PMU | PARACELSUS MEDICAL UNIVERSITY

Track: Pharmacology								
Module Code / Module Title	**Course Title**	**Course Type**	**Sem.**	**ECTS Credits**	**Teaching Units**	**Groups**	**Examination Modalities**	**Grading Scale**
AP 1 / Applied Pharmacology 1	Applied Pharmacology A	VO	1	4.0	68	1	Final examination	5-level
	Applied Pharmacology B	VO	1	4.0	68	1	Final examination	5-level
AP 2 / Applied Pharmacology 2	Applied Pharmacology C	VO	2	3.5	59.5	1	Final examination	5-level
	Applied Pharmacology D	VO	2	3.5	59.5	1	Final examination	5-level
PKIN / Pharmacokinetics	Special Pharmacokinetics	ILV	2	5.0	85	1	Continuous assessment	5-level
	Mathematics and Statistics B	ILV	2	2.0	34	1	Continuous assessment	5-level
PC / Pharmaceutical Care	Introduction to Pharmaceutical Care and Clinical Pharmacy	ILV	3	4.0	68	1	Continuous assessment	5-level
	Pharmaceutical Care and Clinical Pharmacy	PR	3	8.0	-	-	Continuous assessment	5-level
PP / Personalised Pharmacology	Patient-centred Counselling in Practice	SE	3	1.0	7	1	Continuous assessment	5-level
	Palliative Care	SE	3	1.0	7	1	Continuous assessment	5-level
	Medicinal Products during Pregnancy and Breastfeeding	VO	3	1.0	17	1	Final examination	5-level
	Medications in the Elderly	VO	3	1.0	17	1	Final examination	5-level
	Medications during Childhood	VO	3	1.0	17	1	Final examination m	5-level
PHBETR / Pharmaceutical Care	Evidence-based Medication Information	VO	3	1.0	17	1	Continuous assessment	5-level
	Medication Management and Pharmaceutical Care	ILV	3	5.0	85	1	Continuous assessment	5-level

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Track: Pharmaceutical Chemistry

Module Code / Module Title	Course Title	Course Type	Sem.	ECTS Credits	Teaching Units	Groups	Examination Modalities	Grading Scale
WSE / Drug Development	Drug Development	VO	1	2.0	34	1	Final examination	5-level
	Computer-assisted Drug Development	ILV	1	2.0	34	1	Continuous assessment	5-level
MEDCHEM / Medical Chemistry	Drugs A	VO	1	1.0	17	1	Final examination	5-level
	Drugs B	VO	1	1.0	17	1	Final examination	5-level
	Drugs C	VO	2	1.5	25.5	1	Final examination	5-level
	Drugs D	VO	2	1.5	25.5	1	Final examination	5-level

Track: Pharmaceutical Technology

Module Code / Module Title	Course Title	Course Type	Sem.	ECTS Credits	Teaching Units	Groups	Examination Modalities	Grading Scale
AMF / Magistral Preparation of Dosage Forms	Magistral Preparation of Dosage Forms	VO	1	5.0	85	1	Final examination	5-level
	Practical Course in Magistral Preparation of Dosage Forms	ÜB	1	7.0	189	2	Continuous assessment	5-level
PTECH / Pharmaceutical Technology	Pharmaceutical Technology	ILV	2	5.0	85	1	Continuous assessment	5-level

Track: Social and Communication Competence

Module Code / Module Title	Course Title	Course Type	Sem.	ECTS Credits	Teaching Units	Groups	Examination Modalities	Grading Scale
SOSKI1 / Soft Skills 1	Fundamentals of Project Management	ILV	2	2.5	42.5	1	Continuous assessment	5-level
	Social and Communication Competence F	ILV	1	1.5	25.5	1	Continuous assessment	5-level
SOSKI2 / Soft Skills 2	Fundamentals of Management and Leadership	ILV	2	3.0	51	1	Continuous assessment	5-level
	Social and Communication Competence G	ILV	3	1.0	17	1	Continuous assessment	5-level

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Track: Practical Internship								
Module Code / Module Title	*Course Title*	*Course Type*	*Sem.*	*ECTS Credits*	*Teaching Units*	*Groups*	*Examination Modalities*	*Grading Scale*
PPRAX / Pharmaceutical Practical Training	Seminar Pharmaceutical Practical Training	SE	4	0.5	3.5	-	Continuous assessment	5-level
	Pharmacy Practice Simulation	PR	2	5.0	-	10	Continuous assessment	5-level
	Practical Training in Pharmacy	PR	3/4	10.5	-	-	Continuous assessment	5-level
	Practical Training in Industry	PR	3/4		-	-	Continuous assessment	5-level

Track: Scientific Competence								
Module Code / Module Title	*Course Title*	*Course Type*	*Sem.*	*ECTS Credits*	*Teaching Units*	*Groups*	*Examination Modalities*	*Grading Scale*
MSC / Master	Companion Seminar to the Research Internship	SE	4	0.5	3.5	1	Continuous assessment	5-level
	Research Internship	PR	4	9.5	-	-	Continuous assessment	2-level
	Master's Seminar	SE	4	2.0	14	2	Continuous assessment	2-level
	Master's Thesis	PR	4	10.0	-	-	Final examination	5-level
	Master's Examination	-	4	3.0	-	-	Final examination	5-level

Notes and Abbreviations
One teaching unit corresponds to 45 minutes.

