Note:

The following curriculum is a consolidated version. It is legally non-binding and for informational purposes only.

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Curriculum for the **Bachelor's Programme Pharmacy** at the Faculty of Chemistry and Pharmacy of the University of Innsbruck

§ 1 Allocation

The Bachelor's Programme Pharmacy is grouped among the studies in the natural sciences according to § 54 Universities Act 2002.

§ 2 Qualification Profile

(1) The goal of the Bachelor's Programme Pharmacy at the University of Innsbruck is to convey fundamental scientific skills and methods in the main fields of pharmacy as well as associated fields. The Bachelor's Programme Pharmacy leads to a first professional university degree which enables to qualified activities in the pharmaceutical industry, at universities, other research institutions or research institutions.

(2) Graduates of the Bachelor's Programme Pharmacy at the University of Innsbruck have the necessary basic skills for a career start in this field, e.g. in analytical or diagnostic laboratories or in the pharmaceutical industry. They possess fundamental theoretic and practical knowledge of the development, production and quality control of pharmaceuticals and medicines, and they have basic knowledge of the methods of neighbouring subject areas, such as physics, biochemistry, biotechnology, microbiology and hygiene.

(3) Graduates of the Bachelor's Programme Pharmacy at the University of Innsbruck have the necessary qualifications for completing a relevant master's programme from the field of pharmacy or an associated natural science subject.

§ 3 Scope and duration

The Bachelor's Programme Pharmacy covers 180 ECTS-Credits with a duration of six semesters. One ECTS-Credit is equivalent to a work-load of 25 hours.

§ 4 Admission

Admission to the study programme is granted by the Rectorate according to the regulations of the Universities Act 2002.

§ 5 Courses and numbers of participants

(1) Courses without continuing performance assessment:

Lectures (VO) are courses held in lecture format. They introduce the research areas, methods and schools of thought for a given subject. No maximum number of participants.

(2) Courses with continuing performance assessment:

1. Introductory seminars (PS) introduce students interactively to scientific literature through the treatment of selected issues. They convey knowledge and methods of academic work. Maximum number of participants: 20
2. Practical courses (UE) focus on the practical treatment of concrete scientific tasks within an area.

   For the following (phyto)chemical practical courses, a maximum number of participants of 10 applies:

   a) Laboratory Course in Organic Chemistry

   b) Fundamentals of Phytochemical Work

   c) Analysis of Drugs and their Active (Pharmaceutical) Ingredients

   d) Quality Control

   For the following technological practical courses, a maximum number of participants of 12 applies:

   Pharmaceutical Technology

   For the following inorganic and microscopic practical courses, a maximum number of participants of 15 applies:

   a) Qualitative Inorganic Analysis

   b) Quantitative Inorganic Analysis

   c) Morphologic and anatomic analyses of medicinal herbs

   For the following practical courses a maximum number of participants of 20 applies:

   Hygiene and Microbiology
3. Seminars (SE) provide in-depth treatment of scientific topics through students' presentations and discussion thereof. No maximum number of participants.
4. Lectures with practical elements (VU) focus on the practical treatment of concrete scientific tasks that are discussed during the lecture parts of the course.

   For the following VU, a maximum number of participants of 10 applies:

   a) Thermomicromethods

   b) Current Aspects of Pharmacognosy

   For the following VU a maximum number of participants of 20 applies:

   a) General Pharmacology & Pharmacokenetics

   b) Information on Drugs

5. Excursions (EX) conducted outside the premises of the university, serve to demonstrate and deepen course contents. Maximum number of participants: 15

§ 6 Allocation of places in courses with a limited number of participants

In courses with a limited number of participants, course places are allocated as follows:

1. Students for whom the study duration would be extended due to the postponement are to be given priority.
2. If the criteria in No 1 do not suffice, first, students for whom this course is part of a compulsory module are to be given priority, and second, students for whom this course is part of an elective module.
3. If the criteria No 1 and No 2 do not suffice, the time of the acquisition of the prerequisites for registration will apply.
4. If the criteria No 1, No 2, and No 3 do not suffice, the grade of the module is to be used, which is directly required for this course.
5. If the criteria mentioned before do not suffice, the available places are drawn by random.

§ 6a Studies Induction and Orientation Period

(1) Within the scope of the Studies Induction and Orientation Period, which takes place in the first semester, the following course examinations must be passed:

1. Lecture Series Pharmacy (CM1, VO2, 5 ECTS-Credits),
2. General Biology and Cell Biology (CM2b, VO3, 6 ECTS-Credits),
3. Introduction to Mathematics and Statistics (CM2c, VO1, 1 ECTS-Credit),
4. General Chemistry for Students of Pharmacy (CM3a, VO4, 8 ECTS-Credits).

(2) Successful passing of all exams of the Studies Induction and Orientation Period entitles to passing all further courses and examinations and to writing the Bachelor's Thesis.

(3) Before successful completion of the Studies Induction and Orientation Period lectures (VO) and lectures with practical elements (VU) amounting to 10 ECTS-Credits may be passed. The registration requirements listed in the curriculum must be met.

