

Technische Universität Dresden  
Faculty of Biology

**Study Regulations  
for the Bachelor's degree program in Molecular Biology and Biotechnology  
from winter semester 2023/2024**

Consolidated version of the [Official Announcement](#) of August 7, 2018, the [First Amending Statute of the Study Regulations](#) of March 23, 2021, and according to § 6 para. 6 of the Study Regulations the resolution of the Faculty Board of May 13, 2020, May 5, 2021, July 6, 2022, November 2, 2022 and April 5, 2023.

This is valid for all students enrolled in the Bachelor's degree program in Molecular Biology and Biotechnology.

Please note that the English translation is provided for information purposes only. The English text is not legally binding. Only the original German document has legal validity. The official language at TU Dresden is German. German jurisdiction applies.

## **Study Regulations for the Bachelor's degree program in Molecular Biology and Biotechnology**

as of August 7, 2018  
(translated version)

On the basis of § 36 para. 1 of the Act on the Autonomy of Institutions of Higher Education in the Free State of Saxony in the version published on January 15, 2013 (SächsGVBl. p. 3), Technische Universität Dresden issues the following Study Regulations as statutes.

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## **§ 1**

### **Scope of application**

On the basis of the Act on the Autonomy of Institutions of Higher Education in the Free State of Saxony and the examination regulations, these Study Regulations stipulate the objectives, content, structure and organization of the Bachelor's degree program in Molecular Biology and Biotechnology at Technische Universität Dresden.

## **§ 2**

### **Objectives of the degree program**

(1) The students will have basic specialist knowledge and essential interdisciplinary expertise as well as basic practical skills and abilities in accordance with the recommendations specified in the "Subject-specific criteria for bioscience degree programs" (*Fachkanon Biologie*) of the Conference of Biology Departments (KBF) and the recommendations on undergraduate training in biotechnology of the expert network for Engineering and Biotechnology (DECHEMA). They will understand the technical interrelationships of molecular biology and biotechnology and will be able to integrate knowledge from different subject areas into a superordinate overall context. They will have deepened their knowledge, skills and abilities in selected fields of the subject area. Students will also be able to acquire knowledge independently through research and experimentation, critically evaluate and question their own and others' results and findings against the background of comparable work, present them in a scientifically correct way and discuss them in a differentiated manner. Students will be able to identify scientific issues, independently explore new biological topics and plan and carry out basic experiments. They will master strategies to continuously expand their specialist and interdisciplinary skills, to continue their education in a targeted manner and to keep up to date with the latest knowledge in selected areas. They will be able to apply their knowledge and understanding as well as their skills to solve problems in new and unfamiliar situations, communicate scientific information appropriately with both experts and non-experts, and to work in a team. They will acknowledge the importance of accurate documentation and presentation of results and will be committed to good scientific practice. They will be familiar with the laws and regulations relevant to their specialist field. They will be able to professionally assess the risks posed by the handling of the materials frequently used in biology, will be sensitized to the ethical issues arising from modern biological methods and will be able to critically reflect on issues relevant to society. Students will be empowered to act responsibly.

(2) Graduates will be qualified to continue their academic scientific careers in the fields of biology and biotechnology as a result of the specialist, methodological, personal and social skills they have acquired, as well as through their practical abilities and skills. Following an initial training period, they will also be able to master and advance a wide range of tasks in the fields of molecular biology and biotechnology in their professional practice.

## **§ 3**

### **Admission requirements**

To be admitted to the degree program, applicants must have a general university entrance qualification, a subject-specific university entrance qualification in the relevant discipline, or a university entrance qualification that the university has recognized as equivalent.

#### **§ 4**

### **Start and duration of the degree program**

(1) The program can be started each winter semester.

(2) The standard period of study is six semesters and includes on-site attendance, self-study and the Bachelor's examination.

#### **§ 5**

### **Teaching and learning methods**

(1) The curriculum is structured in modules. In the individual modules, the course content is taught, consolidated and deepened through lectures, seminars, exercises, practical training, tutorials, student working groups, projects, research colloquia, field trips, language courses, and self-study.

(2) The teaching and learning formats according to para. 2 are defined as follows:

1. Lectures introduce the subject areas of the modules, address the central themes and structures of the subject area in a coherent presentation, and provide an overview of the current state of research.
2. Seminars allow for the application of the subject matter in exemplary sub-areas as well as the development of methodical, analytical and communicative competences. Students are enabled to familiarize themselves under supervision in a selected area of interest on the basis of specialist literature or other material, to report on the results of their work, to discuss them within the group and / or to present them in writing.
3. Exercises serve to apply the subject matter in exemplary sub-areas.
4. Practical training serve the application of the subject matter taught and the acquisition of further practical skills, they support the combination of theory and practice, and explore specialist topics while considering interdisciplinary research questions.
5. Tutorials are courses designed to provide support for students. In tutorials, students reflect on issues, approaches to solutions, and results of their self-study with a student tutor and receive individual feedback.
6. Student working groups are courses designed for students to introduce and immerse themselves in the methods of scientific work. They encourage holistic and independent learning in a team and foster creativity.
7. Projects support the combination of theory and practice and explore particular topics while including interdisciplinary issues of the professional field. Projects allow students to apply and deepen their methodological and social skills in particular.
8. Research colloquia serve as a forum for lecturers and students to exchange ideas about project work, study results and other research work.
9. Field trips are guided by scientists and take students to places of learning outside the university, enabling them to thoroughly explore relevant subject-specific issues in nature and society.
10. Language courses convey and hone knowledge, skills and abilities in a foreign language. They foster the development of communication and intercultural competences in academic and professional contexts, as well as in everyday situations.
11. Through self-study, students independently consolidate and deepen their knowledge of the course content.

## § 6

### Structure and organization of the degree program

(1) The program is organized in modules. The curriculum is divided into six semesters. The fifth semester is particularly suitable for a temporary stay at another university (mobility window).

(2) The degree program comprises 20 compulsory modules and five elective compulsory modules, which allows students to choose their specialization. The selection is binding. Students must register for elective compulsory modules. The form and deadline for registering will be announced at the beginning of the semester by the Faculty in the usual manner. Modules can be re-selected only once in total; the student must submit a written request to the Examination Office stating the module to be replaced and the newly selected module.

(3) Qualification objectives, content, teaching and learning methods included, requirements, applicability, frequency, workload, and duration of the individual modules are all listed in the module descriptions (Annex 1).

(4) The courses are held in German or, if indicated by the module descriptions, in English. If a module involves the acquisition of foreign language qualifications, courses may also be held in the respective language in accordance with the content and qualification objectives.

(5) The appropriate allocation of the modules to the individual semesters, the observance of which makes it possible to complete the program within the standard period of study, as well as the type and scope of the respective courses included, and the number and standard time of the required study achievements and examined assessments are defined in the study schedule attached (Annex 2).

(6) Upon proposal of the Academic Affairs Committee, the Faculty Board may change the range of elective compulsory modules as well as the study schedule. The current selection of elective compulsory modules available will be announced at the beginning of the semester by the Faculty in the usual manner. The amended study schedule will apply to all students who have been informed about this by the Faculty at the beginning of their studies. The Examination Committee shall decide, upon application by the student, on any exceptions to sentence 3.

(7) If participation in a course of an elective compulsory module is limited by the number of available places in accordance with the module description, the selection of participants shall be made by drawing lots on the basis of the priority they have indicated in advance. The form and deadline for indicating their priority as well as the result of the selection will be announced to the students in good time by the Faculty in the usual manner. If there are fewer than the minimum number of participants for a course (if specified in the relevant module description), the module will not be held.

## § 7

### Content of the degree program

The course content covers the subject areas and topics in accordance with the recommendations of the "Subject-specific criteria for bioscience degree programs" (*Fachkanon Biologie*) of the Conference of Biology Departments (KBF) and the recommendations on undergraduate training in biotechnology of the expert network for Engineering and Biotechnology (DECHEMA). The focus is on molecular aspects of the subject areas and topics. This includes scientific fundamentals of chemistry, mathematics and physics that are relevant to biology and biotechnology as well as fundamentals of molecular, cell and organismic biology and evolution. It also comprises methods of

science, bioscience and biotechnology, including statistics, and their explorative and experimental application in the laboratory and in practice. Moreover, the degree program covers basic aspects of biosafety and the environment, laws and regulations relevant to biology and biotechnology as well as the guidelines of good scientific practice.

## **§ 8 Credit points**

(1) ECTS credit points document the average workload of the students and their individual study progress. One credit point corresponds to a 30-hour workload. Normally, 60 credit points are awarded per academic year, i.e. 30 credit points per semester. The total workload for the program corresponds to 180 credit points and comprises the teaching and learning methods according to type and scope stipulated in the module descriptions, the study achievements and examined assessments, the Bachelor's thesis and the colloquium.

(2) The module descriptions indicate the number of credit points that can be earned by each module. Credit points are awarded upon passing the module examination. § 27 of the examination regulations shall remain unaffected.

## **§ 9 Academic advisory and counseling service**

(1) General advice will be provided by the Central Student Information and Counseling Service at TU Dresden. It covers questions regarding study options, enrollment modalities and general student affairs. Subject-specific advice during studies will be provided by the Academic Advisory Service of the Faculty of Biology. This subject-specific advisory service assists students with regard to the design of their studies.

(2) At the beginning of the third semester, each student who has not yet provided proof of academic performance must make use of the subject-specific advisory services.

## **§ 10 Amendments to module descriptions**

(1) In order to amend to changed conditions, module descriptions may be changed in a simplified procedure in order to optimize study organization, with the exemption of the fields "Module name," "Qualification objectives", "Content", "Teaching and learning methods", "Requirements for earning credit points", and "Credit points and grades".

(2) In a simplified procedure, the Faculty Board will adopt the amendments to the module descriptions upon proposal of the Academic Affairs Committee. The amendments must be published by the Faculty in the usual manner.