European Credit Transfer and Accumulation System (ECTS):
The European Credit Transfer and Accumulation System is a standardized framework for measuring and comparing academic achievement across higher education institutions within the European Higher Education Area. It facilitates the recognition of studies and supports student mobility by providing a transparent measure of workload and learning outcomes. One ECTS credit represents a student workload of approximately 25 to 30 hours, encompassing contact hours, and independent study, preparation, and assessment activities.

Course Types:

- VO (Vorlesung) = Lecture
- ILV (Integrierte Lehrveranstaltung) = Integrated course
- SE (Seminar) = Seminar
- PR (Praktikum) = Practical course
- EX (Exkursion) = Excursion / Field trip
- ÜB (Übung) = Laboratory course

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TRACK: PHARMACOLOGY

APPLIED PHARMACOLOGY 1

Module Code	Module Title	Credits
ANGP1	**Applied Pharmacology 1**	**8.0 ECTS**
Position in the Curriculum	1st semester	

Course Title	**Applied Pharmacology A**
Credits	4 ECTS credits (68 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Cardiologic and vascular diseases and therapy: dyslipidaemia, arteriosclerosis, coronary heart diseases, hypertension, thrombosis, ischemic heart diseases and angina pectoris, myocardial infarction, heart insufficiency, arrhythmia, shock treatment • Pulmonary diseases and therapy: asthma bronchiale, chronic obstructive pulmonary disease (COPD), chronic restrictive pulmonary disease (CRPD), pulmonary emphysema, cystic fibrosis, acute and chronic rhinitis • Allergic diseases and therapy • Dermatologic diseases: acne, psoriasis, neurodermitis, burns • Women's health: contraceptives, gynaecological diseases, obstetrics
Learning Outcomes	Students / know the treatment options for these syndromes with synthetic as well as biogenic drugs. / know the possible side effects and interactions of these drugs. / know the age- and gender-differences in drugs and their influence on therapy.

Course Title	**Applied Pharmacology B**
Credits	4 ECTS credits (68 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Renal diseases and therapy • Chronic renal insufficiency, acute renal insufficiency, acute kidney failure, renal dialysis • Gastrointestinal diseases and therapy: nausea and vomiting, upper gastrointestinal diseases, lower gastrointestinal diseases • Liver diseases: cirrhosis of the liver • Endocrinal diseases: thyroid diseases. Diabetes Mellitus • Diseases of the musculoskeletal system (diseases of joints and bones): gout and hyperuricemia, rheumatic diseases , osteoporosis, osteoarthritis • Pain therapy: treatment of different pictures of pain
Learning Outcomes	Students / know the treatment options for these syndromes with synthetic as well as biogenic drugs. / know the possible side effects and interactions of these drugs. / know the age- and gender-differences in drugs and their influence on therapy.

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APPLIED PHARMACOLOGY 2

Module Code	Module Title	Credits
AP2	**Applied Pharmacology 2**	**7.0 ECTS**
Position in the Curriculum	2nd semester	

Course Title	**Applied Pharmacology C**
Credits	3.5 ECTS credits (59.5 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Neurological diseases and their treatment: headache, Parkinson´s disease, epilepsy, cerebrovascular diseases • Psychiatric illnesses and their treatment: Depression (major depressive and bipolar diseases), neuroleptic diseases (schizophrenia, mania etc.), sleep disturbances, anxiety disorders, psychiatric disorders in children • Oncology
Learning Outcomes	Students / know the treatment options for these syndromes with synthetic as well as biogenic drugs. / know the possible side effects and interactions of these drugs. / know the age- and gender-differences in drugs and their influence on therapy.

Course Title	**Applied Pharmacology D**
Credits	3.5 ECTS credits (59.5 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Infectious diseases and their treatments: CNS-infections, Endocarditis, Infections of the lungs, Tuberculosis, Infectious diarrhoea, Intra-abdominal infections, Perioperative prophylaxis, Urinary tract infections, Sexually transmitted diseases, Osteomyelitis and arthritis, Skin and connective tissue infections, Fungal infections, Viral Infections, HIV, Hepatitis, Parasitic Infections, Eye infections, Ear infections • Eye Diseases (e.g. glaucoma) • Ear Diseases (e.g. Meniere´s disease, tinnitus) • Haematology and blood disorders
Learning Outcomes	Students / know the treatment options for these syndromes with synthetic as well as biogenic drugs. / know the possible side effects and interactions of these drugs / know the age- and gender-differences in drugs and their influence on therapy.

