
7. Bioprocess Engineering I
8. Natural Product Discovery Platforms

**§ 29 Master-Thesis**

(6) Die Master-Thesis ist in deutscher oder in englischer Sprache abzufassen.

**§ 30 Bewertung des schriftlichen Teils der Master-Thesis**

(3) Die Master Thesis wird von zwei Prüfern gem. § 18 Abs. 2 HHG bewertet. Einer der Prüfer muss Professor sein. Der Kandidat kann hierzu einen Vorschlag machen. Bei der Bewertung der Thesis muss als Prüfer beteiligt sein, wer das Thema gestellt und die Arbeit betreut hat.

**§ 37 Inkrafttreten und Übergangsbestimmungen**

(1) Diese Ordnung in der Fassung des 8. Änderungsbeschlusses vom 3.5.2017 gilt für alle Studierenden ab dem Wintersemester 2017/18.

(2) Studierende, die ihr Studium nach der Ordnung vom 04.07.2007 begonnen haben, können das Studium nach jener Ordnung längstens bis 2 Semester nach der Regelstudienzeit beenden, soweit sie nicht bis zum Ende des Jahres 2015 gegenüber dem Prüfungsausschuss schriftlich ihren Wechsel in die damals gültige neue Ordnung erklärt hatten. Für Härtefälle trifft der Prüfungsausschuss angemessene Regelungen.

**I. Die Anlage 1b wird ergänzt durch:**

Studienverlauf Master Insect Biotechnology and Bioresources

<b>1. Sem</b>	<b>Biostatistics and Experimental Design</b> (MK 02) 6 CP	<b>Natural Product Chemistry</b> (MK 87) 6 CP	<b>Entomology I</b> (MK 88) 6 CP	<b>Integrated Pest Management</b> (MK 89) 6 CP	<b>Profile Module</b> 6 CP	30 CP
<b>2. Sem</b>	<b>Entomology II</b> (MK 91) 6 CP	<b>Food Technology</b> (MK 93) 6 CP	<b>Bioprocess Engineering</b> (MK 93) 6 CP	<b>Natural Product discovery platforms</b> (MK 94) 6 CP	<b>Profile Module</b> 6 CP	30 CP
<b>3. Sem</b>	<b>Profile Module</b> 6 CP	<b>Profile Module</b> 6 CP	<b>Profile Module</b> 6 CP	<b>Profile Module</b> 6 CP	<b>Profile Module</b> 6 CP	30 CP
<b>4. Sem.</b>	<b>Profile Module</b> 6 CP	<b>Master Thesis</b> 24 CP				30 CP

II. Die Anlage 2b werden folgende Ergänzungen vorgenommen::

1. Einführung der folgenden Übersicht:

<b>Master Insect Biotechnology and Bioresources</b>
<b>MK 02 - Biostatistics and Experimental Design</b>
<b>MK 87 - Natural Product Chemistry</b>
<b>MK 88 - Entomology I</b>
<b>MK 89 - Integrated Pest Management</b>
<b>MK 91 - Entomology II</b>
<b>MK 92 - Food Technology</b>
<b>MK 93 - Bioprocess Engineering I</b>
<b>MK 94 - Natural Product Discovery Platforms</b>
<b>MK 99 – Master Thesis</b>

2. In Modul MK 02 „Biostatistics and Experimental Design“ wird in der Zeile “Applies to degree courses/semesters” der Studiengangstitel ergänzt.

3. In Modul MK 99 „Master-Thesis“ wird in der Zeile “Applies to degree courses/semesters” der Studiengangstitel ergänzt.

4. Es werden die folgenden Module ergänzend eingeführt:

<b>MK 87 - Natural Product Chemistry</b>				<b>1. Sem.;</b>	<b>6 CP</b>	
English Module Title	Natural Product Chemistry					
Faculty / chair / department	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie / Naturstoffforschung mit Schwerpunkt Insektenbiotechnologie					
Applies to degree courses/semesters	Insect Biotechnology and Bioresources, Master (1.)					
Module coordinator	Prof. Dr. Till Schüberle					
Prerequisites for participation	None (recommended: basic knowledge in organic chemistry)					
Course aims	The students <ul style="list-style-type: none"> <li>• get comprehensive insight into the chemistry of organic natural products.</li> <li>• know the most important classes of natural products, including their biosynthesis, important structural and chemical features as well as bioactivities.</li> </ul>					
Module content	<ul style="list-style-type: none"> <li>• origin, biosynthesis, ecophysiological role, and practical importance of natural products</li> <li>• classes of natural products (carbohydrates, lipids, polyketides, phenylpropanoids, terpenes, amino acids, and their derivatives, biogenic amines and alkaloids) as well as their biosynthesis and important features (structure-activity relationships, toxicity)</li> <li>• production/fermentation, isolation, separation and clean-up of natural products (paper, thin-layer-, ion-exchange, and column chromatography as well as liquid chromatography, especially HPLC)</li> <li>• classical and modern methods for structural elucidation of natural products</li> </ul>					
Forms of instruction	Lecture (50%), Seminar (50%)					
Total workload in hours	180 hours					
	Consisting of: A courses in total			B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work				Total
	Lecture	30	20			
	Seminar	30	40			
	Practical training exercises					
	Study trip					
	Homework					
	60	60	30	30	<b>180 / 6 CP</b>	
Module assessment	Form(s) of assessment	a) written examination or b) other examinations conducted by the teaching staff (see SpeZO § 8).				
	Components of final grade	Written examination (100 %)				
	Form of module component retake examination					

