Fächer und Kursinhalte, FB16 (Stand: 2019) / Subjects and course contents, Faculty of Pharmacy (Status: 2019)

Link zum Vorlesungsverzeichnis / Link to course lists:
https://marvin.uni-marburg.de/qisserver/pages/cm/exa/coursecatalog/showCourseCatalog.xhtml?_flowId=showCourseCatalog-flow&_flowExecutionKey=e1s1

Nr. / No.	Semester	Kursnummer Course number	Kursname Course title (German title)	Kursbeschreibung Course description	h pro Wo./Sem. h per week/Sem.	Kurstyp Course type	ECTS / ECTS points	Prüfung (Klausur, Kolloquium...) Examination (written exam, colloquium...)	Nummer d. zugehörigen Vorlesung/Praktikums (falls vorhanden) Number of associated lecture/practical course (if applicable)	Schein (nur bei Teilnahme am dazugehörigen Praktikum) German title of thecertificate awarded at the end of the course (only at participation in	Verantwortlicher Name of the person/ people responsible for the course
1	1	LV-16-126-014	Chemie für Pharmazeuten/ Chemistry for Pharmacists	Introductory course in general chemistry	4 h /56 h	Vorlesung Lecture	4		LV-16-126-013		Steinmetzer
2	1	LV-16-126-013	Allgemeine und analytische Chemie der anorganischen Arznei-, Hilfs- und Schadstoffe / Qualitative inorganic analysis	The student should learn to identify inorganic ions in a mixture of various compounds. Therefore a sample is given to the student, which has to perform several chemical reactions in the laboratory, which lead to conclusions concerning the actual content of the provided sample. This laboratory practice is a very good first lesson, how to work properly in a lab and how to deal responsibly with chemical substances. It teaches students, how and why compounds react like they do and trains the comprehension of inorganic chemistry.	12 h / 168 h	Praktikum Lab	12	EK 1 EK 2 Written Exam	LV-16-126-014		Steinmetzer
3	1	LV-16-126-003	Pharmazeutische und medizinische Terminologie / Pharmaceutical and medical terminology	In these lectures students learn the vocabulary to understand and deal with a prescription including technical terms and abbreviations, pharmaceutical terms for chemical substances and to understand and use medical terms of pathology, pharmacology and anatomy. The lectures contain vocabulary in Greek as well as in Latin and a short synopsis of Latin grammar. The course is completed by writing an examination, which only counts as passed when the student also passes the examination in History of Sciences (number 18 in this list).	2 h / 26 h	Seminar	2	EK 2 Written Exam			Friedrich/ Guba/ Alexandru

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4	1.	LV-16-126-004	Toxikologie der Hilfs- und Schadstoffe / Toxicology for pharmacists	In this course, students receive a basic introduction into toxicology, including the mechanisms, symptoms and treatments of some common intoxications such as poisoning with Atropa Belladonna, cyanide or heavy metals.	2 h / 22 h	Seminar	2	EK 2 Written Exam			Bünemann, Krasel
5	1.	LV-12-126-001	Mathematische und statistische Methoden für Pharmazeuten / Mathematics for Pharmacists	To evaluate a chemical and pharmaceutical laboratory test-run one needs some mathematical formulas. These formulas are practised and illustrated quite clearly in examples in step with actual practice. This Coursework includes weekly homework which trains the skills of handling scientific results as presented in everyday problems.	2 h / 28 h	Seminar und Übungen Seminar and exercises	3	EK 2 Written Exam			Strauer
6	1./2.	SS LV-16-126-021 WS LV-16-126-022	Grundlagen der Anatomie und Physiologie I Grundlagen der Anatomie und Physiologie II	In these lecture sessions, the anatomy and physiology of the human body is explained In these lecture sessions, the anatomy and physiology of the human body is explained comprehensively by a clear division into the following topics: 1) Cell physiology; 2) The gastrointestinal system; 3) The endocrine system; 4) Skeletal muscle; 5) The nervous system. Major diseases and drugs relevant for the respective organs are also briefly discussed.	3 h / 42 h	Vorlesung Lecture	3	EK 2 Written Exam	LV-16-126-020		Kockskämper
7	1./2.	WS LV-16-126-120	Allgemeine Biologie für Pharmazeuten: Cytologie und Virologie (nur im WS)/ Basic biology for pharmacists: cytology and virology (only in winter term)	This lecture deals with the internal anatomy of living prokaryotic (bacteria) and eukaryotic (plants, fungi, animals) cells. The structures and functions of all cellular organelles are explained. In the last part of the lecture, the students get an introduction to viruses and other sub-cellular pathogens.	2 h / 28 h	Vorlesung Lecture	2	EK 1 EK 2 Written Exam	1.Sem.: LV-16-126-005 2.Sem.: LV-16-126-138		Petersen