PHARMACOKINETICS

Module Code	Module Title	Credits
PKIN	**Pharmacokinetics**	**7.0 ECTS**
Position in the Curriculum	2nd semester	

Course Title	**Special Pharmacokinetics**
Credits	5.0 ECTS credits (85 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalities	Continuous assessment, 5-level grading scale

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Course Content	Zero-order Kinetics • First-order Kinetics • Pharmacokinetic Models • One-compartment model • Two-compartment model • Multi-compartment model • Elimination rate constant • Volume of distribution • Half-life • Clearance • Single dose administration • Multiple dosing • Plasma concentration at steady-state • Time to reach steady state • Intravenous infusions • Single oral dose • Multiple oral dosing • Maintenance dose • Loading dose • Non-linear pharmacokinetics • Therapeutic drug monitoring for e.g.: aminoglycosides, digoxin, theophylline, Lithium, anti-epileptics, cyclosporine, vancomycin • Clinical pharmacokinetics renal impairment • Clinical pharmacokinetics hepatic impairment • Clinical pharmacokinetics in elderly
Learning Outcomes	The students / understand complex pharmacokinetic relationships. / can adjust drug dosing to individual size therapy. / are capable of solving complex pharmacokinetic problems. / can contribute their expertise in a multidisciplinary manner.

Course Title	**Mathematics and Statistics B**
Credits	2.0 ECTS credits (34 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Non-parametric vs. parametric statistics • Variability and its ccauses: nominal variables, ordinal variables, categorical variables, association between two variables, dichotomous variable, descriptive statistics, frequency distributions, probability distributions, significance tests, sample size calculation, data management, data collection, entering data, cleaning data
Learning Outcomes	The students / can interpret clinical studies based on statistical parameters and assess the quality of the studies. / can make methodological contributions to the statistics of clinical studies.

PHARMACEUTICAL CARE

Module Code	Module Title	Credits
PC	**Pharmaceutical Care**	**12.0 ECTS**
Position in the Curriculum	3rd semester	

Course Title	**Introduction to Pharmaceutical Care and Clinical Pharmacy**
Credits	4.0 ECTS credits (68 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalitites	Continuous assessment, 5-level grading scale
Course Conent	Fundamentals of clinical pharmaceutical care of patients during a hospital stay and after discharge from the hospital. • Case studies in relation to causes, symptoms, classification, diagnostic methods and treatment of various diseases with taking into account of laboratory values as well as of the clinical picture. • Individual dosing of drugs with taking into account of Pharmacokinetics, multi-morbidity and pharmaco-economic values. • Patient care in the hospital and Follow-up after discharge from the hospital

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Learning Outcomes	Students / are able to make anamnesis of medications / are able, due to their expertise, to describe a patient's clinical status. / recognise reasons for Non-Compliance. / can create an individualized medication plan based on the patient's known parameters. / can summarize clinical data in a structured manner, as well as present and communicate it clinically. / are familiar with the points of transition following hospital discharge.

Course Title	**Pharmaceutical Care and Clinical Pharmacy PR**
Credits	8.0 ECTS credits
Teaching and Learning Method	Practical course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	5-week internship in various hospital departments under the guidance of hospital pharmacists to deepen the content from "Introduction to Pharmaceutical Care and Clinical Pharmacy" • Taking a medication history upon patient admission • Analysing the medication history for contraindications, interactions, compliance, etc. • Presenting clinical data with particular attention to the pharmacological effects of the prescribed medications • Patient care at the bedside • Preparing a medication plan upon patient discharge
Course Outcomes	Students / create a portfolio consisting of 5 case studies. / can interview patients about their medication. / are able to extract clinically relevant information from patient records. / can identify reasons for potential non-compliance. / are able to identify the pharmaceutical reasons for a hospital stay. / are able to contribute to the development of a medication plan based on the available clinical data.