§ 7 Compulsory and Elective Modules

(1) The following compulsory modules with a total of 172.5 ECTS-Credits are to be taken:

1.	**Compulsory Module: Core Subjects in Pharmacy**	**h**	**ECTS-Credits**
	VO Lecture Series Pharmacy Presentation of relevant topics and issues in the fields of Pharmaceutical Chemistry, Pharmaceutical Technology, Pharmacology and Toxicology and Pharmacognosy.	2	5
	Total	**2**	**5**
	Learning Outcomes: Students are able to classify the four core subjects of Pharmacy (Pharmaceutical Chemistry, Pharmaceutical Technology, Pharmacology & Toxicology and Pharmacognosy) based on selected topics and are able to describe the contents of each subject.		
	Prerequisites: none		

2.	Compulsory Module: Fundamentals of Natural Sciences I	h	ECTS-Credits
a.	**VO Hygiene and Microbiology** General and special bacteriology, mycology and virology, specific detection methods and fundamentals of hygiene.	2	3
b.	**VO General Biology and Cell Biology** Structure, function and reproduction of the cell and its organelles in different organisms (humans, plants), basic terms of genetics.	3	6
c.	**VO Introduction to Mathematics and Statistics** Application of mathematical operations in pharmaceutical context, design of experiments and test evaluation by means of descriptive statistics (graphics, statistical indicators, correlation and regression calculation), introduction to statistical tests.	1	1
	Total	**6**	**10**
	Learning Outcomes: Students are able to explain the basics of general biology, cellbiology and genetics, including hygiene and microbiology, as well as to apply statistical procedure to assess experimental data.		
	Prerequisites: none		

3.	Compulsory Module: Fundamentals of Natural Sciences II	h	ECTS-Credits
a.	**VO General Chemistry for Students of Pharmacy** Composition of matter, chemical reactions, characteristics of gases, heat of reaction, electron structure of atoms – periodic system of elements, chemical bond, molecule geometry – molecule orbitals, fluids and solids, solutions, speed of reaction, chemical equilibrium, acids, bases, salts in water solutions, entropy and free enthalpy, electrochemistry, nuclear chemistry, elements of the main groups as well as transition metals and their compounds.	4	8
b.	**VO Stoichiometry** Setting up chemical equations, yield calculations of chemical reactions, calculating with various concentration units, Calculations of acid-base-equilibria and puffer systems.	1	2
c.	**VO Physics for Students of Pharmacy** Mechanics of solid bodies, mechanics of liquids and gases, oscillations and waves, electricity, and optics, atomic structure.	2	4
d.	**VU Basics for Laboratory Safety** Rules of conduct for working in chemical laboratories, safety and health protection signage, dangerous works, personal protective equipment, hazardous substances, fire protection, first aid.	1	1
	Total	**8**	**15**
	Learning Outcomes: Students are able to explain the basics of general and inorganic as well as physical chemistry. They are able make reaction equations and carry out stoichiometric calculations. They are familiar with and are able to describe the fundamentals of physics, in particular mechanics, electricity, magnetism and optics. Students understand the rules of conduct for working in chemical laboratories and are able to apply their knowledge of laboratory safety.		
	Prerequisites: none		

4.	Compulsory Module: Biochemistry, Physiology and Pathophysiology	h	ECTS-Credits
a.	**VO Biochemistry** Biochemistry and Pathobiochemistry of humans, molecular elements and processes of life, molecular genetics.	3	6
b.	**VO Physiology and Pathophysiology I** Anatomical, histological and cell biological fundamentals of normal bodily functions as well as pathophysiological processes of human diseases; medical terminology.	2	4
c.	**VU Cell Biology and Genetics** Molecular and cellular basics of specific signal transduction processes; importance of pharmacological weak points in humans and in microorganisms; general genetics and genetic fundamentals of selected human diseases.	1	1.5
d.	**UE Hygiene and Microbiology** Detection of microorganisms, practical hygiene, basics of working in sterile conditions.	1	1
	Total	**7**	**12,5**
	Learning Outcomes: Students understand the fundamentals of physiological, biochemical and cell biological processes as well as their pathophysiological changes with common human diseases. They are familiar with and know how to apply important microbiological laboratory techniques and diagnostic procedures.		
	Prerequisites: successful completion of compulsory module 1-3		

5.	Compulsory Module: Analytical Chemistry	h	ECTS-Credits
a.	**VO Introduction to Quantitative Pharmacopoeia Analysis** Measured values and results, measurement analysis, titration with chemical endpoint determination (acid-base-titrations, precipitation titrations, redox-titrations, complexing titrations), electrochemical procedures (conductometry, potentiometry, coulometry, voltammetry, amperometry, electrophoresis), (electro)gravimetry, radiochemical procedures, thermic analysis methods.	2	4
b.	**UE Qualitative Inorganic Analysis** Qualitative inorganic analysis of inorganic compounds, wet-chemical examinations with specific reactions water solutions (precipitation formation, complex formation, colour reactions, gas evolution etc.) and consideration of the characteristics (solubility, colour etc.) to identify the cation and anion of the sample.	3	3
c.	**UE Quantitative Inorganic Analysis** Analytical basic operations (volume measurement, weighing, precipitation, filtration, digestion, glowing), safety and quality control in the analytical laboratory, gravimetric and titrimetric determinations (neutralization, redox measurement analysis, complexometry), endpoint indication with colour indication and instrumental statistical evaluation of measurement data.	3	3
	Total	**8**	**10**