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8	1./2.	SS LV-16-126-119	Allgemeine Biologie für Pharmazeuten: Systematik der Mikroorganismen und Arzneipflanzen (nur im WS)/ Basic biology for pharmacists: cytology and virology (only in winter term)	All living organisms can be sorted into a system according to their relationship and their evolution. The lecture introduces the classification of microorganisms and plants with special emphasis on those that are important for pharmacists as pathogens or producers of pharmaceutical compounds.	2 h / 28 h	Vorlesung Lecture	2	EK 1 EK 2 Written Exam	1.Sem.: LV-16-126-090 2.Sem.: LV-16-126-091		Petersen
9	1./2.	WS LV-16-126-005 (1. Semester) LV-16-126-138 (2. Semester)	Cytologische und histologische Übungen / Cytology and histology	In this course the students learn to look at plant and animal tissues with help of a microscope. They apply specific staining techniques to detect specific compounds and structures of the cells. The observations are documented in drawings.	2 h / 28 h	Praktikum Lab	2		LV-16-126-120		Petersen
10	1./2.	SS LV-16-126-090 (1. Semester) LV-16-126-091 (2. Semester)	Bestimmungs-übungen und Arzneipflanzenexkursionen / Plant classification and excursions (only summer term)	The students learn how to classify plants with help of field guides. The characteristics of important plant families are introduced. This knowledge can be applied and improved in two field excursions	2 h / 28 h	Praktikum und Exkursionen / Practical course and excursions	2		LV-16-126-119		Petersen
11	1./2.	SS LV-13-126-212 WS LV-13-126-211	SS Einführung in die Physik II für Pharmazeuten / Physics for students of Pharmacy WS Einführung in die Physik I für Pharmazeuten	These lectures include experiments and explanations about mechanics, thermodynamics, acoustics and radioactivity as well as clarification of magnetism and optics. In the last 20 minutes, example problems on the lecture subject are posed and enumerated as they occur in the examinations that accompany the practical course. Physics for students of Pharmacy I (These lectures include experiments and explanations about mechanics, thermodynamics, acoustics and radioactivity as well as clarification of magnetism and optics. In the last 20 minutes, example problems on the lecture subject are posed and enumerated as they occur in the examinations that accompany the practical course.	2 h / 42 h 2 h / 42 h	Vorlesung Lecture Vorlesung Lecture	2 2		LV-16-126-100		Bremmer

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12	2.	LV-16-126-100	Physikalische Übungen für Pharmazeuten / Exercises in physics	5 physical experiments are performed in each of the fields of mechanics, optics, electricity and nuclear physics. Students work in groups of two. For each experiment, a protocol is written which includes calculations, diagrams and evaluations presented as tables.	2 h / 28 h	Praktikum und Übung Exercises/Lab	2	Testatschein EK2 Written exam in physics	SS LV-13-126-212 WS LV-13-126-211 SS LV-13-126-212 WS LV-13-126-211		Feuser
13	2.	LV-16-126-100	Physikalisch-chemische Übungen für Pharmazeuten/ Exercises in physical chemistry	5 physical-chemical experiments are performed in each of the fields of fluids, thermodynamics and electrolytical electricity. Students work in groups of two. For each experiment, a protocol is written which includes calculations, diagrams and evaluations presented as tables.	2 h / 28 h	Praktikum und Übung Exercises/Lab	2	Testatschein EK2 Written exam (for physico-chemical exercises)	SS LV-13-126-212 WS LV-13-126-211		Feuser
14	2.	LV-16-126-009	Quantitative Bestimmung von Arznei-, Hilfs- und Schadstoffen / Quantitative inorganic analysis	These lectures provide the theoretical background to the Quantitative inorganic analysis (number 13 in this list). The lectures discuss and consider critically different kinds of quantitative analyses such as argentometry according to Volhardt, Mohr, Liebig and Fajans, volumetric analysis which includes acid/base titration, titration in non-aqueous solutions, preparation and calibration of standard solutions as well as the correct evaluation and calculation of the analysis results.	3 h / 42 h	Vorlesung Lecture	3		LV-12-126-008		Reuter