PERSONALISED PHARMACOLOGY

Module Code	Module Title	Credits
PP	**Personalised Pharmacology**	**5.0 ECTS**
Position in the Curriculum	3rd semester	

Course Title	**Patient-centred Counselling in Practice**
Credits	1.0 ECTS credits (7 teaching units)
Teaching and Learning Method	Seminar
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Phytopharmaceuticals and phytotherapy in community pharmacy practice • Chronic versus acute conditions • Limits of self-medication; general aspects of patient counselling • Types of symptoms and their evaluation • Criteria for selecting phytopharmaceuticals • Phytotherapy for common clinical complaints, including: respiratory tract disorders (patient consultation), musculoskeletal disorders and injuries (patient consultation), gastrointestinal disorders (patient consultation), cardiovascular disorders (patient consultation), dermatological conditions and wound care (patient

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	consultation), women's health and gynaecological disorders (patient consultation), psychological and neurological disorders (patient consultation), herbal immunostimulants (patient consultation)
Course Outcomes	Students are able to: / analyse patient symptoms, distinguish acute from chronic conditions, and recognise the limits of self-medication with phytopharmaceuticals; / critically assess phytopharmaceuticals with regard to quality, efficacy and safety, and derive appropriate therapeutic recommendations; / conduct structured, patient-centred counselling interviews and competently advise patients on the correct use of phytopharmaceuticals; / make well-founded decisions, based on pharmaceutical expertise, regarding the use of phytotherapy for common complaints (respiratory tract disorders; musculoskeletal disorders; gastrointestinal disorders; cardiovascular disorders; dermatological conditions and wound care; women's health and gynaecological disorders; psychological and neurological disorders; herbal immunostimulants) and justify these decisions clearly during counselling.

Course Title	**Palliative Care**
Credits	1.0 ECTS credits (7 teaching units)
Teaching and Learning Method	Seminar
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	The concept of "Palliative Care": death and the significance of nursing care, death in intercultural contexts, death as a life event, the death of a child • Self-determination and education of the dying • The quality of life of a dying person: environment, community, fear, and pain • Counselling of relatives • The clinical pharmacist and palliative care • Assisted dying / euthanasia • Who supports the caregivers of the dying?
Course Outcomes	Students / understand the significance of death for patients and their relatives, as well as the various intercultural perspectives on it. / are aware of the challenges faced by patients, caregivers, and relatives, and understand the importance of support for those accompanying the dying.

Course Title	**Medication during Pregnancy and Breastfeeding**
Credits	1.0 ECTS credits (17 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Revision and integration of the knowledge acquired during the pharmacy study program regarding the use of medicinal products during pregnancy and breastfeeding, with particular emphasis on situation-appropriate counselling of patients • Special hormonal situation during pregnancy • Physiological changes during pregnancy • Fundamentals of the use of medicinal products during pregnancy • Embryonic development • Developmental disorders

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	• Teratogenicity vs. Carcinogenicity • principles of teratogenesis • Direct and indirect teratogens • Placental transfer of drugs • Pharmacokinetic of drugs during pregnancy • Embryonic drug metabolism • Practice of counselling pregnant women on the risk of medicinal products • Assessment of the risk factor of a drug according to the FDA • drug therapy during breastfeeding • Blood–milk barrier • classification of drugs during breastfeeding according to the WHO
Course Outcomes	Students / develop a comprehensive overview of the particularities of drug use during pregnancy and breastfeeding. / are able to counsel patients objectively on drug risks during pregnancy and breastfeeding and to present alternative treatment options.

Course Title	**Medications in the Elderly**
Credits	1.0 ECTS credits (17 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Revision and integration of the knowledge acquired during the pharmacy study program regarding the use of drugs in old age, with particular emphasis on situation-appropriate counselling of patients and/or their relatives • Research and development of drugs for elderly patients • Off-label-Use of drugs for elderly patients • Physiologic und pathophysiologic changes in old age • Goal of pharmacotherapy in old age • Challenges of pharmacotherapy in old age • comorbidities in the elderly • Mortality in old age • changes in Pharmacodynamics • changes in Pharmacokinetics in old age • Compliance in old age • combination therapies in old age • Guidelines for pharmacotherapy in old age • Criteria for the use of new drugs • Drug-induced disease syndromes in the elderly
Course Outcomes	Students / develop a comprehensive overview of the particularities of drug use in advanced age and in patients with multiple comorbidities. / are able to critically evaluate the medication of these patients and to present alternative treatment options.

Course Title	**Medications in Children**
Credits	1.0 ECTS credits (17 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Revision and integration of the knowledge acquired during the pharmacy program regarding the use of drugs in infancy and childhood, with particular emphasis on situation-appropriate counselling of relatives • Stages of development • Physiological differences compared to adults • Pharmacokinetic peculiarities of preterm and new-born infants • Pharmacodynamics • dosing regimens • Child-friendly dosage forms • Paediatric medications • Selected pharmacotherapy for children • Combination preparations for children • Better medicine for children • Off-label-use for

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	children • Clinical studies in paediatrics • Orphan drugs • Compliance and evaluation of effectiveness
Course Outcomes	Students / develop a comprehensive overview of the particularities of drug use in infants, children, and adolescents. / are able to provide objective counselling on drug risks and to present alternative treatment options.