	Learning Outcomes: Students are familiar with the methods of wet-chemical and electrochemical analysis (conductometry, potentiometry, coulometry, voltammetry, amperometry) of inorganic compounds and are able to apply them in order to examine identity and content. They are able to record and interpret the results correctly.
	Prerequisites: successful completion of compulsory module 1-3

6.	**Compulsory Module: Organic Chemistry I**	**h**	**ECTS-Credits**
	VO Basics of Organic Chemistry Structure and nomenclature of organic compounds, qualitative theoretical consideration to covalent bond in hydrocarbons, conformation, thermochemistry, stereochemistry, substances (alkanes, alkyl halides, alcohols, ether, amines, alkenes, alkynes, allenes & aromatics, aldehydes and ketones, enols and enamines, carbonic acid and carboxylic acid derivatives, di-functional compounds), reactions.	4	7.5
	Total	**4**	**7.5**
	Learning Outcomes: Students understand the fundamentals of organic chemistry, organic substances and their characteristics, synthesis and derivatisation. They are able to explain stereochemistry as well as nomenclature of organic compounds and explain important name reactions and reaction mechanisms.		
	Prerequisites: successful completion of compulsory module 1-3		

7.	**Compulsory Module: Physiology and Pathophysiology**	**h**	**ECTS-Credits**
	VO Physiology and Pathophysiology II Anatomical, histological and cell biological fundamentals of normal bodily functions as well as pathophysiological processes of human diseases; medical terminology.	5	10
	Total	**5**	**10**
	Learning Outcomes: Students understand the fundamentals of physiological, biochemical and cell biological processes as well as their pathophysiological changes with common human diseases.		
	Prerequisites: successful completion of compulsory module 1-3		

8.	**Compulsory Module: Fundamentals of Pharmaceutical Technology**	**h**	**ECTS-Credits**
	VO Pharmaceutical Technology I Pharmaceutical-technological tests of the Pharmacopoeia, industrial and magistral production of pharmaceuticals, construction and validity of prescription, powders, aerosols, granules, tablets, capsules, coated solid dosage forms, solutions, suspensions, emulsions, semi-solid preparations (ointments, gels, creams and pastes).	3	5
	Total	**3**	**5**

	Learning Outcomes: Students have pharmaceutical technology basic knowledge in the field of manufacture, characterization and examination of all relevant dosage forms.
	Prerequisites: successful completion of compulsory module 1-3

9.	**Compulsory Module: Organic Chemistry II**	**h**	**ECTS-Credits**
a.	**VO Introduction to Drug Synthesis** Safety in the preparative laboratory, glass devices and reaction apparatus, characterization of organic compounds, techniques to clean organic compounds (distillation, filtration, recrystallization), extraction with treatment to acid, basic and neutral compounds, dying of solids, solutions and solvents, cleaning of laboratory equipment.	1	2
b.	**UE Drug Synthesis** Synthesis and characterization of organic compounds; esterification, hydrolysis, condensation, nucleophilic substitution, electrophilic substitution, oxidation, reduction.	8	8
	Total	**9**	**10**
	Learning Outcomes: Students are able to apply basic working techniques of preparative organic chemistry, including independent processing of chemical reactions in the laboratory as well as the isolation and cleaning of products received.		
	Prerequisites: successful completion of compulsory module 5 and 6		

10.	**Compulsory Module: Pharmacology I**	**h**	**ECTS-Credits**
a.	**VO Fundamentals of Drug Effects** Effect mechanisms, effects profile and quality of drugs (pharmacodynamics); pharmacokinetic processes, core sizes and models o develop a therapy plan; causes and risks of individual response to drugs of patients, including pharmacogenetics.	2	4
b.	**VU Quantification of Drug Effects, Biopharmaceuticals** Elaboration of pharmacodynamics and pharmacokinetic relevant examples in small groups; production, effects and application of biopharmaceuticals, including approval-relevant aspects.	2	3.5
	Total	**4**	**7.5**
	Learning Outcomes: Students are familiar with the general principles of drug effects and toxins, and they are able to explain their qualitative and quantitative effects *in vivo* and *in vitro*. They are able to describe the development and therapeutic application of biopharmaceuticals.		
	Prerequisites: successful completion of compulsory module 4 and 7		

11.	Compulsory Module: Pharmacognosy I	h	ECTS-Credits
a.	**VO Natural Material – Families and their Biosynthesis** Overview of the most important natural substances (flavonoids, alkaloids, saponins etc.), their structural characteristics and biosynthesis, pharmaceutical relevance of the corresponding classes of compounds and their biological effect mechanisms.	2	4
b.	**VO Fundamentals of Phytochemical Works** Introduction to techniques and methods (DC, titration, GC etc.) for the characterization and content determination of herbal drugs based on the information of the pharmacopeia, conveyance of theoretical fundamentals with practical examples.	2	4
c.	**UE Fundamentals of Phytochemical Technology** Practical use of the techniques conveyed in the lecture, i.e. implementation of purity and content determination, including instrumental procedures (e.g. polarimetry, refractometry, HPLC).	4	4.5
	Total	**8**	**12.5**
	Learning Outcomes: Students are able to describe the most important natural substances and their biosynthesis, to explain phytochemical basics and working techniques as well as to apply them practically. The latter comprises pharmacopoeial methods of pharmacognosis, sampling and sample preparation as well as the application of relevant separation and analysis techniques.		
	Prerequisites: successful completion of compulsory module 9		

