Modules at the THM (Technische Hochschule Mittelhessen)

Module Directory for Students of the Master Degree "Insect Biotechnology and Bioresources"

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Formalities – Registration for the THM Modules

Our international Master's program Insect Biotechnology and Bioresources (IBB) offers a broad range of interdisciplinary modules provided in collaboration with other faculties, namely the faculty 08 – Biology and Chemistry of the Justus Liebig University (JLU) and the faculty of Life Science Engineering of the Technical University of Giessen (THM – Technische Hochschule Mittelhessen).

Students of the program Insect Biotechnology and Bioresources have to enroll at the Justus Liebig University and are automatically enrolled at the THM without additional fees. They receive a letter of confirmation from the JLU as well as from the THM. They need to pick up their chip cards from both the Registrar's Office of the JLU and the THM and enroll as cooperation student at the THM.

At the JLU, the distribution of module seats and the communication with the lecturers happens via Stud.IP. At the THM, they use the internet portal Moodle. IBB students have full access to Moodle with their personal data and chip card received from the Registrar's Office (chip card service) of the THM. Once registered and activated (https://scripts.its.thm.de/activate/nph-activate.cgi) students can register online for modules and use the E-Learning platform Moodle to download lecture notes etc. Please use Moodle to register for the core module MK 93 Bioprocess Engineering I and the profile modules THM 01, THM 02, THM 03 and THM 04.

Link Moodle:
https://cas.thm.de/cas/login?service=https%3A%2F%2Fmoodle.thm.de%2Flogin%2Findex.php%3FauthCAS%3DCAS

Please note:

Registration for all examinations (JLU and THM modules) has to be done in FLexNow via the JLU account.

To re-register to the university each semester, IBB students pay the JLU semester contribution to the JLU account; they are then automatically re-registered at the THM and need to re-activate both chip cards, the one of the JLU and the one of the THM, at the respective Registrar's Office.

Commencement of lectures:

Please be aware that the semester at the THM begins one week earlier than at the JLU! The same goes for the examination period so please look at the semester and lecture timetable of the THM to make sure you do not miss any important lectures or exams.

https://www.thm.de/site/en/international-en/incoming-englisch/semester-and-lecture-timetable.html

Important addresses:

Registrar's office THM (Studiensekretariat): Building A 13, 2nd Floor, Platz der Deutschen Einheit 2, 35390 Gießen, room no. 2. 01 - 2. 09

Registrar's office JLU: Goethestraße 58, 35390 Gießen

Core module

MK 93 - Bioprocess Engineering I

Type of Module	Core
Semester / CP	Summer semester / 6 CP
Faculty / chair / department	Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie
Module coordinator	Bioverfahrenstechnik, Membrantechnologie und Zellkulturtechnik
Prerequisites for participation	none
Learning Outcomes:	**Lecture/Exercises:** The students show competences in: • basics concerning prokaryotic and eukaryotic cells and enzymes in biotechnological processes • essential mathematical model concepts to gather cell growth and metabolism • special aspects of fermentation processes and bioreactors • basics of essential unit operations of downstream processes • basic possibilities of process design, characterization, description, and monitoring in up- and downstream of biotechnological production processes **Lab work:** The students learn: • the handling of bioreactors and their tools within the concept and application of cellular/ microbial cultivations • application of essential bioanalytical methods for cell growth and metabolism analysis • concepts of downstream operations
Module content	**Lecture/Exercises:** • Industrial application of microbial and cell cultures, enzymes • Process kinetics • Batch-, Fed-batch and continuous processes, models and kinetics • Heat and mass transfer including the combination with biological reactions • Bioreactors and their choice • Sterilisation: technologies, construction, hygienic design • Methods of cell separation and product purification (lysis, sedimentation, centrifugation, filtration, chromatography, extraction) Lab work: • Bioreactor cultivation including process monitoring • Exemplary downstream processing with various tools • Presentation and discussion of results within the seminar
Forms of instruction	Lecture

Form(s) of assessment	written examination
Exam Registration	via Flexnow
Components of final grade	Written examination (100%)
Language	English
Additional Information	Form of module retake examination: written examination
Time and Place	See Moodle