PHARMACEUTICAL CARE

Module Code	Modultitel	Credits
PHBETR	**Pharmaceutical Care**	**6.0 ECTS**
Position in the Curriculum	3rd semester	

Course Title	**Evidence based Medication information**
Credits	1.0 ECTS credits (17 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Formulation of recommendations for action based on available evidence • guidelines • Evidence based medication information • Media literacy
Course Outcomes	Students / are able to justify their recommendations rationally and support them with study results / understand the importance of guidelines for the treatment of defined medical conditions and can assess the applicability of these guidelines in individual cases.

Course Title	**Medication Management and Pharmaceutical Care**
Credits	5.0 ECTS credits (85 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Medication analysis • Medication appropriateness Index • Common clinically significant drug interactions in community pharmacy • Common clinical symptoms of drug–drug interactions • Interactions with medications, dietary supplements and foods • Specific aspects of caring for patients with chronic illnesses • Disease management programs • Preparation of medication plans • Pharmaceutical care in nursing homes and care facilities • Administration of medications via feeding tubes
Course Outcomes	Students / are able to assess medication-related problems resulting from potentially inappropriate medication (including self-medication). / are able to independently develop solutions for potentially inappropriate medication. / are able to provide long-term follow-up care for patients. / are able to identify the most important and clinically relevant side effects and interactions and discuss them with the treating physician.

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TRACK: PHARMACEUTICAL CHEMISTRY

DRUG DEVELOPMENT

Module Code	Module Title	Credits
WSE	**Drug Development**	**9.0 ECTS**
Position in the Curriculum	1st semester	

Course Title	**Drug Development**
Credits	2.0 ECTS credits (34 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Strategies for drug discovery: types, classification, and validation of target molecules; protein–ligand interactions; ligand-based, structure-based, and rational drug design • Lead structure search and identification: natural products as lead structures; high-throughput screening; molecular libraries – combinatorial chemistry and parallel synthesis; molecular modelling, virtual screening • Lead structure optimization: pharmacophore concept; isosteres and bioisosteres; ADME profiling and optimization of drug-like properties • Prodrug concept
Course Outcomes	Students / are able to describe the relationship between the structure and effects of drugs and explain structure–activity relationships using examples. / are able to explain the basic concepts and strategies of drug discovery and optimization. / are able to identify the properties that allow a drug candidate to be developed into a medicinal product. / are able to determine or derive the pharmacophore of a drug from available data.

Course Title	**Computer-aided Drug Design**
Credits	2.0 ECTS credits (34 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	The theoretical knowledge acquired in the lecture is deepened and expanded in the seminar through independent work on individual projects. In this context, computer-aided methods of modern drug development are to be applied to real datasets. The specific problem may, for example, come from the following areas: • Concepts of ligand- and structure-based drug design • Concepts of lead structure identification and optimization • Chemical databases • Biological data: processing and quality analysis • Chemical space, similarity, and diversity • Virtual screening: pharmacophore- and shape-based approaches, docking • Molecular libraries: virtual combinatorial chemistry • De novo design: designing innovative drug molecules based on active molecules and protein structures • QSAR methods • Protein modelling • ADME prediction or PK/PD modelling • Prediction of bioactivity profiles: effects, adverse effects/toxicity, and selectivity
Course Outcomes	Students

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	⁄ have a fundamental understanding of computer-aided drug design. ⁄ have an overview of relevant data sources. ⁄ are familiar with theoretical methods for addressing a specific problem in drug design.

MEDIZINISCHE CHEMIE / MEDICAL CHEMISTRY

Module Code	Module Title	Credits
MEDCHEM	**Medical Chemistry**	**9.0 ECTS**
Position in the Curriculum	1st and 2nd semester	

Course Title	**Drugs A**
Credits	1.0 ECTS credits (17 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Biogenic and synthetic drugs for cardiological and vascular diseases • Dyslipidemia • Atherosclerosis • Coronary heart disease • Hypertension • Thrombosis • Ischemic heart disease and angina pectoris • Myocardial infarction • Heart failure • Heart failure • Shock management • Lung diseases and their treatment • Asthma bronchiale • Chronic obstructive Pulmonary Disease (COPD) • Chronic restrictive pulmonary disease (CRPD) • Pulmonary emphysema, cystic fibrosis • Acute and chronic rhinitis • Allergies • Dermatological conditions: Acne, psoriasis, atopic dermatitis (neurodermatitis), burns • Women's health: Contraceptives, gynaecological disorders, obstetrics
Course Outcomes	Students ⁄ know the mechanisms of action and structure-activity-relationships of the drug groups for these indications. ⁄ know the scaffolds of natural and synthetic drug groups for these indications. ⁄ understand pharmacognosy as integral part of pharmacology.