**Annex 1:  
Module descriptions**

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P01	Introduction to Applied Molecular Biology and Biotechnology	Prof. Marion Ansorge-Schumacher (marion.ansorge@tu-dresden.de)
<b>Qualification objectives</b>	Students will have gained an insight into the central topics, fields of work and applications of biotechnology and are familiar with key technical terms. They grasp molecular biology as the central foundation of modern biotechnology and can describe the overall interdisciplinary context. They will have an overview of the disciplinary breadth of applied molecular biology and biotechnology. Students will have initial experience with researching, preparing, and presenting facts, as well as critically discussing socially relevant issues. They will have strengthened their communication skills through teamwork.	
<b>Content</b>	The module includes the definition of the field of biotechnology, the categorization based on fields of application, organisms and methods as well as the location in the interdisciplinary context of molecular biology, biological and non-biological fundamental subjects. Further topics are essential methodological molecular and organism-related concepts of biotechnology as well as exemplary classical and modern applications from the fields of application of agricultural biotechnology, food biotechnology, industrial and aquatic biotechnology, environmental biotechnology, medical, forensic and analytical biotechnology. This also includes the professional, ethical and social aspects of the selected topics. Furthermore, the categorization of activities within applied molecular biology and biotechnology and their assignment to the required academic qualification level is included.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), seminar (1 hour per week), tutorial (1 hour per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) biology knowledge. The textbook "LINDER Biologie" by H. Bayrhuber, W. Hauber, U. Kull (eds.) (Schroedel Verlag) is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Practical Insight to Biotechnology as well as Law and Orders in Biological and Biotechnological Working Fields.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	

<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.



<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P02	Basic Cell Biology and Molecular Genetics	Prof. Christian Dahmann (christian.dahmann@tu-dresden.de)
<b>Qualification objectives</b>	Students will have basic knowledge of cellular biology and molecular genetics and know key technical terms. They grasp the central importance of the specialist content as the foundation of modern biology and biotechnology.	
<b>Content</b>	The module includes key concepts in cell biology and molecular genetics. This includes the structure of the eukaryotic cell, construction and function of cell membrane and organelles, structure and function of the cytoskeleton, protein modifications, cell division and formation of cell assemblies, construction, replication, mutagenesis and repair of the genome, expression of genomic information in cells and its control, and the genetic basis of the development of organisms. Furthermore, microscopy and other key cell biological methods are taught.	
<b>Teaching and learning methods</b>	The module comprises lecture (3 hours per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) biology knowledge. The textbook "LINDER Biologie" by H. Bayrhuber, W. Hauber, U. Kull (eds.) (Schroedel Verlag) is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Basic Gene Technology, Law and Orders in Biological and Biotechnological Working Fields, Developmental Biology, Bioinformatics, Genetically Engineered Machines - Synthetic Biology (iGEM competition), Biopolymers, Biomaterials and Biominerals, Microbial Genetics, Applied Cell Biology, Basic Regeneration Biology, Basic Neurobiology as well as Basic Principles in Drug Discovery.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P03	Basic Inorganic Chemistry	Prof. Jan J. Weigand (jan.weigand@tu-dresden.de)
<b>Qualification objectives</b>	Students will have an insight into the central topics, fields of work and applications of chemistry and know key terms. They will have an overview of the disciplinary breadth of general and inorganic chemistry. Students are familiar with laboratory equipment and basic experimental work techniques. They can apply their theoretical knowledge when conducting experiments. They will have strengthened their communication skills through teamwork.	
<b>Content</b>	The module includes the definition of the field of chemistry as well as general basic knowledge in general and inorganic chemistry on atomic structure, periodic table, chemical bonding, structure-property relationships of substances, chemical calculation, chemical equilibria, kinetics and catalysis, fundamentals of chemical reactions, reactions of selected elements and their compounds. It also includes insight into the relationships between chemistry and the environment.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), tutorial (1 hour per week), practical training (2 hours per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) chemistry knowledge. The textbook "Klett Abiturwissen Chemie: für Oberstufe und Abitur" is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Basic Biochemistry as well as Basic Molecular Bioanalytics.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a practical course report, which must both be graded with at least "pass" (4.0).	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P04	Basic Organic Chemistry	Prof. Xinliang Feng (xinliang.feng@tu-dresden.de)
<b>Qualification objectives</b>	The students will have an insight into the central topics, working and application fields of organic chemistry and know key terms. They will have an overview of the disciplinary breadth of organic chemistry. Students are familiar with laboratory equipment and basic experimental work techniques. They can apply their theoretical knowledge when conducting experiments. They will have strengthened their communication skills through teamwork.	
<b>Content</b>	The module includes general principles of organic chemistry, reaction types, reaction mechanisms, isomerism, basic knowledge of substance classes of alkanes, alkenes, alkynes, aromatics, compounds with simple functional groups: Alcohols, phenols, ethers, amines, amino acids, carbonyl compounds such as aldehydes, ketones, carboxylic acids, and fundamentals of carbohydrates.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), tutorial (1 hour per week), practical training (2 hours per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) chemistry knowledge. The textbook "Klett Abiturwissen Chemie: für Oberstufe und Abitur" is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Basic Biochemistry as well as Basic Molecular Bioanalytics.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a practical course report, which must both be graded with at least "pass" (4.0).	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P05	Basic Physics	Prof. Sebastian Reineke (sebastian.reineke@tu-dresden.de)
<b>Qualification objectives</b>	Students will master basic physics concepts and their applications. Furthermore, they have knowledge of selected physical phenomena and of the basics of measurement and observation instruments as well as data evaluation.	
<b>Content</b>	The module includes theory and practice on fundamentals of experimental physics, which include the following topics: Mechanics, oscillations and waves, thermodynamics, electricity, and optics. Also an outlook into the subject area of 'Structure of Matter' is taught. Contents also include selected experimental setups, the collection of measurement data and their evaluation.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), exercise (1 hour per week), practical training (1 hour per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) physics and mathematics knowledge. The textbooks "Abiturwissen Physik" by T. Reimbold (Klett Lerntraining) and "Abiturwissen Mathematik" by H. Scheid (Klett Lerntraining) are suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Basic Molecular Bioanalytics as well as Biophysics.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an ungraded practical course report.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P06	Basics Mathematics	Director of the Institute of Mathematical Stochastics (i.stochastik@tu-dresden.de)
<b>Qualification objectives</b>	Students will be familiar with basic concepts and methods in mathematical topics that are central to life sciences and will be able to apply them in the context of biology. They are able to use simple mathematical models to describe dynamic processes in the natural sciences.	
<b>Content</b>	The module includes the methodology of mathematical description of relations by sequences and functions (of one and more variables), differential and integral calculus, ordinary differential equations, series, power series, basic concepts of linear algebra and probability theory and practice.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), exercise (1 hour per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) mathematics knowledge. The textbooks "Brückenkurs Mathematik" by M. Ruhrländer (Pearson-Verlag) as well as the bridge course "Mathematik" of TU Dresden (also as ONLINE preparation course mathematics in OPAL), especially the topics elementary basics of set theory, real functions as well as elements of differential and integral calculus, are suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 120 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P07	Basic Biochemistry	Prof. Nils Kröger (nils.kroeger@tu-dresden.de)
<b>Qualification objectives</b>	Students will know key technical terms and core concepts of biochemistry. They will have insight into the biomolecular structure of the cell, the properties and functions of key biomacromolecules, and the molecular process and regulation of basic cellular metabolic pathways. They grasp the physical-chemical fundamentals of how biomolecules and cellular processes work. Students also have basic experience with biochemical work methods and working techniques, grasp the handling of very small samples and the importance of an accurate and reproducible working method. They have learned the proper description of their experiments and the results obtained and can communicate their results to fellow students. They will have strengthened their ability to work efficiently as a team.	
<b>Content</b>	The module covers basic terms and concepts of biochemistry. This includes chemical structures, physical properties, and modes of operation of the major biological macromolecules (proteins, nucleic acids, carbohydrates, lipids), central pathways of carbohydrate, lipid, nucleotide, and amino acid formation and degradation, principles of energy metabolism (fermentation, oxidative phosphorylation), determination of protein structures, and enzyme functioning. In addition, selected methods of biochemistry (detection and characterization of biomolecules, applied bioinformatics) are practically included.	
<b>Teaching and learning methods</b>	The module comprises lecture (4 hours per week), exercise (1 hour per week), practical training (4 hours per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) biology knowledge, and the competencies to be acquired in the modules Basic Inorganic Chemistry as well as Basic Organic Chemistry. The textbooks "Chemistry: Basic Chemistry" by C. E. Mortimer (Thieme Verlag) and "Basic Organic Chemistry" by C. Schmuck (Pearson Studium) are suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Biopolymers, Biomaterials and Biominerals, Microbial Biotechnology as well as Basic Principles in Drug Discovery.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 120 minutes and a portfolio equating to 30 hours.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The written test will be triple weighted and the portfolio will be double weighted.	

<b>Module frequency</b>	The module is offered each summer semester.
<b>Workload</b>	The workload comprises a total of 300 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P08	Basic Molecular Bioanalytics	Prof. Marion Ansorge-Schumacher (marion.ansorge@tu-dresden.de)
<b>Qualification objectives</b>	Students know and understand central principles of instrumental analysis of biologically relevant molecules. They can name suitable techniques for the detection of different molecular groups. They grasp the possibilities and limitations of the various analytical methods and are able to interpret results professionally.	
<b>Content</b>	The module includes theoretical basics of qualitative and quantitative instrumental detection of complex molecules by chromatography (column and ion chromatography), electrophoresis (gel and capillary electrophoresis, isoelectric focusing) and spectroscopy (DAD, VIS, IR, polarimetry, MS, atomic absorption) as well as their basic design and coupling for the determination of key biological metabolites (carbohydrates, nucleosides, amino acids, lipids) and macromolecules (nucleic acids, proteins). The content also includes quality assurance within bioanalytics.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), exercise (1 hour per week) and self-study.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Inorganic Chemistry, Basic Organic Chemistry as well as Basic Physics are assumed. The textbooks "Chemistry: The Basic Knowledge of Chemistry" by C. E. Mortimer (Thieme Verlag), "Chemistry for Biologists" by H. P. Latscha (Springer Verlag) and "Physics: for Scientists and Engineers" by P. A. Tipler and G. Mosca (Spektrum-Verlag) or "A Short Textbook of Physics" by H. A. Stuart and G. Klages (Springer Verlag) are suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Microbial Biotechnology as well as Biophysics.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	