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15	2.	LV-12-126-008	Quantitative Bestimmung von Arznei-, Hilfs- und Schadstoffen (Praktikum) / Quantitative inorganic analysis (Lab)	In the first semester students are confronted with the task to find out what kind of inorganic chemical element their sample contains. Now, in continuation to that, the student definitely knows what is in the sample but has to find out how much is in it. The student does this via titration by using burettes, gravimetric analyses or elektrolyses. All these tasks are in consideration of the Pharmacopoea Europaea. It is also goood training in Teamwork, because students have to work in couples.	10 / 140 h	Praktikum Lab	10	Kolloquium EK 2 Oral and written exam	LV-12-126-009		Reuter
16	2.	LV-16-126-020	Kursus der Physiologie / Physiology	In these practical courses, students do experiments on the following topics: 1) The heart – Recording and analysis of the ECG; 2) The cardiovascular system – Blood pressure regulation; 3) Skeletal muscle – Simulation studies on skeletal muscle function; 4) The neuron – Simulation studies on the neuronal action potential; 5) The lung – Determination of lung function; 6) The senses – Vision and hearing. Each practical course starts with an introduction to the field and is finished with a discussion of the results.	5 h / 30 h	Übungen / Exercises	3	EK 2 Written Exam	LV-16-126-021 LV-16-126-022		Kockskämper

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17	2.	LV-16-126-002	Geschichte der Naturwissenschaften unter besonderer Berücksichtigung der Pharmazie / History of the Sciences (with emphasis on pharmacy)	The Institute for the History of Pharmacy is a distinctive feature of the faculty of pharmacy of the Philipps-University in Marburg. It is an independent institution and is therefore unique in the German-speaking world. The course of lectures provides an overview starting with the beginnings of pharmacy up to the 20th century. Teaching and research are concerned with the development and problems of Sciences, and in particular with pharmacy and its basic subjects of Chemistry and Botany, all within the larger framework of the History of Science. The main periods of time to be looked at are the Middle Ages, the Renaissance and the 18th to 20th centuries.	2 h / 26 h	Vorlesung Lecture	2	EK 2 Written Exam			Friedrich
18	2.	LV-12-126-024	Grundlagen der Arzneiformenlehre / Basics of pharmaceutical technology	In this series of lectures, the student is made familiar for the first time with methods of preparation of medications. Basic concepts such as the GMP guidelines and the differences between single-part production and industrial scale production are clarified. Furthermore, various machines and appliances that are used mainly in the pharmaceutical industry are presented. Homoeopathy and Traditional Chinese Medicine are also briefly introduced.	2 h / 28 h	Vorlesung Lecture	2	EK 1 Written Exam	LV-12-126-023		Keck, Brüßler
19	3.	LV-16-126-023	Arzneiformenlehre I	In these practical laboratory exercises, students work in teams. On the basis of the lectures which introduce the students to technical production methods in the pharmaceutical industry, various dosage forms are recreated and declared in accordance with industrial standards. Dosage forms include suppositories, dilutions, ointments and capsules.	5h / 70 h	Praktikum Lab	5	EK 2 Written Exam	LV-16-126-024		Keck, Brüßler

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20	3.	LV-16-126-016	Pharmazeutische und medizinische Chemie (inkl. Nomenklatur) / Pharmaceutical and medical chemistry	The lecture teaches the fundamentals of organic chemistry with special emphasis on pharmaceutical application and drugs. After covering the basics like molecular orbital theory, chemical binding, polarisation, thermodynamics and kinetics, reaction mechanisms are explained in detail. Relevant classes of organic compounds are explained in terms of structure, properties and typical reactions. Special emphasis is placed on the dependence of properties (e.g. pKa) and reactivity (stability) on substituent effects. Pharmaceutical applications and relevance for biochemical pathways is demonstrated whenever possible.	5 h / 70 h	Vorlesung Lecture	5	EK 1 Written Exam	LV-16-126-015 LV-16-126-101		Schlitzer
21	3.	LV-12-126-101	Organisch medizinische Chemie einschließlich der Chemischen Nomenklatur / Nomenclature of organic chemistry	This seminar teaches the basics of organic nomenclature. IUPAC rules are explained and practised with different examples as well as the Cahn-Ingold-Prelog-System. Learning success is evaluated in course of the written examination in Organic Chemistry.	1 h / 14 h	Seminar	1		LV-12-126-015 LV-12-126-016		Schlitzer, Ortmann
22	3.	LV-16-126-015	Chemische Nomenklatur einschließlich Chemie einschließlich der Analytik der organischen Arzneistoffe, Hilfsstoffe und Schadstoffe / Organic chemistry, drug substance synthesis	Basic techniques in preparative organic chemistry (e.g. refluxing, moisture exclusion, solvent drying, solvent extraction, distillation, recrystallization etc.) are demonstrated and applied by the students with the synthesis of different drugs or analytically important drug derivatives. Products are characterized in terms of yield and purity.	12 h / 168 h	Praktikum Lab	12	EK 2 Written Exam	LV-16-126-016 LV-16-126-101		Schlitzer
23	3.	LV-16-126-080	Biologie I: Untersuchung arzneistoffpro-duzierender Organismen / Pharmaceutical Biology I: drug-producing organisms	With help of the light microscope the students learn how different plant organs are built up from differentiated cells. Plant organs and tissues are prepared and stained for microscopic inspection and the microscopic aspects drawn.	3 h / 42 h	Praktikum Lab	2	EK 2 Written Exam	LV-16-126-121 LV-16-126-122		Petersen