Course Title	**Drugs B**
Credits	1.0 ECTS credits (17 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Renal diseases: chronic renal insufficiency, acute renal insufficiency, acute kidney injury, renal dialysis • Gastrointestinal diseases: nausea and vomiting, upper gastrointestinal disorders, lower gastrointestinal disorders, liver diseases, liver cirrhosis • Endocrine diseases: thyroid disorders, diabetes mellitus • Musculoskeletal disorders (joint and bone diseases): gout and hyperuricemia, rheumatic diseases, osteoporosis, osteoarthritis • Pain and its management: treatment of various types of pain
Course Outcomes	Students ⁄ know the mechanisms of action and structure-activity-relationships of the drug groups for these indications. ⁄ know the scaffolds of natural and synthetic drug groups for these indications. ⁄ understand pharmacognosy as integral part of pharmacology

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Course title	**Drugs C**
Credits	1.5 ECTS credits (25.5 teaching units)
Learning- and Teaching Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Drugs for the nervous system: head ache, Parkinson's disease, Epilepsy, cerebrovascular diseases, Psychiatric disorders, Depression (major depressive and bipolar disorders), neuroleptic diseases (schizophrenia, etc.), sleep disturbances, anxiety disorders • Anticancer drugs
Learning Outcomes	Students / know the mechanisms of action and structure-activity-relationships of the drug groups for these indications. / know the scaffolds of natural and synthetic drug groups for these indications. / understand pharmacognosy as integral part of pharmacology.

Course title	**Drugs D**
Credits	1.5 ECTS credits (25.5 teaching units)
Learning- and Teaching Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Drugs indicated for infectious diseases: CNS infections, endocarditis, lung infections, tuberculosis, infectious diarrhoea, antimicrobial prophylaxis, intra-abdominal infections, urinary tract infections, sexually transmitted diseases, osteomyelitis and arthritis, infections of the skin and connective tissue, fungal infection, viral infection (HIV, hepatitis), parasitic infections, eye infections, ear infections • Drugs indicated for eye diseases (e.g. glaucoma) • Drugs indicated for ear diseases (e.g. tinnitus) • Hematologic drugs and drugs for blood disorders
Learning Outcomes	Students / know the mechanisms of action and structure-activity-relationships of the drug groups for these indications. / know the scaffolds of natural and synthetic drug groups for these indications. / understand pharmacognosy as integral part of pharmacology.

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TRACK: PHARMACEUTICAL TECHNOLOGY

MAGISTRAL PREPARATION OF DOSAGE FORMS

Module Code	Module Title	Credits
AMF	**Magistral Preparation of Dosage Forms**	**12.0 ECTS**
Position in the Curriculum	1st semester	

Course Title	**Magistral Preparation of Dosage Forms**
Credits	5.0 ECTS credits (85 teaching units)
Teaching and Learning Method	Lecture
Examination Modalities	Final course examination, 5-level grading scale
Course Content	Basic knowledge of the preparation of magistral preparations: capsules, powders, solutions, suspensions, emulsions, ointments, creams, gels, pastes, suppositories, herbal extracts (macerates, tinctures), triturations, homeopathic dilutions, and homeopathic globules • Ability to identify incompatibilities and independently resolve compounding problems • Plausibility check of magistrale preparations • Preparation of manufacturing instructions in the pharmacy • Maintaining an elaboration record • Assessment of the shelf life and stability of magistral preparations • Legal requirements for handling prescriptions and controlled substances • Basic knowledge in the area of cosmetics (preparations, fields of application, legal framework)
Course Outcomes	The students / are proficient in preparing medicinal products within the scope of pharmacy compounding / can independently solve problems related to magistral prescriptions / understand the correct handling of controlled substances in the pharmacy / know the fields of application of cosmetics and their legal requirements

Course Title	**Practical Course in Magistral Preparation of Dosage Forms**
Credits	7.0 ECTS credits (189 teaching units)
Teaching and Learning Method	Practical course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	The following extemporaneous preparations are produced in practice: powders, capsules, solutions, suspensions, emulsions, ointments, creams, gels, pastes, suppositories, herbal extracts (macerates, tinctures), triturations, homoeopathic dilutions, homoeopathic globules • aseptic techniques are trained in the preparation of eye drops and parenteral solutions.
Course Outcomes	The students / are able to independently prepare all common extemporaneous formulations used in pharmacy compounding. / can identify incompatibilities and are able to resolve them.