<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P09	Basics Biostatistics	Prof. Stefan Diez (stefan.diez@tu-dresden.de)
<b>Qualification objectives</b>	Students will master the biostatistical principles necessary for molecular biology or biotechnology applications. They will become familiar with the theoretical background of the presented techniques and will be able to apply them in practice. They will be able to apply their knowledge to issues in their subject area and critically analyze the findings of bioscientific analyses from a biostatistical perspective.	
<b>Content</b>	The module includes descriptive statistics, inferential statistics (point and range estimates, statistical hypotheses, basics of statistical tests, examples of important tests), analysis of variance, correlation and regression analysis, modern computationally intensive methods, biostatistical experimental design, and computer-assisted data analysis in theory and practice, with particular attention to issues in applied biology.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), exercise (1 hour per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) mathematics knowledge.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the module Introduction to Scientific Working and Publishing.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P10	Basic Plant Structure and Function	Prof. Christoph Neinhuis (christoph.neinhuis@tu-dresden.de)
<b>Qualification objectives</b>	Students have insight into the relationships between the external shape (morphology) and internal structure (anatomy) of plants and understand how the latter enable and influence key functions. They can recognize and interpret these relationships in a wider variety of species. Students will have strengthened their skills in group work, work organization, research, preparation and presentation of findings and their critical discussion. They will have advanced their communication skills through teamwork.	
<b>Content</b>	The module includes the hierarchical organization of the plant corm from the single cell to the complex individual, the relationships between external and internal structure in a wide range of species, and their relationship to various functions of cells and tissues. In addition to the basic structure of individual tissues and organs, ecologically determined and function-dependent modifications (metamorphoses) as well as the transfer of knowledge gained to other disciplines, e.g. for biomimetic materials, are included. Further contents are preparation techniques and examination methods such as microscopy or mechanical measurements.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), practical training (3 hours per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) biology knowledge. The textbook "LINDER Biologie" by H. Bayrhuber, W. Hauber, U. Kull (eds.) (Schroedel Verlag) is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Basic Animal and Plant Physiology, Basic Evolution and Biodiversity, Biological Diversity and Systematics as well as Aquatic Ecology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P11	Basic Animal Structure and Function	Dr. Alexander Froschauer (alexander.froschauer@tu-dresden.de)
<b>Qualification objectives</b>	Students will know the basics of zoology, systematics and morphology of animals and are able to describe and differentiate systematic units based on characteristics. Students are familiar with the major animal groups and have gained specialized practical experience on selected organisms.	
<b>Content</b>	The module includes fundamentals of zoology and systematics of the animal kingdom as well as life cycles, level of organization, and morphology of animal groups. It includes comparison of the structure and function of organs and organ systems and specialized practice for preparation and microscopy of selected histological specimens. Additional content includes the structure and cross-group comparison of animal tissues using microscopic images of selected histological specimens.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), practical training (3 hours per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) biology knowledge. The textbook "LINDER Biologie" by H. Bayrhuber, W. Hauber, U. Kull (eds.) (Schroedel Verlag) is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Basic Animal and Plant Physiology, Basic Evolution and Biodiversity, Law and Orders in Biological and Biotechnological Working Fields, Biological Diversity and Systematics, Developmental Biology as well as Aquatic Ecology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an ungraded practical course report.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P12	Basics Animal and Plant Physiology	Prof. Jutta Ludwig-Müller (jutta.ludwig-mueller@tu-dresden.de)
<b>Qualification objectives</b>	<p>The students will have an insight into the central topics, work and application fields of animal and plant physiology and are familiar with key technical terms. They have an understanding of the function of tissues, organs, and organ systems, including the fundamentals of energy production, and the regulation and control of these processes. Students will be able to comparatively describe functional processes in tissues and organs and will be able to understand the necessary control and regulatory elements in the context of normal functional states, as well as in the case of disturbances and changed environmental conditions of these systems. They will have an overview of the disciplinary breadth of animal and plant physiology, including the diversity of their metabolic activities, and can describe the interdisciplinary context. Students have specialized practical experience in the field of animal physiology or plant physiology, have critically examined technical, ethical, and social aspects of selected topics, and have strengthened their communication skills in teamwork.</p>	
<b>Content</b>	<p>The module includes the definition of the field of animal and plant physiology and a comparison of the key elements of animal and plant physiology. It includes the chemical and physical factors, and mechanisms necessary for the origin, development, and maintenance of the normal function of organisms and their organ systems. The content of animal physiology is the comparison of the function of animal tissue and organ systems. This includes, but is not limited to, aspects of functional anatomy, the molecular basis of tissue and organ system function, and mechanisms for tuning functional performance among tissues and organ systems. Plant physiology involves energy production and the use of nutrients in metabolism, as well as the signals and genetic requirements that lead to organ development. Further content is the comparison of states in organisms in normal functional states and during pathophysiological changes in animals or environmental stress in plants in connection to practical relevant, e.g. biomedical or stress physiological, questions. The module also includes basic methods of working with experimental models of animal and plant origin. Students complete the practical course in the field of animal physiology or plant physiology.</p>	
<b>Teaching and learning methods</b>	<p>The module comprises lecture (4 hours per week), practical training (4 hours per week) and self-study.</p>	
<b>Prerequisites for participation</b>	<p>The competencies to be acquired in the modules Basic Animal Structure and Function as well as Basic Plant Structure and Function are assumed. The textbooks "Purves Biology" by D. Sadava, G. Orrians, H. C. Heller, D. Hillis, M. R. Berenbaum (Springer Verlag) and "Botany" by U. Lüttke, M. Kluge (Wiley-VCH Verlag) are suitable for preparation.</p>	

<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Law and Orders in Biological and Biotechnological Working Fields, Developmental Biology, Applied Cell Biology as well as Molecular Biology of Natural Compounds.
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an ungraded practical course report.
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.
<b>Module frequency</b>	The module is offered each winter semester.
<b>Workload</b>	The workload comprises a total of 300 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P13	Basic Microbiology	Prof. Thorsten Mascher (thorsten.mascher@tu-dresden.de)
<b>Qualification objectives</b>	Students will have a basic understanding of the topics and fields of work in microbiology and know key technical terms. They will be able to classify microbiology as a central field within modern (molecular) biology as well as the fundamental role that microbes play in global processes. Students will be able to describe the relevance that microorganisms have for humans. They master basic techniques of microbiological work and can critically assess the possibilities and limitations of modern microbiology.	
<b>Content</b>	The module includes the definition of the field of microbiology and the microbial concept, the geological and phylogenetic classification of microorganisms, and the structure and function of the relevant components of a microbial cell. It includes an overview of the diversity of microorganisms (including viruses), their metabolic capabilities, and their influence on global cycles of matter. In addition to the basics of microbial growth, including the concept of bacterial multicellularity as an essential life form of microorganisms, basic concepts of bacterial and phage genetics are contents of the module. Furthermore, the module covers methodological basics for working with microorganisms, such as sterile work, isolation of microorganisms from environmental samples, preparation of pure cultures, staining methods for microscopy and taxonomically relevant physiological analyses.	
<b>Teaching and learning methods</b>	The module comprises lecture (4 hours per week), practical training (4 hours per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) biology knowledge. The textbook "LINDER Biologie" by H. Bayrhuber, W. Hauber, U. Kull (eds.) (Schroedel Verlag) is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Basic Evolution and Biodiversity, Law and Orders in Biological and Biotechnological Working Fields, Biological Diversity and Systematics, Genetically Engineered Machines - Synthetic Biology (iGEM competition), Aquatic Ecology, Microbial Biotechnology, Microbial Genetics as well as Molecular Biology of Natural Compounds.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an ungraded practical course report.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.	

<b>Module frequency</b>	The module is offered each winter semester.
<b>Workload</b>	The workload comprises a total of 300 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P14	Basic Gene Technology	Prof. Christian Dahmann (christian.dahmann@tu-dresden.de)
<b>Qualification objectives</b>	The students will have insight into the central topics, work and application fields of molecular genetic engineering. They will have an overview of the disciplinary breadth of genetic engineering and know key terms. Students will have initial hands-on experience with planning, conducting, evaluating, and presenting genetic engineering experiments. They will have strengthened their communication skills through teamwork.	
<b>Content</b>	The module includes central methods of molecular genetic engineering and their exemplary application in research. This includes gene expression, genome diagnostics, genome engineering, DNA cloning and DNA sequencing.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), exercise (1 hour per week), practical training (2 hours per week) and self-study.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the module Basic Cell Biology and Molecular Genetics are assumed. The textbook "Molecular Genetics" by R. Knippers (Thieme Verlag) is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Law and Orders in Biological and Biotechnological Working Fields, Bioinformatics, Genetic Engineering Machines - Synthetic Biology (iGEM competition) as well as Applied Cell Biology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	



<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P15	Introduction to Scientific Working and Publishing	Dr. Jannette Wober (jannette.wober@tu-dresden.de)
<b>Qualification objectives</b>	Students will have insight into the fundamentals of good scientific practice. They know methods of data and source management and can evaluate experimental results using selected statistical methods and present them in a suitable form. Students will be able to research scientific literature, and plan and document experiments. They are sensitized to recognizing and dealing with scientific misconduct. They strengthened their communication skills through discussion and teamwork.	
<b>Content</b>	The module includes the guidelines of good scientific practice. It includes the individual parts of the cycle of generating new scientific knowledge, such as researching and citing scientific literature, documenting and storing scientific data, evaluating and presenting experimental results in words and images, and rights and obligations arising from authorship. Case studies of scientific misconduct are also included in the module.	
<b>Teaching and learning methods</b>	The module comprises lecture (1 hour per week), seminar (2 hours per week) and self-study.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the module Basic Biostatistics are assumed. The textbook "Biostatistics. An Introduction for Life Scientists" by M. Rudolf & W. Kuhlisch (Pearson Studium) is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology. The module is a prerequisite for participation in the modules Basic Evolution and Biodiversity, Practical Insight to Biotechnology, Practical Insight to Biology, Research Specialization in Biology-Biotechnology as well as Genetically Engineered Machines - Synthetic Biology (iGEM competition).	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination comprises a seminar paper equating to 30 hours.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P16	Basics Evolution and Biodiversity	Prof. Klaus Reinhardt (klaus.reinhardt@tu-dresden.de)
<b>Qualification objectives</b>	Students understand evolution as the basic process of biological functions, characteristics, and diversity and have insight into the central topics, fields of work, and applications of evolutionary biology. They understand the levels of biodiversity, can apply baseline metrics, and know how biodiversity conservation mechanisms work. They know the (eco)systemic and economic impacts of the conservation and loss of biodiversity. Students will be able to identify hypotheses tested in scientific articles and independently design experiments to address biological diversity at the molecular, physiological, and organismic levels. They have experience with critical discussion of socially relevant issues in evolutionary biology and biodiversity and are competent in giving and receiving criticism.	
<b>Content</b>	The module includes the origin of evolutionary thought, the theoretical as well as empirical presentation of microevolutionary mechanisms in prokaryotes and eukaryotes, and basic macroevolutionary processes and patterns. It includes basic hypotheses about the origin of life, major evolutionary steps, and important ecological processes affecting biodiversity at the genetic, population, and community levels. Also included are essential methodological concepts of describing and measuring biodiversity at global, regional, and local scales, as well as historical-geological and momentary-ecological mechanisms of biodiversity conservation. Furthermore, exemplary applications of evolutionary biology as well as general experimental principles and determination methods that allow standardized work are contents of the module.	
<b>Teaching and learning methods</b>	The module comprises lecture (3 hours per week), seminar (1 hour per week), exercise (2 hours per week) and self-study.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) evolution knowledge, and the competencies to be acquired in the modules Basic Animal Structure and Function, Basic Plant Structure and Function, Basic Microbiology as well as Introduction to Scientific Working and Publishing. The textbook "Campbell Biology" by N. A. Campbell et al. (eds.) (Spektrum Verlag) is suitable for preparation.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a project work of 2 weeks.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.	