12.	Compulsory Module: Analysis of Drugs and Their Active (Pharmaceutical) Ingredients	h	ECTS-Credits
a.	**VO Separation and Analysis of Organic Drugs** The fundamentals of instrumental analysis to detect and quantify drugs are discussed (UV, IR). Another focus is to convey substance knowledge and pharmacopoeial-relevant detection reactions of drugs: elementary analysis, colour reactions to DC-detection; chemical basics for individual evidence of e.g. alkanes, alkenes, alcohols, carbonic acids and derivates, amines and drugs.	2	4
b.	**SE Separation and Analysis of Organic Drugs** Application of the knowledge conveyed in the lecture to characterize and identify drugs, elaboration of drug-analysis-scheme.	1	1
c.	**UE Analysis of Drugs and Their Active (Pharmaceutical) Ingredients** Chromatography, determination of the elementary composition of drugs, laboratory tests to proof functional groups, identification of drugs according to individual and given analysis schemes, identity-purity-test and pharmacopoeial content determination, drug identification and quantification according to extraction from a drug, analysis of drug mixtures.	8	7.5
	Total	**11**	**12.5**
	Learning Outcomes: Students are familiar with the methods of wet-chemical and chromatographic drugs analysis. They are able to describe the chemical characteristics and reactivities or organic compounds or functional groups as well as to carry out appropriate pharmacopoeial examinations autonomously, to separate drug mixtures and identify individual components.		

	Prerequisites: successful completion of compulsory module 9

13.	Compulsory Module: Pharmacology II	h	ECTS-Credits
a.	**VO Drug Therapy of Specific Diseases** Fundamentals, evidence-based medicine, drug therapy of selected human diseases.	1	2
b.	**VO Pharmacological and Clinical-Pharmacological Methods** Pharmacological methods to quantify drug effects *in vitro*, *in vivo* and in clinical studies; pharmacovigilance.	1	2
c.	**VU Pharmaceutical Drug Information** Methods to obtain medical and therapeutic information; specific aspects of drug therapy/drug information with current questions; medical databases (e.g. PubMed); pharmacoeconomics.	1	1
	Total	**3**	**5**
	Learning Outcomes: Students possess pharmacological knowledge regarding the development and approval of drugs and understand the fundamentals of evidence-based medicine and therapy of selected diseases. They are able to collect and evaluate pharmacological and therapeutic characteristics of a drug from published sources. The terms pharmacovigilance and pharmacoeconomics can be explained.		
	Prerequisites: successful completion of compulsory module 10		

14.	Compulsory Module: Medicinal Chemistry I and Biopharmaceutics	h	ECTS-Credits
a.	**VO Medicinal Chemistry I** Chemical and physicochemical characteristics of substances, structure and passage of biological membranes, synthetic accessibility (application of retro-synthesis-concept), instabilities, metabolizations, prodrugs as well as fundamental concepts of drug optimization (bioisostere-concept). Visualization and analysis of different target classes. Interactions between active ingredients and the target.	3	5
b.	**VO Biopharmaceutics** Relations between physical-chemical characteristics of drugs, dosage form and the type of application to speed and extent of drug resorption, control and testing of drug delivery from dosage forms, bioequivalence, biopharmaceutical classification system.	3	5
	Total	**6**	**10**
	Learning Outcomes: Students are able to derive fundamental pharmaceutical characteristics (e.g. chemical reactivity, physico-chemical parameter, membrane passage, interactions with targets, instabilities as well as metabolization) from the structure of drugs. They are able to develop strategies to optimize biological availability by chemical or galenic measures (biopharmacy) with e.g. prodrugs, process material additives, change of supramolecular characteristics or with special formulations.		
	Prerequisites: successful completion of compulsory module 8 and 9		

15.	Compulsory Module: Pharmaceutical Technology	h	ECTS-Credits
a.	**VO Introduction to Pharmaceutical Technology** Theory to develop and production of pharmaceuticals, pharmaceutical-technological unit operations, characteristics, testing and evaluation of elements and excipients needed for the production of pharmaceuticals as well as common substances and packaging, incompatibilities and interactions, production of sterile products and aseptic operations.	2	4
b.	**UE Pharmaceutical Technology** Production according to recipe instructions and pharmacopoeia-compliant testing of dosage forms, calculation of isotony, disinfection, sterile working and rheological examinations. Essential work steps and calculations are demonstrated in small groups and implemented by every individual.	6	6
	Total	**8**	**10**
	Learning Outcomes: Students are familiar with the basic principles of the formulation of pharmaceutical technology and important excipients. They are able to apply pharmaceutical-technological basic knowledge in the production on a larger scale and to assess the characterization and testing of pharmaceutical technology in practice as well as instabilities and incompatibilities.		
	Prerequisites: successful completion of compulsory module 8		

16.	Compulsory Module: Spectroscopy	h	ECTS-Credits
a.	**VO Instrumental Spectroscopical Analytics** Introduction and application of the medicinal-chemical relevant, spectroscopic methods such as fluorescence spectroscopy, IR spectroscopy and NMR spectroscopy (1H and 13C) as well as mass spectroscopy.	2	4
b.	**SE Structure Elucidation of Organic Compounds** Practical application of the knowledge conveyed in the lecture by interpretation of spectres of simple organic compounds.	1	1
	Total	**3**	**5**
	Learning Outcomes: Students know the theoretical and apparitive fundamentals of the most important spectroscopic analysis methods, and they are able to interpret NMR, IR, fluorescence and mass spectres of simple organic compounds.		
	Prerequisites: successful completion of compulsory module 9 and 12		