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PHARMACEUTICAL TECHNOLOGY

Module Code	Module Title	Credits
PTECH	**Pharmaceutical Technology**	**5.0 ECTS**
Position in the Curriculum	2nd semester	

Course Title	**Pharmaceutical Technology**
Credits	5.0 ECTS credits (85 teaching units)
Teaching and Learning Method	Integrated Course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Fundamentals of Pharmacokinetics and biopharmacy • Pharmacokinetic and biopharmaceutical in vitro test systems • Understanding the processes involved in the movement of drugs within the body • Strategies for developing targeted drug formulations (Drug Targeting): Examples of disease-based targeting, Examples of organ-based targeting, Carrier concepts used for drug targeting • Concepts for increasing bioavailability • Pharmaceutical nanotechnology • In vitro prediction models in pharmaceutical technology (focus on cell culture models) • Methods for stabilizing unstable drugs in dosage forms • Carrier systems for drugs
Learning Outcomes	The students / understand the fundamental mechanisms of pharmacokinetics in relation to modern drug formulations. / know how to increase the bioavailability of drugs. / understand predictive models used in drug development. / can explain the properties of modern drug formulations (including advantages and disadvantages) in a way that is understandable to laypeople.

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TRACK: SOCIAL AND COMMUNICATION COMPETENCE

SOFT SKILLS 1

Module Code	Module Title	Credits
SOSKI1	**Soft Skills 1**	**4.0 ECTS**
Position in the Curriculum	1st semester	

Course Title	**Fundamental of Project Management**
Credits	2.5 ECTS credits (42.5 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Definitional foundations: project, process, product • components of functional project management • objectives of project management • project management systems • project organisation and planning • operational project management • network planning techniques • people in projects • project controlling • effective project communication
Course Outcomes	The students / are familiar with standards and norms in project management. / know the success factors of project management. / can create a work breakdown structure. / can organise a project (aspects of organisational structures, forms of project organisation, distribution of project tasks), plan it (definition of tasks, phase decisions and milestones, effort estimation) and implement it (operational project management). / can define quality objectives within a project.

Course Title	**Social and Communication Competence F**
Credits	1.5 ECTS credits (25.5 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	The psychology of the persuasion process • the GEWINN concept as the basis of effective persuasive communication • needs structure, motives • recognition and interpretation of signals • questioning techniques • argumentation and objection-handling techniques
Course Outcomes	The students are able to maintain continuous commitment to the project from both the project team and the stakeholders in order to achieve a successful completion.

SOFT SKILLS 2

Module Code	Module Title	Credits
SOSKI2	**Soft Skills 2**	**7.0 ECTS**
Position in Curriculum	2nd and 3rd semester	

Course Title	**Fundamentals of Management and Leadership**
Credits	3.0 ECTS credits (51 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalities	Continuous assessment, 5-level grading scale

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Course Content	Basic concepts and management process • Responsibilities of a leader • Strategic analysis • Operational planning and control (PCA) • Designing organizational structures • Motivation and behaviour • Leadership styles and performance • Personnel selection • Personnel development
Learning Outcomes	The students / can position their business within a competitive environment. / can identify the strengths and weaknesses of their business concept. / are aware of different leadership styles. / understand the fundamental factors of employee motivation. / are aware of the requirements in personnel selection.

Course Title	**Social and Communication Competence G**
Credits	1.0 ECTS credits (17 teaching units)
Teaching and Learning Method	Integrated course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Professional communication in organisational settings
Course Outcomes	The students / are able to conduct employee appraisal interviews. / can carry out goal-setting discussions. / are capable of planning and facilitating team meetings. / can recognise important signals of body language. / possess the ability to manage conflicts within a team. / are able to identify early signs of workplace bullying.

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TRACK: PRACTICAL INTERNSHIP

PHARMACEUTICAL PRACTICAL TRAINING

Module Code	Module Title	Credits
PPRAX	**Pharmaceutical Practical Training**	**16.0 ECTS**
Position in the Curriculum	3rd and 4th semester	

Course Title	**Seminar Pharmaceutical Practical Training**
Credits	0.5 ECTS credits (3.5 teaching units)
Teaching and Learning Method	Seminar
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Preparation and Follow-up of the Internships
Course Outcomes	The students / receive an introduction to their rights and obligations as interns. / document their experiences from the internships. / present their experiences from the various professional fields. / share and discuss their experiences.