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24	3.	LV-12-126-121	Allgemeine Biologie für Pharmazeuten: Morphologie und Anatomie / Basic biology for pharma¬cists: anatomy and morphology	How is a plant built and how does it live? This lecture deals with the structure of plants, their organs and their different tissues.	2 h / 28 h	Vorlesung Lecture	2		LV-12-126-122 LV-12-126-080		Petersen
25	3.	LV-16-126-122	Allgemeine Biologie für Pharmazeuten: Grundlagen der Biochemie, Physiologie und Genetik / Basic biology for pharmacists: biochemistry, physiology and genetics	Which molecules are essential for life? How does an organism gain energy? How do plants use light to synthesise sugars? How is the information of life stored and encoded? These are only some of the questions that will be answered in a detailed overview on the biochemistry, physiology and genetics of living organisms in this lecture.	3 h / 42 h	Vorlesung Lecture	3		LV-16-126-121 LV-16-126-080		Petersen
26	4.	LV-16-126-011	Einführung in die Instrumentelle Analytik / Introduction into instrumental analyses	These lectures do not only give the theoretical background information to the above mentioned laboratory work (number 28 on this list) but also draw a line to other more complex instrumental analysis methods, for example mass spectrometry and nuclear magnetic resonance spectroscopy. These lectures also go into further detail in the topic of electro-chemistry, for example conductometry and polarography are considered. Furthermore, the lectures deal with the wide range of chromatography and the common use of it in industry as well as in pharmacies open to the to public, because the instrumental analyses play a major role in the Pharmacopoeia Europa. In this course the necessity of correctly prepared and accomplished experiments in order to fulfill a proper validation is demonstrated.	4 h / 50 h	Vorlesung Lecture	4		LV-12-126-108		Kolb, Vornicescu

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27	4.	LV-12-126-108	Instrumentelle Analytik (Praktikum) / Instrumental analysis (laboratory)	This Laboratory work is teamwork based and includes experiments in chromatographical analyses, for example thin layer chromatography , gas chromatography and high performance chromatography, as well as electrochemical experiments (Dead Stop, potentiometry), optical experiments such as polarimetry, fluorescent and spectroscopic experiments for example UV, visible and IR spectrometry. Since 2009 the methods of structure elucidation (mass spectrometry and nuclear resonance spectroscopy) are part of the laboratory	12 h / 168 h	Praktikum Lab	12	EK 1 EK 2 Written Exam	LV-12-126-011		Kolb, Vornicescu
28	4.	LV-16-126-001	Stereochemie / Stereochemistry	Important and indispensable molecules such as carbohydrates and enzymes can possess various spatial orientations. These can have a dicisive effect on the whole circulation throughout the body. Using modern computer presentations, the diversity of these structures is presented and the students' attention is drawn to the fact that it is of evident importance to recognise exactly these structures because otherwise a poison may be made from a medication, such as , for example, the active agent thalidomide. Various methodologies for the separation and recognition of two different isomers are treated and the spatial powers of imagination sharpened. Furthermore, the “key and lock” principle as in the effect of, for example, enzymes and substrates, is mentioned.	1 h / 14 h	Vorlesung Lecture	1	EK 2 Written Exam			Klebe, Heine
29	4.	LV-16-126-007	Grundlagen der Ernährungslehre / Introduction to nutrition science	The lecture introduces the most important food ingredients (carbohydrates, fats, proteins, water, vitamins and minerals). Their occurrence in foodstuff, their digestion and absorption as well as diseases resulting from malnutrition are discussed.	1 h / 14 h	Vorlesung Lecture	1				Kreusch