Form of module retake examination	Written or oral examination or repeat/revision of the examination as described in b).	
Frequency	Winter term	Duration 1 Semester
Intake capacity	30	
Language of instruction	English	
Website	www.uni-giessen.de/fbz/fb09/institute/iib/nsf	

<b>MK 88 - Entomology I</b>			<b>1. Sem.;</b>	<b>6 CP</b>	
English Module Title	Entomology I				
Faculty / chair / department	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Insektenbiotechnologie / Angewandte Entomologie				
Applies to degree courses/semesters	Insect Biotechnology and Bioresources, Master (1.)				
Module coordinator	Prof. Dr. Andreas Vilcinskas				
Prerequisites for participation	None				
Course aims	<p>The students</p> <ul style="list-style-type: none"> <li>gain fundamental knowledge on insect anatomy and systematics</li> <li>know the basics of insect identification and will learn its practical application</li> <li>learn techniques of insect collecting and preservation of specimens</li> <li>understand the basics of evolutionary biology &amp; ecology of insects</li> </ul>				
Module content	<ul style="list-style-type: none"> <li>studies on internal (including dissections) and external insect morphology</li> <li>microscopy of organ systems</li> <li>use of insect identification keys with real specimens</li> <li>application of collecting techniques in the field</li> <li>setting and preservation of specimens for scientific collections and documentation</li> <li>evolutionary strategies of insects</li> <li>insect ecology</li> </ul>				
Forms of instruction	Lecture (50%), Exercises (37%), Study trip (13%)				
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	30	55		
	Seminar				
	Practical training exercises	22	30		
	Study trip	8	5		
	Homework				
Module examination	60				
	90				
	30				
	<b>180 / 6 CP</b>				
Form(s) of assessment	a) written examination or b) other examinations conducted by the teaching staff (see SpezO § 8).				
Components of final grade	Written examination (100 %)				
Form of module component retake examination					
Form of module retake examination	Written examination or repeat/revision of the examination as described in b).				
Frequency	Winter term	Duration 1 Semester			
Intake capacity	not limited				
Language of instruction	English				
Website	www.uni-giessen.de/fbz/fb09/institute/iib/ento				

<b>MK 89 - Integrated Pest Management</b>				<b>1. Sem.;</b>	<b>6 CP</b>
English Module Title		Integrated Pest Management			
Faculty / chair / department		Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie / Insektenbiotechnologie im Pflanzenschutz			
Applies to degree courses/semesters		Insect Biotechnology and Bioresources, Master (1.)			
Module coordinator		Prof. Dr. Marc Schetelig			
Prerequisites for participation		None			
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>• have important knowledge in the various methods of biological pest control (including classical biological control, inundative releases, etc.)</li> <li>• have competencies in biology and ecology as well as the use of entomopathogenic organisms (fungi, viruses, bacteria, protozoans) in modern microbiological plant protection,</li> <li>• know the basic principles of important biotechnological plant protection strategies,</li> <li>• are able to assess how and to what extent these individual techniques can be used within the framework of integrated control strategies.</li> </ul>			
Module content		<ul style="list-style-type: none"> <li>• The legal basis of integrated and biological plant protection</li> <li>• Systematics, biology, and ecology of agricultural pests and entomopathogens and their application possibilities in crop protection (production and application technology)</li> <li>• Case studies on methods of classical biological pest control, inundative releases of antagonists (in the field and greenhouse), sterile insect technology and strategies for the promotion of natural enemies in agricultural ecosystems</li> <li>• Use of pheromones (monitoring, mass capture, confusion, lure and kill) and other biotechnological plant protection methods in agriculture</li> <li>• Compatibility and possibilities for the integration of different biological, microbiological and biotechnological plant protection techniques in the overall context of integrated control methods</li> </ul>			
Forms of instruction		Lecture (73%), Seminar (13%), Study trip (13%)			
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	44	40		
	Seminar	8	20		
	Practical training exercises				
	Study trip	8	10		
	Homework				
	60	70	20	30	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) written examination and presentation or b) other examinations conducted by the teaching staff (see SpezO § 8).			
	Components of final grade	Written examination (50%), presentation (50%)			
	Form of module component retake examination				
	Form of module retake examination	Written examination or presentation or repeat/revision of the examination as described in b).			
Frequency	Winter term		Duration 1 Semester		
Intake capacity	not limited				
Language of instruction	English				
Website	www.uni-giessen.de/fbz/fb09/institute/iib/ibp				

MK 91 - Entomology II			2. Sem.;	6 CP
English Module Title		Entomology II		
Faculty / chair / department		Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Insektenbiotechnologie / Angewandte Entomologie		
Applies to degree courses/semesters		Insect Biotechnology and Bioresources, Master (2.)		
Module coordinator		Prof. Dr. Andreas Vilcinskas		
Prerequisites for participation		None		
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>• gain in-depth knowledge on insect anatomy</li> <li>• broaden their knowledge on insect systematics</li> <li>• increase their skills in insect identification</li> <li>• understand concepts of insect physiology</li> <li>• understand insect adaptations to environmental pressures</li> <li>• extend their knowledge about insect ecological strategies</li> </ul>		
Module content		<ul style="list-style-type: none"> <li>• microscopic studies on histological sections of insect tissues</li> <li>• identification of specimens on family and species level</li> <li>• specific taxonomic techniques (dissection of insect genitalia)</li> <li>• insect physiology (including development)</li> <li>• examples and concepts how insects adapt to their environment (aquatic insects, etc.)</li> <li>• insect feeding strategies (including field observations)</li> </ul>		
Forms of instruction		Lecture (47%), Exercises (40%), Study trip (13%)		
Total workload in hours			180 hours	
			Consisting of: A courses in total	B autonomous work in the module
		C module examination		
	a contact hours	b preparation/follow-up work		Total
	Lecture	28	50	
	Seminar			
	Practical training			
	exercises	24	30	
Study trip	8	10		
Homework				
	60	90	30	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) written examination or b) other examinations conducted by the teaching staff (see SpezO § 8).		
	Components of final grade	Written examination (100 %)		
	Form of module component retake examination			
	Form of module retake examination	Written examination or repeat/revision of the examination as described in b).		
Frequency	Summer term	Duration 1 Semester		
Intake capacity	not limited			
Language of instruction	English			
Website	www.uni-giessen.de/fbz/fb09/institute/iib/ento			