17.	Compulsory Module: Bachelor's Thesis	h	ECTS-Credits
a.	**SE Literature, Databases and Introduction to Scientific Writing** Structure, content and application of the most important pharmacy-related databases (e.g. Scifinder, Reaxys, Science of Synthesis, Espacenet, DrugBase, Ph.Eur.) as well as diverse online available resources. Development and writing of scientific works and publications, publication types, concrete citation (plagiarism).	2	1.5

b.	**PS Bachelor's Thesis in Pharmacy** Writing of the bachelor's thesis from one of the four core subjects of pharmacy.	3	1 + 5
	Total	**5**	**7.5**
	Learning Outcomes: Students are able to elaborate scientific issues and to apply the necessary methods needed. They are able to summarize and interpret experimental and empirical results based on relevant scientific literature in a written bachelor's thesis.		
	Prerequisites: successful completion of compulsory module 11, 12, 13, 14 and 15		

18.	**Compulsory Module: Medicinal Chemistry II**	**h**	**ECTS-Credits**
	VO Medicinal Chemistry II Within this lecture the molecular basis of pharmaceutical effects is imparted based on structure. Illustrated by selected examples, signal transduction, neurotransmission, impulse conduction and pain, treatment of cardiovascular diseases and inflammation are discussed.	3	5
	Total	**3**	**5**
	Learning Outcomes: Students are familiar with the evaluation of structure-effect-studies, in particular the recognition of pharmacophores, target-effect-interactions and regarding molecular-chemical principles of pharmaceutical effects. They are able to describe the synthesis of drug substances, procedures of substance characterization and (bio)analysis with selected examples.		
	Prerequisites: successful completion of compulsory module 14		

19.	**Compulsory Module: Pharmacognosy II**	**h**	**ECTS-Credits**
a.	**VO Fundamentals of Anatomy, Morphology and Systematics of Medicinal Plants** Fundamentals of botany, including morphological, anatomical and systematic aspects, focusing on higher plants, bacteria and fungi.	2	4
b.	**VO Morphology and Anatomy of Herbal Drugs** Imparting knowledge for the identification and quality definition of medical plants (tea drugs) based on morphological-anatomical examinations, quality criteria according to pharmacopeia (purity, mix-ups, distortions etc.)	1	2
c.	**UE Morphology and Anatomy of Plants and Drugs** Morphological and anatomical characterization of medicating plants, determination of plant species and examination of herbal medicines using macroscopic and microscopic methods.	6	6.5
	Total	**9**	**12.5**
	Learning Outcomes: Students are familiar with the fundamentals of systematics as well as the anatomy and morphology of herbal medicines. They know different microscopic procedures as well as preparation and colouring techniques, and they are able to identify medical drugs with microscopic and macroscopic methods, including powder analysis of single drugs and mixtures.		
	Prerequisites: successful completion of compulsory module 11		

(2) From the following elective modules a total of 5 ECTS-Credits is to be taken:

1.	Elective Module: Medicinal Chemistry	h	ECTS-Credits
a.	**VO Chemical Aspects of Drug Safety** Chemical and spectroscopic procedures to identify the counterfeiting of medicines, insights into the working methods of state-certified controlling bodies.	1	2
b.	**UE Quality Control** Practical application of the techniques imparted to identify ingredients in finished medicinal products from different sources.	2	2
c.	**SE Chemical Aspects of Drug Safety** Presentations to current aspects of topics treated in the lecture or practical course.	1	1
	Total	**4**	**5**
	Learning Outcomes: Students are familiar with analytical methods to identify counterfeiting of medicines and are able to apply these methods with practical case examples and assess relevant risks. They have insights into the working methods of state-certified controlling bodies.		
	Prerequisites: successful completion of compulsory module 16		

2.	Elective Module: Pharmaceutical Technology	h	ECTS-Credits
a.	**VU Thermomicromethods** Application of thermomicroscopic methods in drug analytics and drug development.	2	3
b.	**VO Pre-Formulation in Pharmaceutical Development** Tasks of pre-formulation, analysis and strategies to optimize physicochemical characteristics of pharmaceutical ingredients and excipients regarding their processability as well as an optimum stability and bioavailability of the active ingredients of finished medicinal products.	1	2
	Total	**3**	**5**
	Learning Outcomes: Students are able to apply thermo-microscopic methods; they are familiar with pharmaceutical-relevant crystal and solid body phenomena and have knowledge of the issues in the early stage of pharmaceutical development (pre-formulation).		
	Prerequisites: successful completion of compulsory module 8 and 12		

3.	Elective Module: Pharmacology & Toxicology	h	ECTS-Credits
	VU Selected Topics of Pharmacology, Including Gender Aspects Independent elaboration and critical examination of current therapeutic and/or toxicological issues, including gender-specific aspects of drug effects.	3	5
	Total	**3**	**5**

	Learning Outcomes: Students are able to apply the acquired knowledge in the field of pharmacology and toxicology to current therapeutic and toxicological aspects.
	Prerequisites: successful completion of compulsory module 13