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30	4.	LV-16-126-006	Pharmazeutische Biologie II (Pflanzliche Drogen)/ Pharmaceutical Biology II (macro- and microscopic analysis of herb drugs and analysis of tea mixtures)	In the scheduled course days, approximate 80 herbal drugs are chosen and investigated. They are classified by indications for illnesses that can be treated phytotherapeutically, e.g. coughing, gastro-intestinal disorders and urinary complaints as well as cardiac and circulation problems. Every course day starts with a short introduction for respective herbal drugs including their macro- and microscopic features, chemical constituents and therapeutic indications. Application forms and duration of administration will also be mentioned. After the theoretical introduction, single herbal drugs are analysed by their macro- and microscopic features. In addition, mixtures consisting of five herbal drugs are investigated by macro- and microscopic analysis. The roles of the individual drugs in the mixtures will be discussed.	3 h / 42 h	Praktikum Lab	3	EK 2 Written Exam			Li, Kreusch
31	4.	LV-16-126-025	Einführung in die medizinische Mikrobiologie, Hygiene und Immunologie für Pharmazeuten / Introduction to medical microbiology, hygienics and immunolgy for Pharmacists	This lecture treats various symptoms that are caused by bacteria, viruses, worms and fungi. Also discussed is how far it is possible to influence the development and course of the illness, for example by inoculation of change of life style. Epidemiological considerations are also treated.	2 h / 28 h	Vorlesung Lecture	2		LV-16-126-029		Streubel

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32	4.	LV-16-126-029	Mikrobiologie / Practical course of medical microbiology for Pharmacists	Various kinds of bacteria are studied more closely under the microscope and Gram stains performed. Optionally, a blood sample may be taken and the student's own blood group determined as well as the tetanus and German measles titre values. During a longer period, a sample colony of bacteria taken by students from the floor or from a non-disinfected hand is bred on a agar dish. The same is done with a throat swab.	3 h / 42 h	Praktikum Lab	3	EK 2 Written Exam	LV-16-126-025		Streubel
33	5.	LV-16-126-043	Arzneistoffanalytik unter besonderer Berücksichtigung der Arzneibücher (Qualitätssicherung und Kontrolle bei Arzneistoffen)/ Pharmaceutical Chemistry II (methods of analysis according to the European pharmacopoeia)	Within the framework of the laboratory practice, the students have to determine whether an active ingredient fulfils the requirements of the European Pharmacopoeia, mainly using various wet chemical methods. Furthermore, the students have to validate an analytical procedure according to the ICH guidelines. This course can be regarded as a continuation of the instrumental analysis course in the fourth semester, in which also methods of analysis according to the pharmacopoeia are discussed and practised. The difference is evident in the use of methods. In the fourth semester, the focus is on the instrumental analysis whereas now the student performs wet chemical analysis. These lectures do not only provide the theoretical background information to the above mentioned laboratory but also introduces the students to scientific literature search. Commonly used databases such as Medline, SciFinder, the protein data base, Reaxys, and the visualisation program Pymol are presented. The course also offers a first insight into the legal regulation of the drug market, such as e.g. the German Medicine act.	12 h / 151 h	Praktikum, Seminar Lab		EK 1 EK 2 Written Exam			Diederich

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34	5.	LV-16-126-036	Biogene Arzneimittel (Antiinfektiva) / Drugs with natural origin (herbal drugs, antiinfectives, drugs produced by methods of gene technology)	This is the first part of the seminar drugs with natural origin. The seminars will be presented by student groups. The contents of the seminars include basic knowledge of antiinfectives including antibiotics, antifungal and antimalarial agents. The chemical structures, biosynthesis, production, indications of the clinically used important antiinfectives will be treated in the seminars.	1 h / 14 h	Seminar	1	Hausarbeit mit Vortrag	LV-16-126-037 LV-16-126-038		Stierle
35	5./6.	LV-16-126-027	Krankheitslehre / Pathology for pharmacists	Guest lecturers (clinicians and general practitioners) discuss frequent disorders and illnesses useful for daily practice in the pharmacy. They report on symptoms, clinical pathways and evidence based therapies e.g. of diabetes, mental disorders or cardiovascular diseases	2 h / 28 h	Vorlesung Lecture	2			Klinische Pharmazie	Viniol
36	6.	LV-16-126-037	Biogene Arzneimittel (gentechnisch hergestellte Arzneimittel) / Drugs with natural origin (herbal drugs, antiinfectives, drugs produced by methods of gene technology)	This is the second part of the seminar drugs with natural origin. The seminars will be presented by student groups. The contents of the seminars include basic knowledge of molecular biology and production of recombinant drugs by genetic manipulation. The nature, production and indications of the clinically used important recombinant drugs, e.g. insulin and analoga, antibodies, growth factors and antitumor agents will be treated in the seminars	1 h / 14 h	Seminar	1	Hausarbeit mit Vortrag	LV-16-126-036 LV-16-126-038		Li, Kreusch