<b>MK 92 - Food Technology</b>				<b>2. Sem.;</b>	<b>6 CP</b>	
English Module Title		Food Technology				
Faculty / chair / department		Biologie und Chemie / Institut für Lebensmittelchemie und Lebensmittelbiotechnologie / Lebensmittelchemie				
Applies to degree courses/semesters		Insect Biotechnology and Bioresources, Master (2.)				
Module coordinator		Prof. Dr. Holger Zorn				
Prerequisites for participation		None				
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>• master basic engineering and bioprocess principles relevant to the food industry</li> <li>• know special separation techniques</li> <li>• understand the basic principles of the processing of animal and plant food</li> <li>• can perform basic food biotechnological processes</li> <li>• are able to analyze and assess parameters relevant in processes of food biotechnology</li> </ul>				
Module content		<ul style="list-style-type: none"> <li>• Cereal technology</li> <li>• Production of sugar and confectionery</li> <li>• Techniques to produce fats and oils</li> <li>• Production processes of food additives</li> <li>• Food Biotechnology</li> <li>• Asian food</li> </ul>				
Forms of instruction		Lecture (43%), Seminar (14%), Practical Training (43%)				
Total workload in hours			180 hours			
			Consisting of: A courses in total		B autonomous work in the module	C module examination
		a contact hours	b preparation/follow-up work			Total
	Lecture	30	30			
	Seminar	10	20			
	Practical training exercises	30	30			
	Study trip					
	Homework					
	70	80		30	<b>180 / 6 CP</b>	
Module examination	Form(s) of assessment		a) written examination or b) other examinations conducted by the teaching staff (see SpezO § 8).			
	Components of final grade		Written examination (100 %)			
	Form of module component retake examination					
	Form of module retake examination		Written examination or repeat/revision of the examination as described in b).			
Frequency		Summer term		Duration 1 Semester		
Intake capacity		30				
Language of instruction		English				
Website		www.uni-giessen.de/lcb				

MK 93 - Bioprocess Engineering I				2. Sem.;	6 CP
English Module Title		Bioprocess Engineering I			
Faculty / chair / department		Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie / Bioverfahrenstechnik, Membrantechnologie und Zellkulturtechnik			
Applies to degree courses/semesters		Insect Biotechnology and Bioresources, Master (2.)			
Module coordinator		Prof. Dr. Peter Czermak			
Prerequisites for participation		None			
Course aims		<p>Lecture:</p> <p>The students show competences in:</p> <ul style="list-style-type: none"> <li>basics concerning prokaryotic and eukaryotic cells and enzymes in biotechnological processes</li> <li>essential mathematical model concepts to gather cell growth and metabolism</li> <li>special aspects of fermentation processes and bioreactors</li> <li>basics of essential unit operations of downstream processes</li> <li>basic possibilities of process design, characterization, description, and monitoring in up- and downstream of biotechnological production processes</li> </ul> <p>Seminar and lab work:</p> <ul style="list-style-type: none"> <li>The students learn:</li> <li>the handling of bioreactors and their tools within the concept and application of cellular/ microbial cultivations</li> <li>application of essential bioanalytical methods for cell growth and metabolism analysis</li> <li>concepts of downstream operations</li> </ul>			
Module content		<p>Lecture:</p> <ul style="list-style-type: none"> <li>Industrial application of microbial and cell cultures, enzymes</li> <li>Process kinetics</li> <li>Batch-, Fed-batch and continuous processes, models and kinetics</li> <li>Heat and mass transfer including the combination with biological reactions</li> <li>Bioreactors and their choice</li> <li>Sterilisation: technologies, construction, hygienic design</li> <li>Methods of cell separation and product purification (lysis, sedimentation, centrifugation, filtration, chromatography, extraction)</li> </ul> <p>Seminar and lab work:</p> <ul style="list-style-type: none"> <li>Bioreactor cultivation including process monitoring</li> <li>Exemplary downstream processing with various tools</li> <li>Presentation and discussion of results within the seminar</li> </ul>			
Forms of instruction		Lecture (50%), Seminar (25%), Practical Training (25%)			
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	30	30		
	Seminar	15			
	Practical training exercises	15	30		
	Study trip				
	Homework				
	60	60	20	40	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) written examination or b) other examinations conducted by the teaching staff (see SpezO § 8).			
	Components of final grade	Written examination (100 %)			
	Form of module component retake examination				
	Form of module retake examination	Written examination or repeat/revision of the examination as described in b).			
Frequency	Summer term		Duration 1 Semester		
Intake capacity	30				
Language of instruction	English				
Website	<a href="http://www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html">www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html</a>				