<b>Module frequency</b>	The module is offered each summer semester.
<b>Workload</b>	The workload comprises a total of 300 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P17	Practical Insight to Biotechnology	Dean of Studies (dekanat.biologie@tu-dresden.de)
<b>Qualification objectives</b>	Students will have insight into practical tasks, processes and frameworks associated with biotechnology activities. They can identify fields of activity with a specialist background in biotechnology and assess requirements. They have honed their ability to take on new tasks, navigate unfamiliar environments, and fit into unfamiliar teams. They have strengthened their communication and self-organization skills.	
<b>Content</b>	The module includes fields of activity, laboratories, operations, activities and processes of biotechnological research and commercial application of biotechnology. It includes exemplary experiments and routine work in a laboratory or company with a subject-related focus on biotechnology of the student's choice.	
<b>Teaching and learning methods</b>	The module comprises field trip (three weeks) and self-study.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Introduction to Applied Molecular Biology and Biotechnology as well as Introduction to Scientific Working and Publishing are assumed.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an ungraded portfolio equating to 10 hours.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module will only be graded as either "pass" or "fail."	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31P18	Practical Insight to Biology	Dean of Studies (dekanat.biologie@tu-dresden.de)
<b>Qualification objectives</b>	Students will have insight into practical tasks, processes, and frameworks associated with biological activities. They can identify fields of activity with a specialist background in biology and assess requirements. They have further honed their ability to take on new tasks, navigate unfamiliar environments, and fit into unfamiliar teams. They have further strengthened their communication and self-organization skills.	
<b>Content</b>	The module includes fields of activity, laboratories and operations as well as activities and processes of biological research and industrial application of biology. It includes exemplary experiments and routine work in a laboratory or operation with subject matter related to biology of the student's choice.	
<b>Teaching and learning methods</b>	The module comprises field trip (three weeks) and self-study.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the module Introduction to Scientific Working and Publishing are assumed.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an ungraded portfolio equating to 10 hours.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module will only be graded as either "pass" or "fail."	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P19	Law and Orders in Biological and Biotechnological Working Fields	Prof. Oliver Zierau (oliver.zierau@tu-dresden.de)
<b>Qualification objectives</b>	The students will have insight into laws and regulations concerning the fields of biology and biotechnology and are familiar with the relevant regulations for activities in the bioscientific field. They will be able to properly assess the hazards posed by handling materials commonly used in biology and biotechnology. Students have studied bioethical issues and are aware of the ethical problems arising from modern biological and biotechnological methods. They can apply their knowledge of the biosciences to ethical and legal issues and use rational evaluation standards for this purpose.	
<b>Content</b>	The module covers bioscience-related regulations, e.g. concerning animal welfare, animal experiments, genetic engineering, radiation protection, nature and environmental protection, biomaterials, hazardous substances and the handling of biomaterials. In addition, the module includes related legal and ethical aspects and professional practice.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), seminar (2 hours per week) and self-study.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Introduction to Applied Molecular Biology and Biotechnology, Basic Cell Biology and Molecular Genetics, Basic Animal Structure and Function, Basic Animal and Plant Physiology, Basic Microbiology as well as Basic Gene Technology are assumed.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32P20	Research Specialization in Biology-Biotechnology	Dean of Studies (dekanat.biologie@tu-dresden.de)
<b>Qualification objectives</b>	Students will have insight into specific research topics in biology and biotechnology. They have deepened their subject-related knowledge and skills in a selected area and are able to grasp scientific issues. They have gained initial practical experience in addressing a scientific question by planning, organizing, conducting and evaluating suitable experiments. They will be able to present and discuss results appropriately, both verbally and in writing.	
<b>Content</b>	The module comprises research topic in applied biology according to the current research activities of the supervising scientific institution chosen by the student. It includes the related theoretical principles as well as specialized practice in experimentation, speaking and writing.	
<b>Teaching and learning methods</b>	The module comprises practical training (9 hours per week), research colloquium (1 hour per week) and self-study.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the module Introduction to Scientific Working and Publishing are assumed.	
<b>Applicability</b>	The module is a compulsory module in the Bachelor's degree program in Molecular Biology and Biotechnology.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an oral presentation equating to 15 hours or a practical course report of the student's choice.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32W01	Biological Diversity and Systematics	Prof. Christoph Neinhuis (christoph.neinhuis@tu-dresden.de)
<b>Qualification objectives</b>	Students will have an in-depth overview of the diversity of plants, animals and microorganisms and can identify them. They have in-depth knowledge of the major groups of organisms and are able to identify their characteristics in the context of genetic and taxonomic diversity and habitats. Students will have specialized practical knowledge in current methods for determining different groups of organisms.	
<b>Content</b>	The module includes the diversity of important groups of organisms using selected examples in theory and practice. In addition to the phylogeny, the module includes the current systematics of the individual groups as well as the identification of selected species on the basis of the characteristic features of the organisms using the methodology commonly used in the respective field.	
<b>Teaching and learning methods</b>	The module comprises lecture (3 hours per week), seminar (1 hour per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 66 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in either German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Plant Structure and Function, Basic Animal Structure and Function as well as Basic Microbiology are assumed.	
<b>Applicability</b>	The module is one of seven elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, one of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an ungraded oral examination lasting 15 minutes and will take place as a group examination.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	



<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32W03	Developmental Biology	Dr. Alexander Froschauer (alexander.froschauer@tu-dresden.de)
<b>Qualification objectives</b>	Students will have in-depth insight into the history and concepts of developmental biology. They are familiar with important model organisms and are able to take a comparative look at developmental genetic processes and cell differentiation. Students will be able to describe mechanisms of cell migration, morphogenesis, and axis formation in various organisms and will be able to contextualize genetic and cell biological detection methods to demonstrate these processes. Students gained specialized practical experience, strengthened their English language skills in science and their communication skills in teamwork. They are able to present their knowledge in English.	
<b>Content</b>	The module includes history and concepts of developmental genetics, model organisms of developmental biology, cell fate and differentiation, pattern formation and morphogenesis. It includes comparison of genetic and cell biological mechanisms of developmental biology (control of gene expression, morphogen gradients, Turing model, signal transduction, stem cells, and plasticity). Furthermore, related professional, ethical and social aspects and professional practice are content of the module.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), seminar (2 hours per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 32 participants in accordance with § 6 para. 7 of the Study Regulations. The courses will be held in English.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Cell Biology and Molecular Genetics, Basic Animal Structure and Function as well as Basic Animal and Plant Physiology are assumed.	
<b>Applicability</b>	The module is one of seven elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, one of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a practical course report. The examination language is English.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32W04	Bioinformatics	Prof. Michael Schröder (michael.schroeder@tu-dresden.de)
<b>Qualification objectives</b>	Students will have knowledge of the basic concepts of bioinformatics and be able to use online resources to answer biological questions. They understand the complexity of the underlying data and analysis methods and can critically evaluate analyses. They are able to code and can make queries to databases.	
<b>Content</b>	The module includes basic concepts of bioinformatics, especially in the area of sequence and structural analysis, in theory and practice, as well as current topics in bioinformatics.	
<b>Teaching and learning methods</b>	The module comprises lecture (4 hours per week), exercise (4 hours per week) and self-study. Participation in the exercise is limited to 30 participants in accordance with § 6 para. 7 of the Study Regulations. The courses will be held in English.	
<b>Prerequisites for participation</b>	Students need to have basic course-level baccalaureate ( <i>Abitur</i> ) mathematics knowledge and the competencies to be acquired in the modules Basic Cell Biology and Molecular Genetics as well as Basic Gene Technology are assumed.	
<b>Applicability</b>	The module is one of seven elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, one of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment. The examination language is English.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32W05	Genetically Engineered Machines - Synthetic Biology (iGEM competition)	Prof. Thorsten Mascher (thorsten.mascher@tu-dresden.de)
<b>Qualification objectives</b>	Students will have basic knowledge of synthetic biology and are familiar with key technical terms and experimental approaches. They grasp the interdisciplinary nature of the subject and its central role in modern biology and biotechnology. They have experience in independent planning and execution of a molecular biology project using genetic methods. Students will have the ability to research, prepare, and present scientific facts. They are able to communicate the concept and importance of synthetic biology to the public and also to lead controversial discussions on the opportunities and risks of this discipline. The students have knowledge of the legal framework of genetic engineering work and can document it. They have initial experience in securing sponsors and acquiring funding to conduct a student research project. Students will have extensive knowledge of how to organize a team and its activities, as well as initial experience in conflict management.	
<b>Content</b>	The module includes key concepts and methodological approaches of synthetic biology. It covers the fundamentals of the engineering approach and its application in modern molecular biology, as well as interdisciplinary interfaces of synthetic biology to biotechnology, chemistry, mathematics and computer science, physics, and engineering. The module also includes the methodological principles for the genetic modification of microorganisms.	
<b>Teaching and learning methods</b>	The module comprises practical training (2 hours per week), research colloquium (2 hours per week), student work group (2 hours per week), project (4 hours per week) and self-study. According to § 6 para. 7 of the Study Regulations, the module has a minimum number of 6 participants. Participation in the practical training and in the project is limited to 12 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Cell Biology and Molecular Genetics, Basic Microbiology, Basic Gene Technology as well as Introduction to Scientific Working and Publishing are assumed.	
<b>Applicability</b>	The module is one of seven elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, one of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination comprises a project work of four weeks.	