Course Title	**Pharmacy Practice Simulation**
Credits	5.0 ECTS credits
Teaching and Learning Method	Practical course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Pharmacy Internship as a Simulation Game in Virtual Pharmacies. As part of a simulation involving the operation of multiple public pharmacies in a fictional town, students will work in small groups competing against each other to learn the following: Independently managing a public pharmacy in small groups using market-standard pharmacy software • Personnel planning in the pharmacy • Action planning in a pharmacy • Planning and executing promotional activities • Conducting screening measures • Customer consultations with case examples • Counselling sessions with difficult patients • Resolving prescription-related questions with doctors • Creating a medication plan • Pharmacist care for patients in a nursing home or assisted living facility • Complaint management • Organizing inventory management • Complying with recording obligations (controlled substances, goods receipt, alcohol, etc.) • Responding to unforeseen incidents (e.g., theft in the pharmacy, supply shortages, employee resignation) The virtual businesses compete with each other and are evaluated based on defined parameters (economic success, customer frequency, number of complaints, etc.) • “Patients" are portrayed by actors, while the exercise leaders represent "doctors," "wholesalers," and other contacts.
Learning Outcomes	The students / gain experience in the pharmacy profession through the simulation of a public pharmacy. / receive immediate feedback on the success or failure of their pharmacy.

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Course Title	**Practical Training in Pharmacy**
Credits	At least 3 ECTS credits / 10.5 ECTS in combination with the Practical Training in Industry
Teaching and Learning Method	Practical course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Areas of responsibility of pharmacists in community pharmacies
Course Outcomes	The students / gain an overview of the professional fields of pharmacists. / are familiar with the areas of responsibility and duties of the different professional groups within a pharmacy. / prepare extemporaneous formulations in the pharmacy under supervision. / participate in the identity testing of medicinal products and in maintaining the goods-inward records. / obtain insight into reimbursement procedures for eligible patients. / know the requirements for dispensing medicinal products on medical prescription. / are familiar with the pharmacy's stock management system. / understand the processes of inventory management (ordering, receipt of goods, storage, return of goods) in the pharmacy. / participate in screening activities carried out in the pharmacy.

Course Title	**Practical Training in Industry**
Credits	At least 3 ECTS credits / 10.5 ECTS in combination with the Practical Training in Pharmacy.
Teaching and Learning Method	Practical internship
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Supervised internship in one of the following areas: research & development, quality control, quality assurance, production, marketing, regulatory affairs, drug safety, logistics, or wholesale
Course Outcomes	The students / are familiar with fields of employment and professional activities in the pharmaceutical industry. / are familiar with typical workflows in the specific area of the pharmaceutical industry they have chosen.

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TRACK: SCIENTIFIC COMMPETENCE

MASTER

Module Code	Module Title	Credits
MSc	**Master**	**25.0 ECTS**
Position in the Curriculum	4th semester	

Course Title	**Companion Seminar to the Research Internship**
Credits	0.5 ECTS credits (3.5 teaching units)
Teaching and Learning Method	Seminar
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Accompanying the research internship: development of research questions and hypotheses • Selection of methods • Experimental design • Communication with supervisors • Exchange of experiences among the students
Course Outcomes	The students are adequately prepared for the successful completion of the research internship.

Course Title	**Research Internship**
Credits	9.5 ECTS credits
Teaching and Learning Method	Practical course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Development of a scientific research question • Execution of the research process • Critical review of the literature • Data collection and experimental work for the master's thesis • Analysis and interpretation of the results obtained
Course Outcomes	The students possess the necessary foundation to work with their supervisor to develop a research-relevant question, select appropriate methods, design an experimental approach, and carry out the study accordingly.

Course Title	**Master's Seminar**
Credits	2.0 ECTS credits (14 teaching units)
Teaching and Learning Method	Seminar
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Accompanying the preparation of the master's thesis: data analysis and processing, statistics • communication with supervisors • Preparation for the defence, presentation techniques • Exchange of experiences among the students
Course Outcomes	The students are adequately prepared for the successful completion of the master's thesis and the master's examination. In addition, they receive continuous supervision from their advisor as well as professional and scientific exchange with fellow students and other experts.

Course Title	**Master's Thesis**
Credits	10.0 ECTS credits
Teaching and Learning Method	Practical course
Examination Modalities	Continuous assessment, 5-level grading scale
Course Content	Preparation of an original work in English based on the data collected during the research internship.

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Course Outcomes	The students are able to independently address an innovative, discipline-specific topic, analyse it scientifically, and document the results appropriately in the context of the master's thesis.

Course Title	**Master's Examination**
Credits	3.0 ECTS credits
Teaching and Learning Method	-
Examination Modalities	Final examination, 5-level grading scale
Course Content	15-minute presentation of the master's thesis • 15-minute discussion of the master's thesis • 15-minute oral examination on the contents of the master's programme
Course Outcomes	The students / are able to represent, with professional responsibility, the results and findings obtained in the course of writing the master's thesis to external audiences. / can communicate these results, findings, and interrelations in a target-group-specific manner and apply subject-specific English terminology as well as appropriate presentation techniques. / are able, within the framework of the master's examination, to reproduce and integrate the contents of the programme orally and to apply the competencies they have acquired.

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