MK 94 - Natural Product Discovery Platforms				2. Sem.;	6 CP
English Module Title		Natural Product Discovery Platforms			
Faculty / chair / department		Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie / Naturstoffforschung mit Schwerpunkt Insektenbiotechnologie			
Applies to degree courses/semesters		Insect Biotechnology and Bioresources, Master (2.)			
Module coordinator		Prof. Dr. Till Schäberle			
Prerequisites for participation		None			
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>gain insights into the principles and set-up of natural product discovery approaches and pipelines (biological activity-based platforms versus modern genomics / bioinformatics-driven pipelines)</li> <li>get knowledge in currently used and emerging natural product-producing microorganisms and their application in pharmaceutical, agricultural and food industry</li> <li>acquire knowledge in the industrial value chain from spanning early discovery programs up to lead candidate identification and lead development</li> <li>get experience in the application of bioinformatic tools for biosynthetic gene cluster identification</li> <li>get insights into recent literature and acquire skills in selecting and presenting publications in seminars</li> </ul>			
Module content		<ul style="list-style-type: none"> <li>Systematics, biology, and ecology of microorganisms producing natural products</li> <li>Examples of natural products biosynthesis in microorganisms (physiology, gene regulation)</li> <li>From the environment to the product: strategies to select and exploit bioresources for natural product discovery</li> <li>Principles and application of biological detection systems and their application in academic and industrial screening systems</li> <li>Target identification and target-based screening systems</li> <li>Analytical platforms in natural product identification</li> <li>Connection of gene clusters and metabolites: modern approaches for drug discovery</li> <li>Lead identification and strategies for lead development</li> <li>Seminar on recent approaches in drug discovery</li> <li>Demonstration / hands on training to gain insights into bioinformatics tools in drug discovery using the antiSMASH platform as an example to exploit genome sequence information</li> </ul>			
Forms of instruction		Lecture (70%), Seminar (15%), Exercises (15%)			
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	42	40		
	Seminar	9	10		
	Practical training exercises	9	10		
	Study trip				
	Homework				
	60	60	30	30	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) Written examination and presentation or b) other examinations conducted by the teaching staff (see SpezO § 8).			
	Components of final grade	exam (50 %), presentation (50%)			
	Form of module component retake examination				
	Form of module retake examination	Written examination or presentation or repeat/revision of the examination as described in b).			
Frequency	Summer term		Duration 1 Semester		
Intake capacity	Not limited				
Language of instruction	English				

## Profilmodule

MP 149 - Molecular Techniques				1./3. Sem.;	6 CP	
English Module Title		Molecular Techniques				
Faculty / chair / department		Agrarwissenschaften, Ökotoxologie und Umweltmanagement / Institut für Insektenbiotechnologie / Insektenbiotechnologie im Pflanzenschutz				
Applies to degree courses/semesters		Profil, Master (1./3.)				
Module coordinator		Prof. Dr. Marc Schetelig				
Prerequisites for participation		None				
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>• have a basic knowledge of molecular biology,</li> <li>• know important vector and plasmid systems</li> <li>• know important molecular pathways as well as cloning strategies</li> <li>• have a good knowledge of molecular techniques used in insect biotechnology</li> <li>• can independently compile, summarize and present literature on a given topic in a lecture</li> </ul>				
Module content		<ul style="list-style-type: none"> <li>• Fundamentals of molecular biology</li> <li>• History and evolution of plasmids and DNA cloning</li> <li>• Molecular biology and their benefits in biotechnology</li> <li>• Transformation possibilities and transgenesis in insects</li> <li>• "From plasmids to biotechnologically modified insects"</li> <li>• Current molecular tools in insect biotechnology and their risk assessment</li> </ul>				
Forms of instruction		Lecture (47%), Seminar (40%), Exercises (13%)				
Total workload in hours			180 hours			
			Consisting of: A courses in total		B autonomous work in the module	C module examination
		a contact hours	b preparation/follow-up work			Total
	Lecture	28	30			
	Seminar	24	20			
	Practical training exercises	8	10			
	Study trip					
	Homework					
	60	60	30	30	<b>180 / 6 CP</b>	
Module examination	Form(s) of assessment		a) written examination and presentation or b) other examinations conducted by the teaching staff (see SpezO § 8).			
	Components of final grade		Written examination (50 %), presentation (50 %)			
	Form of module component retake examination					
	Form of module retake examination		Written examination or presentation or repeat/revision of the examination as described in b).			
Frequency		Winter term		Duration 1 Semester		
Intake capacity		30				
Language of instruction		English				
Website		<a href="http://www.uni-giessen.de/fbz/fb09/institute/iib/ibp">www.uni-giessen.de/fbz/fb09/institute/iib/ibp</a>				

MP 150 - Milestones of Insect Biotechnology & Bioresources				2./4. Sem.;	6 CP
English Module Title		Milestones of Insect Biotechnology & Bioresources			
Faculty / chair / department		Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie / Insektenbiotechnologie im Pflanzenschutz			
Applies to degree courses/semesters		Profil, Master (2./4.)			
Module coordinator		Prof. Dr. Marc Schetelig			
Prerequisites for participation		None			
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>• have an overview of currently discussed relevant topics in science and industry in the field of insect biotechnology</li> <li>• have an overview of currently discussed relevant topics in science and industry in the field of bioresources</li> <li>• ???Research and presentation of current relevant publications and discussion within the context of the lecture, classification of potential industrial and social relevance</li> </ul>			
Module content		<ul style="list-style-type: none"> <li>• presentation and discussion of currently important topics in insect biotechnology &amp; bioresources</li> <li>• literature research and presentation of currently relevant topics in pharmaceutical and industrial biotechnology based on publications</li> </ul>			
Forms of instruction		Lecture (67%), Seminar (33%)			
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	40	30		
	Seminar	20	20		
	Practical training exercises				
	Study trip				
	Homework				
	60	50	40	30	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) written examination and presentation or b) other examinations conducted by the teaching staff (see SpezO § 8).			
	Components of final grade	Written examination (50 %), presentation (50 %)			
	Form of module component retake examination				
	Form of module retake examination	Written examination or presentation or repeat/revision of the examination as described in b).			
Frequency	Summer term		Duration 1 Semester		
Intake capacity	30				
Language of instruction	English				
Website	<a href="http://www.uni-giessen.de/fbz/fb09/institute/iib/ibp">www.uni-giessen.de/fbz/fb09/institute/iib/ibp</a>				