<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the project work.
<b>Module frequency</b>	The module is offered each summer semester.
<b>Workload</b>	The workload comprises a total of 300 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32W13	Insects	Prof. Klaus Reinhardt (klaus.reinhardt@tu-dresden.de)
<b>Qualification objectives</b>	Students will be able to distinguish large groups of insects, know essential recording and various preparation methods, and be able to make a specialized collection of insects or insect tissues. Students will have an overview of current concepts in insect systematics and morphology, insect ecology, and scientific and social problems of insect conservation. They know economically important insects such as disease vectors and pollinators and their economic importance on both a local and global scale. Students will have an overview of insect biotechnology and important model organisms, and a practical familiarity with important applications of citizen science in the field of entomology. They will be able to independently plan, conduct and evaluate a research project.	
<b>Content</b>	The module includes insect identification, collection and preparation methods, and current concepts in insect systematics and morphology, insect ecology, and insect conservation. It also includes an overview of economically important insects and their global and local significance, insect biotechnology and important model organisms, and an overview of citizen science applications to entomology.	
<b>Teaching and learning methods</b>	The module comprises lectures (5 hours per week), exercise (3 hours per week), field trip (2 hours per week) and self-study. Participation in the field trip is limited to 18 participants in accordance with § 6 para. 7 of the Study Regulations.	
<b>Prerequisites for participation</b>	There are no specific prerequisites.	
<b>Applicability</b>	The module is one of seven elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, one of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an ungraded oral examination lasting 30 minutes and a project work of two weeks.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32W14	Aquatic Ecology	Prof. Thomas U. Berendonk (thomas.berendonk@tu-dresden.de)
<b>Qualification objectives</b>	Students will have in-depth knowledge of the limnology of standing and flowing waters and have an overview of the diversity of communities in aquatic ecosystems. They will possess skills in basic data collection and sampling techniques in the field as well as exploratory and experimental work techniques in the laboratory. Furthermore, they are capable of basic sample and data analysis and of presenting their results in a scientifically correct manner as well as discussing them with fellow students.	
<b>Content</b>	The module includes basic concepts related to mechanistic and biological relationships in aquatic ecology. It covers the basics of water-specific biological processes, the interrelationships of substance turnover in water bodies and relevant groups of organisms in the aquatic food web, and selected problem areas of water protection. Furthermore, methodical approaches for the analysis of aquatic systems with regard to physico-chemical, ecotoxicological and biological components are content of the module. It also includes insight into the practical application of important methods in molecular ecology and aquatic microbiology. Other content includes research and communication of scientific content.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), seminar (2 hours per week), exercise (4 hours per week) and self-study. According to § 6 para. 7 of the Study Regulations, the module has a minimum number of 5 participants. Participation in the module is limited to 15 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Plant Structure and Function, Basic Animal Structure and Function as well as Basic Microbiology are assumed.	
<b>Applicability</b>	The module is one of seven elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, one of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an oral presentation equating 15 hours.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	

**Module duration**

The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-32W18	Biopolymers, Biomaterials and Biominerals	Prof. Yael Politi (yael.politi@tu-dresden.de)
<b>Qualification objectives</b>	Students will know the most important biopolymers, biomaterials and biominerals. They understand their composition, structure, function and have insights into the cell biology, biochemistry and genetics of their formation. They are familiar with key technical terms and have an insight into current research on individual polymers and minerals.	
<b>Content</b>	The module covers the molecular basis of the biosynthesis of the biopolymers cellulose, collagen, and chitin and the biomaterials based on them, and the biomineral formation of silicate by diatoms, of magnetic iron minerals by magnetotactic bacteria, and of calcium carbonate by calcareous algae and sea urchins. The structure of biomaterials and biominerals, their properties and methods to characterize them as well as the underlying formation processes are part of the module.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), seminar (2 hours per week) and self-study. Participation in the module is limited to 20 participants in accordance with § 6 para. 7 of the Study Regulations. The courses will be held in English.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Biochemistry, Basic Cell Biology and Molecular Genetics as well as basic knowledge of molecular genetics at Bachelor level are prerequisites.	
<b>Applicability</b>	The module is one of seven elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, one of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an oral presentation equating 15 hours and a project work of one week. The examination language is English.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.	
<b>Module frequency</b>	The module is offered each summer semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	



<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W06	Microbial Biotechnology	Prof. Marion Ansorge-Schumacher (marion.ansorge@tu-dresden.de)
<b>Qualification objectives</b>	Students will have basic knowledge of biotechnological reaction engineering and process control using microbial systems and can define key terms. They know important methods of product processing and can assess the economics of a biotechnological process. They grasp the central importance of microbes as the foundation of modern biotechnology. They have knowledge of the safe handling of microorganisms, have practical experience with selected methods and techniques of their application and have deepened their skills in the evaluation, presentation and discussion of experimental results.	
<b>Content</b>	The module includes the history of the use of microbial conversions to the importance of microbes in today's biotechnology. It includes commonly used organisms/groups and their cultivation. Furthermore, it includes the basics of technical design of bioreactors, sterile technology, process control and measurement and control technology in biotechnological processes. In addition, essential techniques of product processing as well as the economics of biotechnological processes are included in the module. Important use cases of microbial biotechnology are exemplified in theory and practice.	
<b>Teaching and learning methods</b>	The module comprises lecture (3 hours per week), exercise (1 hour per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 40 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturers at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Biochemistry, Basic Microbiology as well as Basic Molecular Bioanalytics are assumed.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an ungraded practical course report.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W07	Microbial Genetics	Prof. Thorsten Mascher (thorsten.mascher@tu-dresden.de)
<b>Qualification objectives</b>	Students will have basic knowledge of the genetics of bacteria and yeasts and they know key technical terms. They grasp the central importance of the subject content as the foundation of modern biology and biotechnology. They have first practical experience with genetic methods using the example of selected microorganisms (bacteria or yeasts). Students have experience with research, preparation, and presentation of facts.	
<b>Content</b>	The module includes key concepts in bacterial and yeast genetics. It includes genomic organization, mutation and variation, gene expression, methods of DNA transfer, and genetic modification of bacteria and yeasts. Furthermore, the module includes the cultivation and life cycle of selected bacteria and yeasts, and their application in genetic engineering and as model systems in modern biology.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), seminar (2 hours per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 32 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Cell Biology and Molecular Genetics as well as Basic Microbiology are assumed.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a practical course report.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W08	Applied Cell Biology	Dr. Alexander Froschauer (alexander.froschauer@tu-dresden.de)
<b>Qualification objectives</b>	Students will have in-depth insight into the applications of cell biology. They are familiar with various culture techniques and are able to record cell cultures and processes of cell differentiation in a variety of systems. Students will be able to comparatively describe cellular processes in vivo and in vitro and will be able to evaluate genetic and cell biological methods for detecting these processes in context. Students gained specialized practical experience and strengthened their communication skills in teamwork.	
<b>Content</b>	The module includes comparison of cell biology and the application of cell culture in genetic and molecular analysis (cell culture techniques, cell communication and stem cells) and practical relevance to medicine. It includes related professional, ethical and social aspects and professional practice.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), seminar (2 hours per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 36 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Cell Biology and Molecular Genetics, Basic Animal and Plant Physiology as well as Basic Gene Technology are assumed.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an oral examination lasting 45 minutes and will take place as a group examination.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W09	Molecular Biology of Natural Compounds	Prof. Jutta Ludwig-Müller (jutta.ludwig-mueller@tu-dresden.de)
<b>Qualification objectives</b>	The students will have an insight into the central topics, fields of work and applications of molecular biology of natural products in various organisms, are familiar with key technical terms and can describe the interdisciplinary context. They understand the function and biosynthesis of natural products of different organisms. They are able to detect their effect on other organisms. Students will have gained additional specialized practical experience and will be able to critically evaluate the possibilities and limitations of natural products biology.	
<b>Content</b>	The module includes the definition of the field, classification, function of natural products from different organisms and their effect on other living organisms. It covers occurrence, biosynthesis and analysis of selected natural products, their biotechnological production and function in the producer and in interaction with other organisms. Other content includes the effect of natural products on humans and microorganisms in terms of interaction with cellular components, physiological processes, toxicity, and medical aspects such as resistance. The module also includes experimental methods of natural products research and the use of microbial and plant models.	
<b>Teaching and learning methods</b>	The module comprises lecture (4 hours per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 40 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Animal and Plant Physiology as well as Basic Microbiology are assumed.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an ungraded practical course report.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W11	Basic Regeneration Biology	Prof. Catherina Becker (catherina.becker@tu-dresden.de)
<b>Qualification objectives</b>	Students will have insight into the central topics, work and application fields of modern regenerative biology. They will have an overview of the disciplinary breadth of regenerative biology and know key terms. Students will have initial hands-on experience with planning, conducting, evaluating, and presenting experiments in regenerative biology. They will have strengthened their communication skills through teamwork.	
<b>Content</b>	The module includes central methods of modern regenerative biology and their exemplary application in research. The fundamental definitions and concepts of regenerative biology and their theoretical and practical aspects are included.	
<b>Teaching and learning methods</b>	The module comprises lecture (4 hours per week), exercise (2 hours per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 15 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the module Basic Cell Biology and Molecular Genetics are assumed.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a practical course report.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W12	Biophysics	Prof. Michael Schlierf (michael.schlierf@tu-dresden.de)
<b>Qualification objectives</b>	Students will master the fundamentals necessary for biophysical investigations. They know the most common biophysical methods including their theoretical background and have gained practical experience using selected methods. They are able to apply their knowledge to issues in their field.	
<b>Content</b>	The module includes the basics of biophysical methods such as spectroscopy (CD, Raman, fluorescence), NMR and microscopy (light, fluorescence, force, electrons), as well as selected methods used primarily in biological studies using original papers. Also included are experiments on spectroscopy and microscopy.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), seminar (2 hours per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 15 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competences to be acquired in the modules Basic Physics as well as Basic Molecular Bioanalytics are assumed.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an oral examination lasting 30 minutes and will take place as a group examination.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W15	Basic Neurobiology	Prof. Marius Ader (marius.ader@tu-dresden.de)
<b>Qualification objectives</b>	Students will master the fundamentals and fathom the technical breadth of neuroscience. They will know the key terms and the most common methods used in neuroscience and their theoretical background. Students will have initial experience in the practical application of selected techniques as well as the design, implementation, and analysis of neuroscience experiments.	
<b>Content</b>	The module includes basic concepts as well as methodological approaches to cellular and histological investigations in neurobiology. It covers essential features of neural cells and tissues, particularly with respect to the development, maturation, and function of neurons in the vertebrate central nervous system.	
<b>Teaching and learning methods</b>	The module comprises lecture (4 hours per week), exercise (2 hours per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 15 participants in accordance with § 6 para. 7 of the Study Regulations. The course will be held in German or English, which will be specified by the lecturer at the beginning of each semester and announced by the Faculty.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the module Basic Cell Biology and Molecular Genetics are assumed.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a practical course report.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W16	Basic Principles in Drug Discovery	Dr. Nikolay Ninov (nikolay.ninov@tu-dresden.de)
<b>Qualification objectives</b>	Students will have insights into the basic principles as well as fundamental processes of current drug research and development. They are familiar with methods of drug design and lead optimization, pharmacokinetics and dynamics, high-throughput drug screening using cultured cells and animal models of human disease, as well as important drug target classes and precision medicine, as well as intellectual property principles and clinical trials. Students will have practical experience in the application of selected techniques, such as cell and in vivo based screening, as well as in the design, execution and evaluation of relevant drug discovery experiments.	
<b>Content</b>	The module includes basic concepts of drug discovery and chemical biology as well as methodological approaches for in vitro and in vivo screening. The module also covers the key fundamentals of drug discovery, including pharmacokinetics, toxicology, screening, and intellectual property.	
<b>Teaching and learning methods</b>	The module comprises lecture (4 hours per week), exercise (2 hours per week), practical training (4 hours per week) and self-study. Participation in the practical training is limited to 15 participants in accordance with § 6 para. 7 of the Study Regulations. The courses will be held in English.	
<b>Prerequisites for participation</b>	The competencies to be acquired in the modules Basic Cell Biology and Molecular Genetics as well as Basic Biochemistry are assumed.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and a practical course report.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	