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37	6.	LV-16-126-034	Pharmazeutische Biologie III (Biologische und phytochemische Untersuchungen / Pharmaceutical Biology III (Biological and phytochemical investigations	In a block course, approximate 40 herbal drugs are planned for investigation. They contain constituents of about 13 natural product groups. Every course day starts with a short lecture presented by students. The lectures are referred to selected substance groups with focus on their chemical structures, biosynthesis, occurrence in herbal drugs and mode of action as well as their use in the phytotherapy. The indications of the selected substances are the respiratory tract, the digestive tract, the urinary tract, and the blood vessel system as well as the heart. Practical parts after the short lecture are to identify and distinguish herbal drugs by chemical analysis of the metabolite pattern, quantification of the effective constituents.	6 h / 84 h	Praktikum Lab	6	EK 2 Written Exam	RVL LV-16-126-115 LV-16-126-116 LV-16-126-117		Li, Kreusch
38	6.	LV-16-126-046	Biochemie und Molekularbiologie/ Biochemistry and molecular biology	Organisms, Biomolecules, Water as biomolecule, Amino acids, Proteins, Enzymes, Enzyme kinetics, Carbohydrate metabolism (pathways, regulation and signal transduction), Lipid metabolism (Lipid classes and structures, biological membranes, fatty acid oxidation and synthesis, isoprene derivatives and cholesterol), Amino acid and nucleotide metabolism, RNA/DNA, Helix structures, Hyperchromicity, Intercalation, DNA supercoiling, Topoisomerases, Histones, Histone modification, DNA packaging, Protamine, DNA replication, Telomerase, DNA damage and repair, DNA recombination, Transposition, Genome structure, Repetitive elements, Genetic Fingerprint, DNA methylation, Protein biosynthesis and antibiotics, Transcription, RNA processing, splicing and editing, RNA interference, Nuclear transport of RNA, RNA decay	3 h / 36 h	Vorlesung Lecture	2		LV-16-126-045 LV-16-126-047		Hartmann, Grünweller

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39	6.	LV-16-126-045	Biochemische Untersuchungs methoden einschl. klin. Chemie / Methods of biochemical analysis (including clinical chemistry)	Biochemical analysis methods including clinical chemistry; Protein concentration determination, SDS-PAGE, Western Blot, Urine and blood analysis, Hemoglobin/gel filtration, Proteases, Xanthinoxidase, Enzyme kinetics, Isoenzymes, PCR, Bioinformatics	7 h / 98 h	Praktikum Lab	7	EK 2 Written Exam	LV-16-126-046 LV-16-126-047		Hartmann, Grünweller
40	6.	LV-16-126-047	Grundlagen der Klinischen Chemie und Pathobiochemie / Introduction into clinical chemistry and patho-biochemistr	Protein concentration determination, Measured clinical-chemical values, Biochemical separation techniques, Immunochemical analysis techniques, Blood analysis, Diagnostic marker enzymes, DNA analysis, Blood analysis in the pharmacyics	2 h / 28 h	Vorlesung Lecture	2		LV-16-126-045 LV-16-126-046		Hartmann, Grünweller

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41	6./7.	WS LV-16-126-136 SS LV-16-126-137	Pharmazeutische Technologie einschließlich Medizinprodukte Teil A / Pharmaceutical Technology and Medicinal Products Pharmazeutische Technologie einschließlich Medizinprodukte Teil B / Pharmaceutical Technology and Medicinal Products	Acquisition of expertise in the fields of classical and modern dosage forms, particularly the manufacture, testing and assessment, evaluation and properties of excipients and additives, incompatibilities, stabilities of medicines and the essential foundations of homoeopathic pharmaceuticals, medical devices, sera and vaccines. Acquisition of expertise in the fields of classical and modern dosage forms, particularly the manufacture, testing and assessment, evaluation and properties of excipients and additives, incompatibilities, stabilities of medicines and the essential foundations of homoeopathic pharmaceuticals, medical devices, sera and vaccines.	34h / 14 h	Vorlesung Lecture	3				Bakowsky, Schäfer, Jedelská
42	7.	LV-16-126-074	Pharmazeutische Technologie / Pharmaceutical Technology	In these practical laboratory exercises, students work in teams. On the basis of the lectures which introduce the students to technical production methods in the pharmaceutical industry, various dosage forms are recreated and declared in accordance with industrial standards. Dosage forms include suppositories, dilutions, ointments and capsules.	14h / 196 h	Seminar, Praktikum Lab	14	EK 2 Written Exam	LV-16-126-136 LV-16-126-137		Bakowsky, Schäfer, Jedelská
43	7.	LV-16-126-072	Qualitätssicherung bei Herstellung und Prüfung von Arzneimitteln / Quality management in the production and control of drugs	This course clarifies the GMP guidelines as well as production practices in industry and the pharmacy. You learn how to best ensure the hygienic standards exigencies set on a medicinal product in industry as well as in a pharmacy.	2 h / 28 h	Seminar	2	EK 2 Written Exam	LV-16-126-073		Bakowsky, Schäfer,