MP 151 - Antibiotics: present, past, and future				1./3. Sem.;	6 CP
English Module Title		Antibiotics: present, past, and future			
Faculty / chair / department		Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie / Naturstoffforschung mit Schwerpunkt Insektenbiotechnologie			
Applies to degree courses/semesters		Profil, Master (1./3.)			
Module coordinator		Prof. Dr. Till Schäberle			
Prerequisites for participation		Natural Product Discovery Platforms (MK 94)			
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>get comprehensive insight into the main chemical classes of antibiotics used in human and veterinary medicine as well as for agricultural applications.</li> </ul>			
Module content		<ul style="list-style-type: none"> <li>Main chemical classes (<math>\beta</math>-lactams, tetracyclins, aminoglycosides, macrolides, peptide antibiotics, 'hybrid' structures, others) of antibiotics used in human and veterinary medicine as well as for agricultural applications;</li> <li>Microbial secondary metabolism as the primary source of antibiotics, including biosynthesis of the most important classes;</li> <li>Modes of action and target sites of important classes of antibiotics;</li> <li>Resistance to antibiotics and novel strategies to overcome antibiotic resistance;</li> <li>Optimizing the effectiveness of antibiotics by chemical and biosynthetic modification (partial synthesis, precursor-directed biosynthesis etc.);</li> <li>Design &amp; optimization of antibiotic fermentation processes;</li> <li>History of antibiotic research and to antimicrobial metabolites from other than microbial sources;</li> </ul>			
Forms of instruction		Lecture (80%), Seminar (20%)			
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	48	30		
	Seminar	12	30		
	Practical training exercises				
	Study trip				
	Homework				
	60	60	30	30	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) written examination or b) other examinations conducted by the teaching staff (see SpezO § 8).			
	Components of final grade	Written examination (100 %)			
	Form of module component retake examination				
	Form of module retake examination	Written examination or repeat/revision of the examination as described in b).			
Frequency	Winter term		Duration 1 Semester		
Intake capacity	30				
Language of instruction	English				
Website	www.uni-giessen.de/fbz/fb09/institute/iib/nsf				

<b>MP 152 - Trends and Advances in Natural Product Research</b>				<b>1./3. Sem.;</b>	<b>6 CP</b>
English Module Title		Trends and Advances in Natural Product Research			
Faculty / chair / department		Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Insektenbiotechnologie / Naturstoffforschung mit Schwerpunkt Insektenbiotechnologie			
Applies to degree courses/semesters		Profil, Master (1./3.)			
Module coordinator		Prof. Dr. Till Schäberle			
Prerequisites for participation		Natural Product Chemistry (MK 87)			
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>will be introduced to modern approaches and state-of-the-art instrumentation in natural product research, which are presented in a historic, comparative context.</li> </ul>			
Module content		<ul style="list-style-type: none"> <li>empiric use of natural products in a historic context (arrow poisons, 'magic' potions, ancient insecticides, monastic herbal medicines etc.)</li> <li>history of natural product chemistry as a discipline of science from the beginning until present</li> <li>important classes of other than microbial or insect origin, their practical use and importance</li> <li>recently discovered, bioactive secondary metabolites, which display novel structures/modes of action</li> <li>achievements and limits of classical approaches in natural products research</li> <li>modern approaches and state-of-the-art instrumentation for natural product dereplication</li> <li>novel target-oriented screening strategies to find new lead structures and novel modes of action</li> </ul>			
Forms of instruction		Lecture (80%), Seminar (20%)			
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	48	50		
	Seminar	12	20		
	Practical training exercises				
	Study trip				
	Homework				
	60	70	20	30	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment		a) written examination or b) other examinations conducted by the teaching staff (see SpezO § 8).		
	Components of final grade		Written examination (100 %)		
	Form of module component retake examination				
	Form of module retake examination		Written examination or repeat/revision of the examination as described in b).		
Frequency		Winter term		Duration 1 Semester	
Intake capacity		30			
Language of instruction		English			
Website		www.uni-giessen.de/fbz/fb09/institute/iib/nsf			

<b>MP 153 - Instrumental, biochemical and trace analytical methods in food analysis</b>		<b>3. Sem.;</b>	<b>6 CP</b>	
English Module Title	Instrumental, biochemical and trace analytical methods in food analysis			
Faculty / chair / department	Biologie und Chemie / Institut für Lebensmittelchemie und Lebensmittelbiotechnologie / Lebensmittelchemie			
Applies to degree courses/semesters	Profil Insect Biotechnology and Bioresources, Master (3.)			
Module coordinator	Prof. Dr. Holger Zorn			
Prerequisites for participation	None			
Course aims	<p>The students</p> <ul style="list-style-type: none"> <li>• learn sophisticated analytical procedures used in the working groups of the Institute of Food Chemistry and Food Biotechnology</li> <li>• gain detailed knowledge of analytical quality assurance and GLP</li> <li>• present their research results in form of a protocol</li> </ul>			
Module content	<ul style="list-style-type: none"> <li>• Research-related methods of modern food chemistry</li> <li>• Food Chemical trace- and other high-performance analytical methods</li> <li>• Electrophoretic techniques</li> <li>• Methods in molecular biology</li> </ul>			
Forms of instruction	Seminar (5%), Practical Training (95%)			
Total workload in hours	180 hours			
	Consisting of: A courses in total		B autonomous work in the module	C module examination
	a contact hours	b preparation/follow-up work		Total
	Lecture			
	Seminar	6	12	
	Practical training exercises	108	24	
	Study trip			
	Homework			
	114	36	30	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) Final protocol or b) other examinations conducted by the teaching staff (see SpezO § 8)		
	Components of final grade	Final protocol (100 %)		
	Form of module component retake examination			
	Form of module retake examination	Revision of the protocol within 4 weeks or repeat/revision of the examination as described in b)		
Frequency	Winter term	Duration 1 Semester		
Intake capacity	11			
Language of instruction	English			
Website	www.uni-giessen.de/lcb			