4.	**Elective Module: Pharmacognosy**	**h**	**ECTS-Credits**
a.	**VO History of Pharmacy** Historical development of pharmaceuticals and pharmacy, ethno-pharmacology and medical-pharmaceutical-alchemistic knowledge.	1	1
b.	**VU Current Aspects of Pharmacognosy** Conveyance of current trends in phytochemical and phytopharmaceutical research in the form of practice-related exercises.	1	2
c.	**VO Systematic of Medicinal Plants** In-depth knowledge of the systematics of medicinal plants and their relations, aspects of chemosystematics and molecular systematics.	1	1
d.	**EX Pharmacobotanical Excursion** Practical identification of local (medicinal)plants and their differential characteristics, ecological and phenological aspects, species and biotope protection.	1	1
	Total	**4**	**5**
	Learning Outcomes: Students have in-depth knowledge in the field of pharmacognosy regarding the history of pharmacy, systematics and determination of important medicinal plants as well as current aspects of pharmaceutical biology.		
	Prerequisites: successful completion of compulsory module 11		

(3) From the following elective modules a total of 2.5 ECTS-Credits is to be taken:

1.	**Elective Module: Ethics in the Natural Sciences**	**h**	**ECTS-Credits**
	VU Ethics in Natural Sciences Insights in current ethical issues from the fields of pharmaceutical sciences, guidelines of good working practice in the development and production of pharmaceuticals as well as implementation of clinical studies, responsibility to the nature (e.g. animal testing, nature protection).	1	2.5
	Total	**1**	**2.5**
	Learning Outcomes: Students know ethical aspects from the field of natural sciences, such as good scientific and clinical practice, the implementation of pharmaceutical development and clinical studies, good laboratory practice as well as nature and environmental protection.		
	Prerequisites: successful completion of compulsory module 1-3		

2.	Elective Module: Skills from other Disciplines	h	ECTS-Credits
	Courses with a maximum number of 2.5 ECTS-Credits can be chosen freely from all curricula of bachelor's programmes offered at the University of Innsbruck.	-	2.5
	Total	**-**	**2.5**
	Learning Outcomes: Students acquire additional qualifications, e.g. in foreign languages, IT, management or scientific and ethical reflection.		
	Prerequisites: The prerequisites for registration specified in the relevant curricula do apply.		

§ 8 Bachelor's Thesis

(1) The bachelor's thesis is a scientific piece of work which proves that the students are able to work independently. The bachelor's thesis is to be completed within module 17.

(2) In the Bachelor's Programme Pharmacy, a bachelor's thesis, amounting to 5 ECTS-Credits, is to be completed from the four core subjects of pharmacy (Pharmacognosy, Pharmacology, Medicinal Chemistry, Pharmaceutical Technology). The performance for the bachelor's thesis is to be made additionally to the course in which it is to be completed.

(3) The bachelor's thesis is to be submitted in paper form and in digital version determined by the Director of Studies.

§ 9 Examination Regulations

(1) The performance of the modules is assessed by module examination. Module examinations are examinations which assess the knowledge and skills acquired in a module. With positive evaluation of all parts of a module examination, the corresponding module is completed.

(2) The performance of the courses from the modules is assessed by course examinations. Course examinations are

1. examinations which assess the knowledge and skills acquired in an individual course and which comprise a single examination held at the end of the course.
2. continuous assessment courses (‚immanent examination') where evaluation is based on regular written and/or oral contributions of participants.

(3) The lecturer of the relevant course has to inform the students about the following aspects before the course begins and within the first course unit:

1. learning objectives/results
2. content
3. methods
4. type of examination including the right to apply for an alternative examination method
5. type and scope of performance records
6. award of ECTS-Credits
7. evaluation criteria
8. repetition of examinations
9. status of the course or the module in the curriculum

§ 10 Academic Degree

Graduates of the Bachelor's Programme Pharmacy are awarded the academic degree „Bachelor of Science", abbreviated „BSc".

§ 11 Coming into force

(1) The curriculum is effective as of 1 October 2015.

(2) The modification of the curriculum in the version of the University of Innsbruck Bulletin of 2 June 2016, Issue 36, No. 440 comes into effect on 1 October 2016 and is to be applied to all students commencing the study programme as of the 2016/2017 winter semester.

(3) The modification of the curriculum in the version of the University of Innsbruck Bulletin of 27 June 2017, Issue 46, No. 654 comes into effect on 1 October 2017 and is to be applied to all students.

§ 12 Transitional Provisions

(1) This curriculum applies to all students starting the study programme from the winter semester 2015/16.

(2) Regular students who have commenced the Diploma Programme Pharmacy (curricula published in the University of Innsbruck Bulletin in the version of 26 June 2003, Issue 33, No 309) before 1 October 2015 are entitled from this point in time onwards to complete the first section of this programme within a maximum of three semesters, the second section within a maximum of seven and the third section within a maximum of five semesters.

(3) If a section of the diploma programme is not completed within the specified time according to Para 2 then the curriculum of the Bachelor's Programme Pharmacy will apply. Moreover, students are entitled to change to the Bachelor's Programme Pharmacy at any time on a voluntary basis.

(4) The recognition of exams is set out in appendix of this curriculum.