<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31W17	Food Microbiology	Prof. Thorsten Mascher (thorsten.mascher@tu-dresden.de)
<b>Qualification objectives</b>	The students will have basic knowledge of the importance of microorganisms for the production as well as the spoilage of food and know the associated technical key terms. They grasp the central importance of the subject content as the foundation of modern biotechnology and food process technology. They have initial hands-on experience using microorganisms (bacteria or yeasts) to produce selected foods (e.g., yogurt, kefir, sauerkraut, and beer). Students continue to have experience with research, preparation, and presentation of facts.	
<b>Content</b>	The module includes key concepts in food microbiology. It covers the importance of microorganisms as food, to their production as well as in their spoilage, concepts of food poisoning as well as food infection. Furthermore, it includes food hygiene including hygiene regulations, hygiene practices, hygiene plans, the HACCP concept, and microbiological control of food.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), practical training (4 hours per week), seminar (2 hours per week) and self-study. Participation in the practical training is limited to 16 participants in accordance with § 6 para. 7 of the Study Regulations.	
<b>Prerequisites for participation</b>	Basic knowledge of microbiology is assumed. The textbook 'Brock Microbiology' by M.T. Madigan et al. (Pearson, ISBN 978-3-8689-4144-9) is suitable for preparation.	
<b>Applicability</b>	The module is one of nine elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an oral examination lasting 15 minutes as an individual examination and an ungraded practical course report.	
<b>Credit points and grades</b>	Participants can earn ten credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments pursuant to § 12 para. 1 sentence 5 of the Examination Regulations.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 300 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30Q01	Studium Generale	Dr. Helmut Gebauer (helmut.gebauer@tu-dresden.de)
<b>Qualification objectives</b>	Students will be enabled to deal reflexively with their own field of study and cross-disciplinary interdisciplinary topics. They will have knowledge of methods from other disciplines and will be able to use these methods in the context of their own subject. This enables them to analyze and evaluate complex problems, weigh up options for action and assess consequences.	
<b>Content</b>	The module includes non-disciplinary or interdisciplinary methods and content of the students' choice, such as globalization, internationalization, diversity management, digitalization or drama.	
<b>Teaching and learning methods</b>	The module comprises lecture, seminar, exercise, practical training with the scope of 4 hours per week as well as self-study. The courses are to be chosen from the catalog Studium generale of the Bachelor's program Molecular Biology and Biotechnology of the Faculty of Biology to the extent indicated; this catalog, including the respective required examination, will be announced at the beginning of the semester by the Faculty.	
<b>Prerequisites for participation</b>	There are no specific prerequisites.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an ungraded examined assessment specified in the Studium Generale catalog.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module will only be graded as either "pass" or "fail."	
<b>Module frequency</b>	The module is offered each semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31Q02	Introduction to Business Studies	Prof. Michael Schefczyk (michael.schefczyk@tu-dresden.de)
<b>Qualification objectives</b>	Students will have basic knowledge of the concepts and principles of business administration. They have the methodological tools and the systematic orientation to successfully deal with simple business issues.	
<b>Content</b>	Contents of the module are basic concepts and principles of business administration. Included are, for example, the presentation of the company as a subject of business administration, innovations and property rights, legal forms, project management, production - logistics - quality, market and competition, service management, marketing, controlling, technology management, human resources, organization, corporate culture, financing, company valuation as well as business models.	
<b>Teaching and learning methods</b>	The module comprises lecture (2 hours per week), tutorial (1 hour per week) and self-study.	
<b>Prerequisites for participation</b>	There are no specific prerequisites.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-31Q03	Drawing Biological Objects	Bernd Schulz (bernd.schulz@tu-dresden.de)
<b>Qualification objectives</b>	Students will be able to draw three-dimensional objects in biology. They have sharpened their skills of close observation and developed their skills of accurate reproduction.	
<b>Content</b>	The module includes the drawing of biological objects (e.g. plant parts, insects, humans) with special consideration of perspective, spatiality, light, shadow and visual perception. It includes various drawing techniques (e.g. pencil, pen and ink drawing).	
<b>Teaching and learning methods</b>	The module comprises practical training (4 hours per week), seminar (1 hour per week) and self-study. Participation in the practical training is limited to 12 participants in accordance with § 6 para. 7 of the Study Regulations.	
<b>Prerequisites for participation</b>	There are no specific prerequisites.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of an ungraded practical course report.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module will only be graded as either "pass" or "fail."	
<b>Module frequency</b>	The module is offered each winter semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	
<b>Module duration</b>	The module comprises one semester.	

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP04	Foreign Language A1	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will have elementary language proficiency in a foreign language of choice at level A1 of the Common European Framework of Reference for Languages. Students can grasp slowly and clearly articulated concrete information on familiar topics from everyday life, understand syntactically, semantically, lexically and morphologically simple and short texts with a focus on key words while reading, infer the meanings of unfamiliar concrete terms from context, and express themselves about their environment using simple phrases and respond appropriately to simple questions about them.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• very simple texts and listening texts on everyday situations, especially in a university environment,</li> <li>• elementary oral and written text production and interaction on this topic,</li> <li>• Development of relevant reading and listening strategies,</li> <li>• Development of simple grammatical structures and appropriate vocabulary as well as</li> <li>• automation exercises in different forms of work and with different media.</li> </ul> <p>The languages that can be selected are Arabic, Chinese, Czech, French, German as a foreign language, Italian, Japanese, Polish, Portuguese, Russian, Spanish or Swedish.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses are to be chosen in the specified scope from the catalog of A1 courses offered by the TU Dresden language training; this will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	There are no specific prerequisites.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the module Foreign Language A2.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an oral examination lasting 15 minutes as an individual examination.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The written examination will be double weighted, the oral examination will be single weighted.	

<b>Module frequency</b>	The module is offered each semester.
<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP05	Foreign Language A2	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess basic communicative skills in a foreign language to be chosen at level A2 of the Common European Framework of Reference for Languages. Students can grasp slowly and clearly articulated concrete information on topics related to everyday life, understand syntactically, semantically, lexically and morphologically simple and short texts related to everyday and professional experiences in a reading manner when vocabulary is limited to frequently occurring and internationally understood words, largely follow and respond appropriately to short, simple conversations and very simple presentations when the topic is familiar, describe their environment orally and in writing using simple phrases and sentences.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• simple texts on everyday situations / concrete topics, especially in a university environment,</li> <li>• simple presentations / original documents (e.g. announcements / interviews / short audio and video sequences) on this topic,</li> <li>• development of relevant reading and listening strategies,</li> <li>• development of simple grammatical structures and appropriate vocabulary as well as</li> <li>• automation exercises in different forms of work and with different media.</li> </ul> <p>The languages that can be selected are Arabic, Chinese, Czech, French, German as a foreign language, Italian, Japanese, Polish, Portuguese, Russian, Spanish and Swedish.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be chosen in the specified scope from the catalog of TU Dresden's language training A2 courses; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level A1 of the Common European Framework of Reference for Languages, as acquired in the Foreign Language A1 module, is required.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the modules Foreign Language A2+ - Europe and Mediterranean Region as well as Foreign Language A2+ - East Asia. It also creates the conditions leading to the acquisition of language certificates (UNlcert® level Basic in the following languages: French, Italian, Portuguese, Swedish, Spanish).	

<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an oral examination lasting 15 minutes.
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The written examination will be double weighted, the oral examination will be single weighted.
<b>Module frequency</b>	The module is offered each semester.
<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.