<b>MP 154 - Method development in food analysis and food biotechnology</b>		<b>4. Sem.;</b>	<b>6 CP</b>		
English Module Title	Method development in food analysis and food biotechnology				
Faculty / chair / department	Biologie und Chemie / Institut für Lebensmittelchemie und Lebensmittelbiotechnologie / Lebensmittelchemie				
Applies to degree courses/semesters	Profil Insect Biotechnology and Bioresources, Master (4.)				
Module coordinator	Prof. Dr. Holger Zorn				
Prerequisites for participation	None				
Course aims	<p>The students</p> <ul style="list-style-type: none"> <li>• learn analytical procedures used in the working groups of the Institute of Food Chemistry and Food Biotechnology</li> <li>• develop and establish new experiments for practical courses</li> <li>• gain detailed knowledge of analytical quality assurance and GLP</li> <li>• present their research results in the form of a protocol</li> </ul>				
Module content	<ul style="list-style-type: none"> <li>• basic methods used in modern food analysis</li> <li>• gravimetric, photometric, chromatographic and titrimetric methods</li> <li>• Analysis of available databases and literature</li> </ul>				
Forms of instruction	Seminar (5%), Practical Training (95%)				
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture				
	Seminar	6	12		
	Practical training exercises	108	24		
	Study trip				
	Homework				
	114	36		30	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) Final protocol or b) other examinations conducted by the teaching staff (see SpezO § 8)			
	Components of final grade	Final protocol (100 %)			
	Form of module component retake examination				
	Form of module retake examination	Revisiom oft the protocol within 4 weeks or repeat/revision of the examination as described in b)			
Frequency	Summer term	Duration 1 Semester			
Intake capacity	11				
Language of instruction	English				
Website	www.uni-giessen.de/lcb				

MP 156 - Laboratory Course I				1.-4. Sem.;	6 CP	
English Module Title		Laboratory Course I				
Faculty		Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Biologie und Chemie / THM				
Applies to degree courses/semesters		Profil Insect Biotechnology and Bioresources, Master (1.-4.)				
Module coordinator		Am Studiengang beteiligte Hochschullehrer				
Prerequisites for participation		None				
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>acquire specific research-relevant laboratory knowledge</li> <li>improve their cooperative work skills across groups</li> </ul>				
Module content		<ul style="list-style-type: none"> <li>cooperation with different work groups</li> <li>training of modern laboratory techniques and autonomous lab work in special topics</li> <li>topic specific literature research and presentation</li> </ul>				
Forms of instruction		Seminar (11%), Practical Training (89%)				
Total workload in hours	180 hours					
	Consisting of: A courses in total			B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total	
	Lecture					
	Seminar	10	10			
	Practical training exercises	80				
	Study trip					
	Homework					
	90	10	50	30	<b>180 / 6 CP</b>	
Module examination	Form(s) of assessment	a) Presentation or protocol or b) other examinations conducted by the teaching staff (see SpezO § 8).				
	Components of final grade	Presentation (100 %) or protocol (100 %)				
	Form of module component retake examination					
	Form of module retake examination	Presentation or protocol or repeat/revision of the examination as described in b)				
Frequency	Winter term and Summer term (blockmodule)		Duration 1 Semester			
Intake capacity	In Rücksprache mit den Dozenten					
Language of instruction	English					



MP 157 - Laboratory Course II				1.-4. Sem.;	6 CP	
English Module Title		Laboratory Course II				
Faculty		Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Biologie und Chemie / THM				
Applies to degree courses/semesters		Profil Insect Biotechnology and Bioresources, Master (1.-4.)				
Module coordinator		Am Studiengang beteiligte Hochschullehrer				
Prerequisites for participation		None				
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>acquire specific research-relevant laboratory knowledge</li> <li>improve their cooperative work skills across groups</li> </ul>				
Module content		<ul style="list-style-type: none"> <li>cooperation with different work groups</li> <li>training of modern laboratory techniques and autonomous lab work in special topics</li> <li>topic specific literature research and presentation</li> </ul>				
Forms of instruction		Seminar (11%), Practical Training (89%)				
Total workload in hours	180 hours					
	Consisting of: A courses in total			B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total	
	Lecture					
	Seminar	10	10			
	Practical training exercises	80				
	Study trip					
	Homework					
	90	10	50	30	<b>180 / 6 CP</b>	
Module examination	Form(s) of assessment	a) Presentation or protocol or b) other examinations conducted by the teaching staff (see SpezO § 8).				
	Components of final grade	Presentation (100 %) or protocol (100 %)				
	Form of module component retake examination					
	Form of module retake examination	Presentation or protocol or repeat/revision of the examination as described in b)				
Frequency	Winter term and Summer term (blockmodule)		Duration 1 Semester			
Intake capacity	In Rücksprache mit den Dozenten					
Language of instruction	English					