Anlage 1: Anerkennung von Prüfungen

Die nachstehenden, im Rahmen des Diplomstudiums Pharmazie an der Universität Innsbruck (Studienplan kundgemacht im Mitteilungsblatt vom 26. Juni 2003, 33. Stück, Nr. 309, idgF) positiv beurteilten Prüfungen werden gemäß § 78 Abs. 1 UG für das Bachelorstudium Pharmazie an der Universität Innsbruck als gleichwertig anerkannt wie folgt:

Studienplan für das Diplomstudium Pharmazie in der Fassung des Mitteilungsblattes vom 8. Juni 2011, 26. Stück, Nr. 459		**Curriculum in der Fassung des Mitteilungsblattes vom 02. Juni 2016, 36 Stück, Nr. 440**	
§5(2)	Ringvorlesung Pharmazie (VO 2 / 3 ECTS-AP)	§7(1)1	Ringvorlesung Pharmazie (VO 2 / 5 ECTS-AP)
§5(2)	Hygiene und Mikrobiologie I (VO 2 / 2 ECTS-AP) und	§7(1)2a	Hygiene und Mikrobiologie (VO 2 / 3 ECTS-AP)
§5(2)	Hygiene und Mikrobiologie II (VO 2 / 2,5 ECTS-AP)		
§5(2)	Grundlagen der Biologie für Pharmazeuten (VO 3 / 4 ECTS-AP)	§7(1)2b	Allgemeine Biologie und Zellbiologie (VO 3 / 6 ECTS-AP)
§5(2)	Einführung in stöchiometrisches Rechnen und Biostatistik (VO 2 / 2 ECTS-AP)	§7(1)2c	Einführung in Mathematik und Statistik (VO 1 / 1 ECTS-AP) und
		§7(1)3b	Stöchiometrie (VO 1 / 2 ECTS-AP)
§5(2)	Allgemeine Chemie und anorganische Arzneistoffe (VO 4 /6 ECTS-AP)	§7(1)3a	Allgemeine Chemie für Studierende der Pharmazie (VO 4 / 8 ECTS-AP)
§5(2)	Physik für Pharmazeuten (VO 2 / 3 ECTS-AP)	§7(1)3c	Physik für Studierende der Pharmazie (VO 2 / 4 ECTS-AP)
§5(3)	Biochemie und Molekularbiologie für Pharmazeuten (VO 3 / 4 ECTS-AP)	§7(1)4a	Biochemie (VO 3 / 6 ECTS-AP)
§5(3)	Anatomie, Physiologie und Pathophysiologie (einschl. med. Terminologie) II (VO 3 /4 ECTS-AP)	§7(1)4b	Physiologie und Pathophysiologie I (VO 2 / 4 ECTS-AP) und
		§7(1)4c	Zellbiologie und Genetik (VU 1 / 1,5 ECTS-AP)
§5(2)	Hygiene und Mikrobiologie Übungen I (UE 1 / 0,5 ECTS-AP) und	§7(1)4d	Hygiene und Mikrobiologie (UE 1 / 1 ECTS-AP)
§5(2)	Hygiene und Mikrobiologie Übungen II (UE 1 / 0,5 ECTS-AP)		
§5(2)	Einführung in die pharmazeutische Analytik (VO 3 / 4 ECTS-AP)	§7(1)5a	Einführung in die quantitative Arzneibuchanalytik (VO 2 / 4 ECTS-AP)
§5(2)	Qualitative anorganische Arzneibuchanalytik (UE 5 / 2,5 ECTS-AP)	§7(1)5b	Qualitative anorganische Analytik (UE 3 / 3 ECTS-AP)
§5(2)	Quantitative anorganische Arznei buchanalytik (UE 4 / 2 ECTS-AP)	§7(1)5c	Quantitative anorganische Analytik (UE 3 / 3 ECTS-AP)