<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP06	Foreign language A2+ - Europe and Mediterranean Region	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess elementary communicative language skills in a foreign language of choice at the A2+ level of the Common European Framework of Reference for Languages. Students can grasp clearly articulated concrete information on topics related to everyday life, understand syntactically, semantically, lexically and morphologically simple texts related to everyday and professional experiences in a reading manner when vocabulary is limited to frequently occurring and internationally understood words, recognize different types of texts, communicate relatively easily in simple, routine situations and use connectors appropriately, describe their environment using simple phrases and sentences orally and in writing, responding to a limited number of simple follow-up questions.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• simple texts and listening texts on everyday situations, especially in a university environment,</li> <li>• elementary oral and written text production and interaction on this topic,</li> <li>• development of relevant reading and listening strategies,</li> <li>• development of grammatical structures and an extended vocabulary as well as</li> <li>• automation exercises in different forms of work and with different media.</li> </ul> <p>The languages that can be selected are Arabic, Czech, French, German as a foreign language, Italian, Polish, Portuguese, Russian, Spanish or Swedish.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be chosen in the specified scope from the catalog of TU Dresden's language training A2+ courses; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level A2 of the Common European Framework of Reference for Languages, as acquired in the Foreign Language A2 module, is required.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the module Foreign Language B1 - Europe and Mediterranean Region. It also creates the conditions leading to the acquisition of language certificates (UNIcert® level Basic in the following languages: Polish, Czech).	

<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an oral examination lasting 15 minutes as an individual examination.
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The written examination will be double weighted, the oral examination will be single weighted.
<b>Module frequency</b>	The module is offered each semester.
<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP07	Foreign language A2+ - East Asia	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess elementary communicative language skills in a foreign language of choice at the A2+ level of the Common European Framework of Reference for Languages. Students can grasp clearly articulated concrete information on topics related to everyday life, understand syntactically, semantically, lexically and morphologically simple texts related to everyday and professional experiences in a reading manner when vocabulary is limited to frequently occurring and internationally understood words, recognize different types of texts, communicate relatively easily in simple, routine situations and use connectors appropriately, describe their environment using simple phrases and sentences orally and in writing, responding to a limited number of simple follow-up questions.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• simple texts and listening texts on everyday situations, especially in a university environment,</li> <li>• elementary oral and written text production and interaction on this topic,</li> <li>• development of relevant reading and listening strategies,</li> <li>• development of grammatical structures and an extended vocabulary as well as</li> <li>• automation exercises in different forms of work and with different media.</li> </ul> <p>The languages that can be selected are Chinese or Japanese.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be chosen in the specified scope from the catalog of TU Dresden's language training A2+ courses; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level A2 of the Common European Framework of Reference for Languages, as acquired in the Foreign Language A2 module, is required.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the module Foreign Language B1 - East Asia. It also creates the conditions leading to the acquisition of language certificates (UNIcert® level Basic in the following languages: Chinese, Japanese).	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 150 minutes and an oral examination lasting 15 minutes.	

<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The written examination will be double weighted, the oral examination will be single weighted.
<b>Module frequency</b>	The module is offered each semester.
<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP08	Foreign language B1 – Europe and Mediterranean Region	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess advanced communicative skills in a foreign language to be chosen at level B1 of the Common European Framework of Reference for Languages. Students can understand the main points of listening texts on topics related to everyday life and university settings when spoken in clearly articulated standard language or a familiar variety, largely understand non-fiction texts on topics related to their own interests and areas of expertise, express themselves orally and in writing in a detailed and coherent way on topics related to their own areas of interest, compose simple official writing, mastering communication techniques such as summarizing, arguing, and taking initiative in conversations.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• texts and listening texts on everyday situations, especially in the university environment,</li> <li>• oral and written text production and interaction on this topic,</li> <li>• development of relevant reading and listening strategies,</li> <li>• development of grammatical structures and expanded vocabulary.</li> </ul> <p>The languages that can be selected are Arabic, French, German as a foreign language, Italian, Russian, Swedish or Spanish.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be chosen in the specified scope from the catalog of TU Dresden's language training B1 courses; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level A2+ of the Common European Framework of Reference for Languages, as acquired in the Foreign Language A2+ – Europe and Mediterranean Region module, is required.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the module Foreign Language B1+ - Europe and Mediterranean Region.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an oral examination lasting 15 minutes as an individual examination.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The written examination will be double weighted and the oral examination will be single weighted.	

<b>Module frequency</b>	The module is offered each semester.
<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP09	Foreign language B1- East Asia	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess advanced communicative skills in a foreign language to be chosen at level B1 of the Common European Framework of Reference for Languages. Students can understand the main points of listening texts on topics related to everyday life and university settings when spoken in clearly articulated standard language or a familiar variety, largely understand non-fiction texts on topics related to their own interests and areas of expertise, express themselves orally and in writing in a detailed and coherent way on topics related to their own areas of interest, compose simple official writing, mastering communication techniques such as summarizing, arguing, and taking initiative in conversations.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• texts and listening texts on everyday situations, especially in the university environment,</li> <li>• oral and written text production and interaction on this topic,</li> <li>• development of relevant reading and listening strategies,</li> <li>• development of grammatical structures and expanded vocabulary.</li> </ul> <p>The languages that can be selected are Chinese or Japanese.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be chosen in the specified scope from the catalog of TU Dresden's language training B1 courses; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level A2+ of the Common European Framework of Reference for Languages, as acquired in the Foreign Language A2+ – East Asia module, is required.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the module Foreign Language B1+ - East Asia.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade corresponds to the grade of the examined assessment.	
<b>Module frequency</b>	The module is offered each semester.	
<b>Workload</b>	The workload comprises a total of 150 hours.	

**Module duration**

The module comprises one semester.



<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP10	Foreign language B1+ - Europe and Mediterranean Region	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess productive and receptive skills in a foreign language of choice at the B1+ level of the Common European Framework of Reference for Languages. Students will have sufficient language skills to complete an internship abroad or to participate in courses at a foreign university in the local language. They can understand the main points of listening texts on topics related to everyday life and university settings when spoken in standard language or a familiar variety; can largely understand non-fiction texts on abstract and concrete topics related to own interests and areas of expertise; can express themselves orally and in writing in a detailed and coherent way on past, present and future topics in their own areas of interest; can compose official written documents.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• texts and listening texts on everyday situations, especially in the university environment,</li> <li>• oral text production as well as interaction on this topic,</li> <li>• writing longer texts on topics in own university environment,</li> <li>• development of grammatical structures and expanded vocabulary.</li> </ul> <p>The languages that can be selected are Arabic, French, German as a foreign language, Italian, Russian, Swedish or Spanish.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be chosen in the specified scope from the catalog of TU Dresden's language training B1+ courses; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level B1 of the Common European Framework of Reference for Languages, as acquired in the module Foreign Language B1 - Europe and Mediterranean Region, are required.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the module Introduction to Professional and Academic Language B2+.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 90 minutes and an oral examination lasting 15 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the weighted average grade of the examined assessments. The written examination will be double weighted and the oral examination will be single weighted.	

<b>Module frequency</b>	The module is offered each semester.
<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP11	Foreign language B1+ - East Asia	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess productive and receptive skills in a foreign language of choice at the B1+ level of the Common European Framework of Reference for Languages. Students will have sufficient language skills to complete an internship abroad or to participate in courses at a foreign university in the local language. They can understand the main points of listening texts on topics related to everyday life and university settings when spoken in standard language or a familiar variety; can largely understand non-fiction texts on abstract and concrete topics related to own interests and areas of expertise; can express themselves orally and in writing in a detailed and coherent way on past, present and future topics in their own areas of interest; can compose official written documents.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• texts and listening texts on everyday situations, especially in the university environment,</li> <li>• oral text production as well as interaction on this topic,</li> <li>• writing longer texts on topics in own university environment,</li> <li>• development of grammatical structures and expanded vocabulary.</li> </ul> <p>The languages that can be selected are Chinese or Japanese.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be chosen in the specified scope from the catalog of TU Dresden's language training B1+ courses; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level B1 of the Common European Framework of Reference for Languages, as acquired in the Foreign Language B1 - East Asia module, is required.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the module Introduction to Professional and Academic Language B2+. It also creates the conditions leading to the acquisition of language certificates (UNIcert® Level I in the following languages: Chinese, Japanese).	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of a written test lasting 60 minutes and an oral examination lasting 15 minutes.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments. The written examination will be double weighted and the oral examination will be single weighted.	

<b>Module frequency</b>	The module is offered each semester.
<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP12	Introduction to Professional and Academic Language B2+	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess the ability to communicate independently in a foreign language of their choice in the fields of their study and work, both in writing and orally, at the B2+ level of the Common European Framework of Reference for Languages. Students will be able to comprehend complex academic and professional written or oral texts to a large extent, express themselves clearly and fluently in detail using complex linguistic structures on selected topics in their field, use a variety of strategies to ensure comprehension. Students will have intercultural skills.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• fundamentals of academic language,</li> <li>• reading and listening strategies,</li> <li>• reception and production of specialist and scientific texts,</li> <li>• fundamentals of business correspondence,</li> <li>• simulation of job-specific communication constellations such as team meetings,</li> <li>• drawing up of presentations and oral presentations with subsequent discussion,</li> <li>• preparation of application documents,</li> <li>• additional media for independent work on and with texts and audio texts.</li> </ul> <p>The languages that can be selected are German as a foreign language or English, French, Russian or Spanish.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be selected in the specified scope from the catalog of Professional and Academic Language B2+ courses on the website of TU Dresden's Teaching Center for Languages and Regional Studies; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level B2 of the Common European Framework of Reference for Languages is required, as acquired in the Foreign Language B1+ module.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen. The module is a prerequisite for participation in the module Advanced Professional and Academic Language C1.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of the examined assessments specified in the course catalog.	
<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.	
<b>Module frequency</b>	The module is offered each semester.	

<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.