<b>MP 158 - Insects for food and feed production systems</b>				<b>2./4. Sem.;</b>	<b>6 CP</b>	
English Module Title		Insects for food and feed production systems				
Faculty / chair / department		Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Insektenbiotechnologie / Angewandte Entomologie				
Applies to degree courses/semesters		Profil, Master (2./4.)				
Module coordinator		Prof. Dr. Andreas Vilcinskis				
Prerequisites for participation		None				
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>• learn analytical procedures used in the area of food and feed</li> <li>• develop and establish new systems for food production through insect material</li> <li>• gain knowledge on strategies to convert waste to food</li> <li>• present their research results in the form of a presentation</li> </ul>				
Module content		<ul style="list-style-type: none"> <li>• basic methods used in modern food analysis</li> <li>• Analysis of available databases and literature for suitable insects, protein requirements and improved waste management</li> </ul>				
Forms of instruction		Lecture (70%), Seminar (30%)				
Total workload in hours	180 hours					
	Consisting of: A courses in total			B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total	
	Lecture	42	60			
	Seminar	18	30			
	Practical training exercises					
	Study trip					
	Homework					
	60	90		30	<b>180 / 6 CP</b>	
Module examination	Form(s) of assessment	a) Written examination and Presentation or b) other examinations conducted by the teaching staff (see SpezO § 8).				
	Components of final grade	Written examination (50%), Presentation (50%)				
	Form of module component retake examination					
	Form of module retake examination	Written examination or presentation or repeat/revision of the examination as described in b).				
Frequency	Summer term			Duration 1 Semester		
Intake capacity	30					
Language of instruction	English					
Website	<a href="http://www.uni-giessen.de/fbz/fb09/institute/iib/ento">www.uni-giessen.de/fbz/fb09/institute/iib/ento</a>					

THM 01 - Pharmaceutical Basics				1./3. Sem.;	6 CP
English Module Title		Pharmaceutical Basics			
Faculty / chair / department		Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie / Biopharmazeutische Technologie und Biopharmazie			
Applies to degree courses/semesters		Profil Insect Biotechnology and Bioresources, Master (1./3.)			
Module coordinator		Prof. Dr. Frank Runkel			
Prerequisites for participation		None			
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>• have a basic knowledge in different dosage forms (solid, liquid, semi-solid)</li> <li>• can name properties, characterization and testing of dosage forms</li> <li>• can describe the requirements for medicinal product test according to Pharmacopeia</li> <li>• have an overview of rules and guidelines in the pharmaceutical industry</li> <li>• can name excipients and packing materials</li> <li>• apply to Pharmacopeia und pharmaceutical terms</li> <li>• can interpret laws, Rich lines and standards</li> <li>• designate the fundamentals of quality management</li> </ul>			
Module content		<ul style="list-style-type: none"> <li>• Fundamentals of drug morphology</li> <li>• Pharmacopeia and other standard work</li> <li>• Drug forms by Pharmacopeia</li> <li>• Excipients and active ingredients</li> <li>• Preparations of medical forms</li> <li>• Testing of the pharmaceutical quality</li> <li>• Fundamentals of quality management</li> <li>• Legal framework: DIN ISO, GMP-guideline</li> <li>• Cycle of quality control</li> <li>• Quality assurance program</li> <li>• Lab: making and testing of several dosage forms</li> </ul>			
Forms of instruction		Lecture (40%), Seminar (20%), Practical Training (40%)			
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	40	15		
	Seminar	20	10		
	Practical training exercises	40	15		
	Study trip				
	Homework				
	100	40		40	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) Written examination or b) other examinations conducted by the teaching staff (see SpezO § 8)			
	Components of final grade	Written examination (100 %)			
	Form of module component retake examination				
	Form of module retake examination	Written examination or repeat/revision of the examination as described in b)			
Frequency	Winter term		Duration 1 Semester		
Intake capacity	16				
Language of instruction	English				
Website	<a href="http://www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html">www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html</a>				

THM 02 - Quality Management				2./4. Sem.;	6 CP	
English Module Title	Quality Management					
Faculty / chair / department	Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie / Biopharmazeutische Technologie und Biopharmazie					
Applies to degree courses/semesters	Profil Insect Biotechnology and Bioresources, Master (2./4.)					
Module coordinator	Prof. Dr. Frank Runkel					
Prerequisites for participation	None					
Course aims	<p>The students</p> <ul style="list-style-type: none"> <li>• can safely deal with the concepts and definitions of quality management</li> <li>• understand the meaning and importance of quality management</li> <li>• can perform and analyze risk assessments</li> <li>• know how to identify critical process steps</li> <li>• can accompany qualifications and validations in companies</li> <li>• can develop steps for risk reduction</li> </ul>					
Module content	<ul style="list-style-type: none"> <li>• Basic concepts for risk and quality management</li> <li>• Quality management systems (DIN ISO)</li> <li>• Strategies for handling and managing risks in manufacturing companies</li> <li>• Risk assessment by FMEA, HACCP, Kepner-Tregoe, FTA</li> <li>• Quality-related strategies (TQM, EFQM, TPM, KVP)</li> <li>• Further qualification and validation phases</li> <li>• Internal / external quality audits</li> <li>• certification</li> </ul>					
Forms of instruction	Seminar (75%), Exercises (25%)					
Total workload in hours	180 hours					
	Consisting of: A courses in total			B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total	
	Lecture					
	Seminar	45	45			
	Practical training exercises	15	15			
	Study trip					
	Homework					
	60	60	30	30	<b>180 / 6 CP</b>	
Module examination	Form(s) of assessment	a) Written examination or b) other examinations conducted by the teaching staff (see SpezO § 8)				
	Components of final grade	Written examination (100 %)				
	Form of module component retake examination					
	Form of module retake examination	Written examination or repeat/revision of the examination as described in b)				
Frequency	Summer term	Duration 1 Semester				
Intake capacity	30					
Language of instruction	English					
Website	<a href="http://www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html">www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html</a>					