Profile modules

THM 01 - Pharmaceutical Basics

Type of Module	Profile
Semester / CP	Wintersemester / 6 CP
Faculty / chair / department	…
Module coordinator	…
Intake capacity	16
Prerequisites for participation	none
Learning outcomes	The students • have a basic knowledge in different dosage forms (solid, liquid, semi-solid) • can name properties, characterization and testing of dosage forms • can describe the requirements for medicinal product test according to Pharmacopeia • have an overview of rules and guidelines in the pharmaceutical industry • can name excipients and packing materials • apply to Pharmacopeia und pharmaceutical terms • can interpret laws, Rich lines and standards • designate the fundamentals of quality management
Module content	• Fundamentals of drug morphology • Pharmacopeia and other standard work • Drug forms by Pharmacopeia • Excipients and active ingredients • Preparations of medical forms • Testing of the pharmaceutical quality • Fundamentals of quality management • Legal framework: DIN ISO, GMP-guideline • Cycle of quality control • Quality assurance program • Lab: making and testing of several dosage forms
Forms of instruction	Lecture, Seminar, Practical training
Form(s) of assessment	Written examination, Assignments
Exam Registration	Flexnow or Application for the Approval of Modules
Components of final grade	Written examination (100%)
Language	English
Additional Information	Form of retake examination: Written examination

	Time and place: see Moodle

THM 02 - Quality Management

Type of Module	Profile
Semester / CP	Summer semester / 6 CP
Faculty / chair / department	Internationale Wirtschaftsbeziehungen (VWL III) / International economic relations
Module coordinator	Biopharmazeutische Technologie und Biopharmazie
Intake capactiy	30
Prerequisites for participation	none
Learning outcomes	The students • can safely deal with the concepts and definitions of quality management • understand the meaning and importance of quality management • can perform and analyze risk assessments • know how to identify critical process steps • can accompany qualifications and validations in companies • can develop steps for risk reduction
Module content	Module Content: • Basic concepts for risk and quality management • Quality management systems (DIN ISO) • Strategies for handling and managing risks in manufacturing companies • Risk assessment by FMEA, HACCP, Kepner-Tregoe, FTA • Quality-related strategies (TQM, EFQM, TPM, KVP) • Further qualification and validation phases • Internal / external quality audits • certification
Forms of instruction	Seminar, Excercises
Form(s) of assessment	Written examination
Exam Registration	Flexnow
Components of final grade	Written examination (100%)
Language	English
Additional Information	Form of module retake examination: Written examination
Time and Place	See Moodle

THM 03 - Bioprocess Engineering II –Advanced

Type of Module	Profile
Semester / CP	Wintersemester / 6 CP
Faculty / chair / department	Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie
Module coordinator	Bioverfahrenstechnik, Membrantechnologie und Zellkulturtechnik
Intake capactiy	12
Prerequisites for participation	none
Learning outcomes	The students • 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 • 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 • know how to analyze, characterize and optimize developed processes, also in combination with mathematical operations • know how to transfer, verify and optimize designed process steps into experiments and integrate them into the overall process
Module content	• Bioprocesses for the production of recombinant products with different expression systems • Advanced process analysis of bioreactor systems including system balances • Process description – kinetics, mass- and heat transfer • Downstream processing- advanced tools, concepts, choice, requirements • 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 • Conceptual development of downstream processing for a certain topic • Transfer of the specific topics of up- and downstream processing based on the seminar into lab experiments • Presentation and discussion of the results within the seminar
Forms of instruction	Lecture, seminar, practical training
Form(s) of assessment	Written examination
Exam Registration	Flexnow
Components of final grade	Written examination
Language	English

Additional Information	Form of module retake examination: Written examination

THM 04 - Selected Chapters of Pharmaceutical & Industrial Biotechnology

Type of Module	Core
Semester / CP	Summer semester / 6 CP
Faculty / chair / department	Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie
Module coordinator	Bioverfahrenstechnik, Membrantechnologie und Zellkulturtechnik
Intake capactiy	15
Prerequisites for participation	none
Learning Outcomes	The students • have an overview of currently discussed relevant topics in science and industry in the field of biotechnology • 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
Module content	• currently important topics in pharmaceutical and industrial biotechnology • literature research and presentation of currently relevant topics in pharmaceutical and industrial biotechnology based on publications
Forms of instruction	Lecture, seminar
Form(s) of assessment	Written examination (100%)
Exam Registration	via Flexnow
Components of final grade	Written examination
Language	English
Additional Information	Form of module retake examination: Written examination