<b>Module number</b>	<b>Module name</b>	<b>Responsible lecturer</b>
BIO-MBBT-30SP13	Advanced Professional and Academic Language C1	Ute Meyer (ute.meyer@tu-dresden.de)
<b>Qualification objectives</b>	Students will possess the ability to communicate independently in a foreign language of their choice in the fields of their study and work, both in writing and orally, at the C1 level of the Common European Framework of Reference for Languages. Students will be able to understand complex academic and professional written or spoken texts, express themselves clearly and fluently on topics in their field in detail using complex linguistic structures and a wide range of general and specialized vocabulary, follow and participate in complex interaction in discussions including abstract and complex topics, use language flexibly and effectively including the expression of inauthenticity such as irony, allusions, metaphor, deal effectively with communication and cultural problems.	
<b>Content</b>	<p>Contents of the module in a foreign language of the student's choice are:</p> <ul style="list-style-type: none"> <li>• fundamentals of academic language,</li> <li>• reading and listening strategies,</li> <li>• reception and production of specialist and scientific texts,</li> <li>• fundamentals of business correspondence,</li> <li>• simulation of job-specific communication constellations such as team meetings,</li> <li>• drawing up of presentations and oral presentations with subsequent discussion,</li> <li>• preparation of application documents,</li> <li>• additional media for independent work on and with texts and audio texts.</li> </ul> <p>The languages that can be selected are German as a foreign language or English, French, Russian or Spanish.</p>	
<b>Teaching and learning methods</b>	The module comprises language courses (4 hours per week) and self-study. The courses must be selected in the specified scope from the catalog of Professional and Academic Language C1 courses on the website of TU Dresden's Teaching Center for Languages and Regional Studies; this catalog will be announced at the beginning of the semester.	
<b>Prerequisites for participation</b>	Language proficiency in the chosen language at level B2+ of the Common European Framework of Reference for Languages, as acquired in the Introduction to Professional and Academic Language B2+ module, is required.	
<b>Applicability</b>	The module is one of 13 elective compulsory modules in the Bachelor's degree program in Molecular Biology and Biotechnology, two of which must be chosen.	
<b>Requirements for earning credit points</b>	Credit points are earned after passing the module examination. The module examination consists of the examined assessments specified in the course catalog.	

<b>Credit points and grades</b>	Participants can earn five credit points for this module. The module grade is calculated from the unweighted average grade of the examined assessments.
<b>Module frequency</b>	The module is offered each semester.
<b>Workload</b>	The workload comprises a total of 150 hours.
<b>Module duration</b>	The module comprises one semester.



**Annex 2:**  
**Study schedule**

including type and scope of the courses in hours per week as well as required academic work, the type, scope and design of which can be found in the module descriptions

Module no.	Module name	1 <sup>st</sup> semester	2 <sup>nd</sup> semester	3 <sup>rd</sup> semester	4 <sup>th</sup> semester	5 <sup>th</sup> semester (M)	6 <sup>th</sup> semester	CP
		L/E/S/P/T	L/E/S/P	L/E/S/P/LC	L/E/S/P/T/RC/SW/Pr/F/LC	L/E/S/P/T/RC/LC	L/E/S/P/RC	
<b>Compulsory Field</b>								
BIO-MBBT-31P01	Introduction to Applied Molecular Biology and Biotechnology	2/0/1/0/1 1xEx						5
BIO-MBBT-31P02	Basic Cell Biology and Molecular Genetics	3/0/0/0/0 1xEx						5
BIO-MBBT-31P03	Basic Inorganic Chemistry	2/0/0/2/1 2xEx						5
BIO-MBBT-31P04	Basic Organic Chemistry	2/0/0/2/1 2xEx						5
BIO-MBBT-31P05	Basic Physics	2/1/0/1/0 2xEx						5
BIO-MBBT-31P06	Basic Mathematics	2/1/0/0/0 1xEx						5
BIO-MBBT-32P07	Basic Biochemistry		4/1/0/4 2xEx					10
BIO-MBBT-32P08	Basic Molecular Bioanalytics		2/1/0/0 1xEx					5
BIO-MBBT-32P09	Basic Biostatistics		2/1/0/0 1xEx					5
BIO-MBBT-32P10	Basic Plant Structure and Function		2/0/0/3 1xEx					5

Module no.	Module name	1 <sup>st</sup> semester	2 <sup>nd</sup> semester	3 <sup>rd</sup> semester	4 <sup>th</sup> semester	5 <sup>th</sup> semester (M)	6 <sup>th</sup> semester	CP
		L/E/S/P/T	L/E/S/P	L/E/S/P/LC	L/E/S/P/T/RC/SW/Pr/F/LC	L/E/S/P/T/RC/LC	L/E/S/P/RC	
BIO-MBBT-32P11	Basic Animal Structure and Function		2/0/0/3 2xEx					5
BIO-MBBT-31P12	Basic Animal and Plant Physiology			4/0/0/4/0 2xEx				10
BIO-MBBT-31P13	Basic Microbiology			4/0/0/4/0 2xEx				10
BIO-MBBT-31P14	Basic Gene Technology			2/1/0/2/0 1xEx				5
BIO-MBBT-31P15	Introduction to Scientific Working and Publishing			1/0/2/0/0 1xEx				5
BIO-MBBT-32P16	Basic Evolution and Biodiversity				3/2/1/0/0/0/0/0/0/0 2xEx			10
BIO-MBBT-32P17	Practical Insight to Biotechnology				3 weeks Field Trip 1xEx			5
BIO-MBBT-31P18	Practical Insight to Biology					3 weeks Field Trip 1xEx		5
BIO-MBBT-32P19	Law and Orders in Biological and Biotechnological Working Fields						2/0/2/0/0 1xEx	5
BIO-MBBT-32P20	Research Specialization in Biology-Biotechnology						0/0/0/9/1 1xEx	10
							Bachelor's Thesis	12
							Colloquium	3

Module no.	Module name	1 <sup>st</sup> semester	2 <sup>nd</sup> semester	3 <sup>rd</sup> semester	4 <sup>th</sup> semester	5 <sup>th</sup> semester (M)	6 <sup>th</sup> semester	CP
		L/E/S/P/T	L/E/S/P	L/E/S/P/LC	L/E/S/P/T/RC/SW/Pr/F/LC	L/E/S/P/T/RC/LC	L/E/S/P/RC	
<b>Elective Compulsory Field</b>								
BIO-MBBT-32W01*	Biological Diversity and Systematics				3/0/1/4/0/0/0/0/0 2xEx			10
BIO-MBBT-32W03*	Developmental Biology				2/0/2/4/0/0/0/0/0 1xEx			10
BIO-MBBT-32W04*	Bioinformatics				4/4/0/0/0/0/0/0/0 1xEx			10
BIO-MBBT-32W05*	Genetically Engineered Machines - Synthetic Biology (iGEM competition)				0/0/0/2/0/2/2/4/0/0 1xEx			10
BIO-MBBT-32W13*	Insects				5/3/0/0/0/0/0/0/2/0 2xEx			10
BIO-MBBT-32W14*	Aquatic Ecology				2/4/2/0/0/0/0/0/0/0 1xEx			10
BIO-MBBT-32W18*	Biopolymers, Biomaterials and Biominerals				2/0/2/0/0/0/0/0/0/0 2xEx			10
BIO-MBBT-31W06**	Microbial Biotechnology					3/1/0/4/0/0/0/0 2xEx		10
BIO-MBBT-31W07**	Microbial Genetics					2/0/2/4/0/0/0/0 1xEx		10
BIO-MBBT-31W08**	Applied Cell Biology					2/0/2/4/0/0/0/0 1xEx		10
BIO-MBBT-31W09**	Molecular Biology of Natural Compounds					4/0/0/4/0/0/0/0 2xEx		10
BIO-MBBT-31W11**	Basic Regeneration Biology					4/2/0/4/0/0/0/0 2xEx		10
BIO-MBBT-31W12**	Biophysics					2/0/2/4/0/0/0/0 1xEx		10
BIO-MBBT-31W15**	Basics Neurobiology					4/2/0/4/0/0/0/0 2xEx		10
BIO-MBBT-31W16**	Basic Principles in Drug Discovery					4/2/0/4/0/0/0/0 2xEx		10
BIO-MBBT-31W17**	Food Microbiology					2/0/2/4/0/0/0/0 2xEx		10

Module no.	Module name	1 <sup>st</sup> semester	2 <sup>nd</sup> semester	3 <sup>rd</sup> semester	4 <sup>th</sup> semester	5 <sup>th</sup> semester (M)	6 <sup>th</sup> semester	CP
		L/E/S/P/T	L/E/S/P	L/E/S/P/LC	L/E/S/P/T/RC/SW/Pr/F/LC	L/E/S/P/T/RC/LC	L/E/S/P/RC	
BIO-MBBT-30Q01***	Studium Generale				4 hrs/wk**** 1xEx			5
BIO-MBBT-31Q02***	Introduction to Business Studies					2/0/0/0/1/0/0 1xEx		5
BIO-MBBT-31Q03***	Drawing Biological Objects					0/0/1/4/0/0/0 1xEx		5
BIO-MBBT-30SP04***	Foreign Language A1			0/0/0/0/4 2xEx				5
BIO-MBBT-30SP05***	Foreign Language A2				0/0/0/0/0/0/0/0/4 2xEx			5
BIO-MBBT-30SP06***	Foreign language A2+ - Europe and Mediterranean Region					0/0/0/0/0/0/4 2xEx		5
BIO-MBBT-30SP07***	Foreign language A2+ - East Asia					0/0/0/0/0/0/4 2xEx		5
BIO-MBBT-30SP08***	Foreign language B1 - Europe and Mediterranean Region				0/0/0/0/0/0/0/0/4 2xEx			5
BIO-MBBT-30SP09***	Foreign language B1- East Asia				0/0/0/0/0/0/0/0/4 1xEx			5
BIO-MBBT-30SP10***	Foreign language B1+ - Europe and Mediterranean Region					0/0/0/0/0/0/4 2xEx		5
BIO-MBBT-30SP11***	Foreign language B1+ - East Asia					0/0/0/0/0/0/4 2xEx		5
BIO-MBBT-30SP12***	Introduction to Professional and Academic Language B2+				0/0/0/0/0/0/0/0/4 Ex according to catalog			5
BIO-MBBT-30SP13***	Advanced Professional and Academic Language C1					0/0/0/0/0/0/4 Ex according to catalog		5
<b>CP</b>		30	30	30	30	30	30	180

M	Mobility window pursuant to § 6 para. 1 sentence 3	Pr	Project
CP	Credit points	F	Field Trip
L	Lecture	LC	Language course
E	Exercise	Ex	Examination(s)
S	Seminar	*	alternative (1 out of 7)
P	Practical training	**	alternative (2 out of 9)
T	Tutorial	***	alternative (2 out of 13)
RC	Research colloquium	****	alternatively students can choose: lecture, seminar, exercise, practical training totaling 4 hours per week according to the catalog Studium Generale catalog
SW	Student working group		