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44	7.	LV-16-126-073	Biopharmazie einschließlich arzeniformen bezogener Pharmakokinetik / Biopharmacy and pharmaco-kinetics	This introduces the principles of general and special pharmacokinetics and respiration barriers. Part of the course is a 3 days “hands-on” computer workshop looking at pharmacological and bioequivalence computations	2 h / 28 h	Praktikum Lab	2		LV-16-126-072		Bakowsky, Schäfer,
44	7.	LV-16-126-056	Pharmakotherapie (einschließlich Übungen) / Pharmacotherapy (including exercises)	This seminar discusses the therapy concepts and available drugs for the treatment of major diseases, e.g. diabetes, hypertension, hyperthyroidism, psychiatric diseases, epilepsy etc. Treatment guidelines are presented for the most common diseases that are highly relevant in the daily routine in the pharmacy. Exercises include case studies presenting prescriptions for common diseases where knowledge on therapy guidelines is required to identify pharmaceutical problems and drug interactions.	2 h / 28 h	Seminar	2	EK 2 Written Exam			Culmsee
45	7.	LV-16-126-038	Biogene Arzneimittel (Phytopharmaka) Biogenic drugs: herbal medicinal products	Important herbal medicina products on the market are introduced in students’ presentations.	1 h / 14 h	Seminar	1	Hausarbeit mit Vortrag	LV-16-126-036 LV-16-126-037		Kreusch

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46	7.	LV-16-126-054	Klinische Pharmazie I / Clinical Pharmacy I	This course covers a variety of topics of Clinical Pharmacy and Clinical Pharmacology: Problem oriented learning: Patient cases and in particular cases of multimorbidity are presented and discussed in order to identify and solve pharmaceutical problems, to demonstrate side effects and interaction potential of various pharmaceuticals. Pharmaceutical care: Everyday consulting in the pharmacy and clinic. Includes the option of touring a ward in the Fulda clinic (Klinikum Fulda). Special pharmacokinetics and dosage individualization. Design and assessment of clinical studies	3 h / 42 h	Seminar	3		LV-16-126-055		Culmsee
47	8.	LV-16-126-055	Klinische Pharmazie II / Clinical Pharmacy II	This course covers a variety of topics of Clinical Pharmacy and Clinical Pharmacology: Problem oriented learning: Patient cases and in particular cases of multimorbidity are presented and discussed in order to identify and solve pharmaceutical problems, to demonstrate side effects and interaction potential of various pharmaceuticals. Pharmaceutical care: Everyday consulting in the pharmacy and clinic. . Includes the option of touring a ward of the Fulda clinic (Klinikum Fulda). Special pharmacokinetics and dosage individualization. Design and assessment of clinical studies	3 h / 42 h	Seminar	3	EK 2 Written Exam	LV-16-126-054		Culmsee
48	8.	LV-16-126-057	Pharmakologischer -toxikolo-gischer Demonstrationskurs Pharmacology and Toxicology Demonstrations	Experimental demonstrations and presentations dealing with the effects of pharmaceuticals are introduced, discussed and critically assessed	8 h / 88 h	Praktikum (Demonstration) / Lab (Demonstration)	8	EK 2 Written Exam			Bünemann, Krasel

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49	8.	LV-16-126-048	Arzneimittelanalytik (Drugmonitoring, toxikologische und umweltrelevante Untersuchungen) / Drug analysis, drug monitoring, toxicological and environmental analysis	This course is divided into a theoretical and a practical part. The students are introduced to the fundamental basics of metabolism, structure-activity-relationships (QSAR), ADME, and pro drugs as well as biotransformation and stability of drugs. Students perform qualitative and quantitative analysis of drugs. Stability testing of APIs as well as the examination of potentially counterfeit drugs is also offered.	9 h / 12 h	Praktikum Lab	9	EK 2 Written Exam			Keusgen
50	7./8.	nur im SS LV-16-126-044	Spezielle Rechtsgebeite für Apotheker / Law for pharmacists	These specialist areas include the requirements for the approval of drugs, drug registration and administration laws, and GMP fundamentals (this latter is relevant for and close to industry)	1 h / 14 h	Vorlesung Lecture	1				Friedrich, Binger

Wahlpflichtfächer Pharmazie FB16 (Stand: 2019): M-08-126-20022-10 - Wahlpflichtfach