§5(2) §5(3)	Grundlagen der Organischen Chemie (VO 4 / 7 ECTS-AP) und Nomenklatur und Stereochemie von Arzneistoffen (VO 1 / 2 ECTS-AP)	§7(1)6	Grundlagen der organischen Chemie (VO 4 / 7,5 ECTS-AP)
§5(2)	Anatomie, Physiologie und Pathophysiologie (einschl. med. Terminologie) I (VO 5 / 6 ECTS-AP)	§7(1)7	Physiologie und Pathophysiologie II (VO 5 / 10 ECTS-AP)
§5(2)	Einführung in die Übungen zur Arzneistoffsynthese (VO 1 / 2 ECTS-AP)	§7(1)9a	Einführung in die Übungen zur Arzneistoffsynthese (VO 1 / 2 ECTS-AP)
§5(3)	Arzneistoffsynthese (UE 12 / 7 ECTS-AP)	§7(1)9b	Übungen zur Arzneistoffsynthese (UE 8 / 8 ECTS-AP)
§5(3)	Allgemeine Pharmakologie & Pharmakokinetik (VU3 / 4 ECTS-AP)	§7(1)10a	Grundlagen von Arzneimittelwirkungen (VO 2 / 4 ECTS-AP) und
		§7(1)10b	Quantifizierung von Arzneimittelwirkungen, Biopharmaka (VU 2 / 3,5 ECTS-AP)
§5(3)	Chemische und biologische Analyse biogener Arzneimittel (VO 2 / 3,5 ECTS-AP)	§7(1)11b	Grundlagen des phytochemischen Arbeitens (VO 2 / 4 ETCS-AP)
§5(3)	Chemische und biologische Analyse biogener Arzneimittel (UE 6 / 2,5 ECTS-AP) und	§7(1)11c	Grundlagen des phytochemischen Arbeitens (UE 4 / 4,5 ETCS-AP)
§5(3)	Qualitätsprüfung und –beurteilung von Arzneidrogen und Phytopharmaka (UE 2 / 1 ECTS-AP)		
§5(3)	Trenn- und Analysenmethoden organischer Arzneistoffe (VO 3 / 5,5 ECTS-AP)	§7(1)12a	Trenn- und Analysenmethoden organischer Arzneistoffe (VO 2 / 4 ETCS-AP)
§5(3)	Arzneistoff- und Arzneimittelanalytik (UE 13 / 6,5 ECTS-AP)	§7(1)12b	Trenn- und Analysenmethoden organischer Arzneistoffe (SE 1 / 1 ECTS-AP) und
		§7(1)12c	Arzneistoff- und Arzneimittelanalytik (UE 8 / 7,5 ETCS-AP) und
		§7(1)16b	Strukturaufklärung organischer Verbindungen (SE 1 / 1 ETCS-AP)
§5(3)	Ausgewählte Kapitel der Pharmakologie,Toxikologie und Ernährungslehre I (VU 2 / 1 ECTS-AP)	§7(1)13a	Arzneitherapie ausgewählter Erkrankungen (VO 1 / 2 ETCS-AP) und
		§7(1)13b	Pharmakologische und klinisch-pharmakologische Methoden (VO 1 /2 ETCS-AP)

§5(3)	Pharmazeutische Chemie I (VO 3 / 6 ECTS-AP)	§7(1)14a	Pharmazeutische Chemie I (VO 3 / 5 ETCS-AP)
§5(3)	Biopharmazie (VO 2 / 3,5 ECTS-AP)	§7(1)14b	Biopharmazie (VO 3 / 5 ECTS-AP)
§5(3)	Einführung in die Übungen aus pharmazeutischer Technologie I (VO 1,5 / 2,5 ECTS-AP)	§7(1)15a	Einführung in die Arzneiformenlehre (VO 2 / 4 ETCS-AP)
§5(3)	Übungen aus pharmazeutischer Technologie I (UE 6 / 3 ECTS-AP) und	§7(1)15b	Arzneiformenlehre (UE 6 / 6 ETCS-AP)
§5(3)	Pharmazeutisch-technologisches Seminar I (SE 1 / 0,5 ECTS-AP)		
§5(3)	Instrumentelle pharmazeutische Analytik(VO 2 / 3 ECTS-AP)	§7(1)16a	Instrumentelle spektroskopische Analytik (VO 2 / 4 ECTS-AP)
§5(4)	Literatur in den pharmazeutischen Wissenschaften: Beschaffung und Auswertung (SE 2 / 2 ECTS-AP)	§7(1)17a	Literatur, Datenbanken und Einführung in das wissenschaftliche Schreiben (SE 2 / 1,5 ECTS-AP)
§5(3)	Pharmazeutische Chemie II (VO 3 / 4,5 ECTS-AP) und	§7(1)18	Pharmazeutische Chemie II (VO 3 / 5 ECTS-AP)
§5(3)	Pharmazeutische Chemie III (VO 3 / 6 ECTS-AP)		
§5(3)	Grundlagen der Anatomie, Morphologie und Systematik arzneistoffliefernder Organismen (VO 2 / 4 ECTS-AP)	§7(1)19a	Grundlagen der Anatomie, Morphologie und Systematik arzneistoffliefernder Organismen (VO 2 / 4 ECTS-AP)
§5(3)	Morphologisch-anatomische Analyse von Arzneidrogen inkl. Arzneibuchanalytik (VO 1 / 1,5 ECTS-AP)	§7(1)19b	Morphologie und Anatomie von pflanzlichen Arzneidrogen (VO 1 / 2 ECTS-AP)
§5(3)	Grundlagen der Anatomie und Morphologie von Arzneipflanzen (UE 3 / 6 ECTS-AP) und	§7(1)19c	Morphologie und Anatomie von Pflanzen und Arzneidrogen (UE 6 / 6,5 ECTS-AP)
§5(3)	Morphologisch-anatomische Analyse von Arzneidrogen inkl. Arzneibuchanalytik (UE 5 / 1,5 ECTS-AP)		
§5(4)	Thermomikromethoden in der Pharmazie (VU 1 / 1 ECTS-AP)	§7(2)2a	Thermomikromethoden (VU 2 / 3 ECTS-AP)
§5(4)	Geschichte der Pharmazie (VO 1 / 1 ECTS-AP)	§7(2)4a	Geschichte der Pharmazie (VO 1 / 1 ECTS-AP)
§5(4)	Systematik von Arzneipflanzen (VO 1 / 1 ECTS-AP)	§7(2)4c	Systematik von Arzneipflanzen (VO 1 / 1 ECTS-AP)
§5(4)	Pharmakobotanische Exkursion (EX 1 / 1 ECTS-AP)	§7(2)4d	Pharmakobotanische Exkursion (EX 1 / 1 ECTS-AP)