THM 03 - Bioprocess Engineering II – Advanced				3. Sem.;	6 CP	
English Module Title		Bioprocess Engineering II – Advanced				
Faculty / chair / department		Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie / Bioverfahrenstechnik, Membrantechnologie und Zellkulturtechnik				
Applies to degree courses/semesters		Profil Insect Biotechnology and Bioresources, Master (3.)				
Module coordinator		Prof. Dr. Peter Czermak				
Prerequisites for participation		Bioprocess Engineering I (MK 93)				
Course aims		<p>The students</p> <p>show knowledge in upstream processing: successful strategies for expression, expansion and product formation in different bioreaction-systems can be developed and ideally combined based on the competences gained in the core module concepts, possibilities,</p> <p>show knowledge in downstream processing: successful strategies for cell separation and product purification can be developed and ideally combined based on the competences gained in the core module</p> <p>know how to analyze, characterize and optimize developed processes, also in combination with mathematical operations</p> <p>know how to transfer, verify and optimize designed process steps into experiments and integrate them into the overall process concept</p>				
Module content		<ul style="list-style-type: none"> <li>• Bioprocesses for the production of recombinant products with different expression systems</li> <li>• Advanced process analysis of bioreactor systems including system balances</li> <li>• Process description – kinetics, mass- and heat transfer</li> <li>• Downstream processing- advanced tools, concepts, choice, requirements</li> <li>• Application of modern software for design, development, modelling and simulation of complex bioreactor systems and biosynthesis for specific topics regarding the overall process including up- and downstream</li> <li>• Conceptual development of downstream processing for a certain topic</li> <li>• Transfer of the specific topics of up- and downstream processing based on the seminar into lab experiments</li> <li>• Presentation and discussion of the results within the seminar</li> </ul>				
Forms of instruction		Lecture (25%), Seminar (50%), Practical Training (25%)				
Total workload in hours	180 hours					
	Consisting of: A courses in total			B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total	
	Lecture	15	15			
	Seminar	30	30			
	Practical training exercises	15	10			
	Study trip					
	Homework					
	60	55	25	40	<b>180 / 6 CP</b>	
Module examination	Form(s) of assessment	a) Written examination or b) other examinations conducted by the teaching staff (see SpezO § 8)				
	Components of final grade	Written examination (100 %)				
	Form of module component retake examination					
	Form of module retake examination	Written examination or repeat/revision of the examination as described in b)				
Frequency	Winter term	Duration 1 Semester				
Intake capacity	12					
Language of instruction	Englisih					
Website	<a href="http://www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html">www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html</a>					

<b>THM 04 - Selected Chapters of Pharmaceutical &amp; Industrial Biotechnology</b>				<b>2./4. Sem.;</b>	<b>6 CP</b>
English Module Title		Selected Chapters of Pharmaceutical & Industrial Biotechnology			
Faculty / chair / department		Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie / Bioverfahrenstechnik, Membrantechnologie und Zellkulturtechnik			
Applies to degree courses/semesters		Profil Insect Biotechnology and Bioresources, Master (2./4.)			
Module coordinator		Prof. Dr. Peter Czermak			
Prerequisites for participation		None			
Course aims		<p>The students</p> <ul style="list-style-type: none"> <li>• have an overview of currently discussed relevant topics in science and industry in the field of biotechnology</li> <li>• know how to research and present current relevant publications and discuss them within the context of the lecture, classification of potential industrial and social relevance</li> </ul>			
Module content		<ul style="list-style-type: none"> <li>• currently important topics in pharmaceutical and industrial biotechnology</li> <li>• literature research and presentation of currently relevant topics in pharmaceutical and industrial biotechnology based on publications</li> </ul>			
Forms of instruction		Lecture (67%), Seminar (33%)			
Total workload in hours	180 hours				
	Consisting of: A courses in total		B autonomous work in the module	C module examination	
	a contact hours	b preparation/follow-up work			Total
	Lecture	30	30		
	Seminar	15	25		
	Practical training exercises				
	Study trip				
	Homework				
	45	55	40	40	<b>180 / 6 CP</b>
Module examination	Form(s) of assessment	a) Written examination or b) other examinations conducted by the teaching staff (see SpezO § 8)			
	Components of final grade	Written examination (100 %)			
	Form of module component retake examination				
	Form of module retake examination	Written examination or repeat/revision of the examination as described in b)			
Frequency	Summer term		Duration 1 Semester		
Intake capacity	15				
Language of instruction	English				
Website	<a href="http://www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html">www.thm.de/lse/forschung/ibpt/uebersicht-ibpt.html</a>				

### III. Anpassung der Anlage 4: Einschlägige Studiengänge

#### M.Sc. Insect Biotechnology and Bioresources

Einschlägige B.Sc.: - Agrarwissenschaften

- Biologie
- Biotechnologie
- Chemie
- Lebensmittelchemie

#### M.Sc. Nutzpflanzenwissenschaften

Einschlägige B.Sc.: - Agrarbiologie

- Agrarwirtschaft

- Agrarwissenschaften
- Gartenbau
- Landwirtschaft
- Nachwachsende Rohstoffe und Bioenergie
- Ökologische Landwirtschaft

**Art. 2**  
**Inkrafttreten**

Dieser Beschluss tritt am Tage nach seiner Verkündung in Kraft. Der neue Wortlaut der geänderten Ordnung wird in den Mitteilungen der Universität Gießen bekannt gemacht.

Gießen, den 01.08.2017  
Prof. Dr. Joybrato Mukherjee  
Präsident