Link to course lists:
https://marvin.uni-marburg.de/qisserver/pages/cm/exa/coursecatalog/showCourseCatalog.xhtml?_flowId=showCourseCatalog-flow&_flowExecutionKey=e1s31

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	7./8.	LV-16-126-030	Wahlpflichtpraktikum - Specialization of choice	This specialization of choice offers the unique possibility within a 3 week lab-course during the semester holidays - to join a current working group at the University of Marburg. Depending on the student's personal major areas of interest, a working group is chosen that is currently operating in that area of research. The student is assigned to a postgraduate with whom the student then personally and practically collaborates and supports.	37,5 h / 112 h	Labor (Bibliothek) / Lab (Library)	8			

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1	7./8.	LV-16-126-030 1. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Biologie - Biochemie und Molekularbiologie des pilzlichen Sekundärstoffwechsels / Specialization of choice - Pharmaceutical Biology: Biochemistry and molecular biology of the secondary fungal metabolism							Li
2	7./8.	LV-16-126-030 2. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Biologie - Biochemie und Molekularbiologie des pflanzlichen Sekundärstoffwechsels / Specialization of choice – Pharmaceutical biology: Compulsory optional lab work					Protokoll und mündliche Presentation / protocol and oral presentation	Biochemie und Molekularbiologie des pflanzlichen Sekundärstoff-wechsels des Wahlpflichtfaches der Pharmazeuti-schen Biologie des Stoffgebiets K Wahlpflichtfach	Petersen

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3	7./8.	LV-16-126-030 3. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Strukturbasiertes Design und Synthese von Enzyminhibitoren / Specialization of choice - Pharmaceutical Chemistry: Structure-based design and synthesis of enzyme inhibitors						Wahlpflichtfach Medizinische Chemie - Wirkstoffsynthese	Diederich
4	7./8.	LV-16-126-030 4. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Wirkstoffdesign, -synthese, -optimierung und Arznei- u. Wirkstoffinformation / Specialization of choice - Pharmaceutical Chemistry: Active substance design - synthesis, optimization and drug and active substance information							Schlitzer

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5	7./8.	LV-16-126-030 5. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Synthese und Charakterisierung von Wirkstoffen / Specialization of choice - Pharmaceutical Chemistry: Synthesis and characterization of active substances							Steinmetzer
6	7./8.	LV-16-126-030 6. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Molekularbiologie / Specialization of choice - Pharmaceutical Chemistry: Molecular Biology	Recombinant expression, Partial purification and activity measurements of enzymes acting on DNA and RNA (e.g. T7 RNA polymerase, Taq and Pfu DNA polymerases)				Teilnahme und Protokoll / participation and protocol		Hartmann
7	7./8.	LV-16-126-030 7. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Chemoinformatik und strukturbasiertes Wirkstoffdesign							Kolb
8	7./8.	LV-16-126-030 8. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Schwerpunkt Bioanalytik / Specialization of choice - Pharmaceutical Chemistry: Bioanalytic							Keusgen

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9	7./8.	LV-16-126-030 9. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Strukturbiologie und Wirkstoffdesign / Specialization of choice - Pharmaceutical Chemistry: Structural biology and active substance design							Klebe
10	7./8.	LV-16-126-030 10. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Molekularbiologie, Biochemie und Strukturbiologie - Molecular Biology, Biochemistry and Structural Biology							Reuter
11	7./8.	LV-16-126-030 11. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Chemie - Strukturbiologie - Structural Biology							Heine
12	7./8.	LV-16-126-030 12. Parallelgruppe	Wahlpflichtpraktikum in Pharmaziegeschichte / Specialization of choice - History of Pharmacy			Bibliothek der GeschPH / Lab (Library at the Institute for the History of Pharmacy)				Friedrich

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13	7./8.	LV-16-126-030 13. Parallelgruppe	Wahlpflichtpraktikum in Pharmakologie / Klinische Pharmazie / Specialization of choice - Pharmacology: G-Protein coupled receptor signalling							Bünemann
14	7./8.	LV-16-126-030 14. Parallelgruppe	Wahlpflichtfach: Praktikum in Pharmakologie / Klinische Pharmazie - Pharmakologie des neuronalen Zelltods / Specialization of choice - Clinical Pharmacy : Neurodegenerative diseases							Culmsee
15	7./8.	LV-16-126-030 15. Parallelgruppe	Wahlpflichtfach: Praktikum in Pharmakologie / Klinische Pharmazie - Wissenschaftliche Fragestellungen in der Klinischen Pharmazie - Scientific Topics of Clinical Pharmacy							Culmsee

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16	7./8.	LV-16-126-030 16. Parallelgruppe	Wahlpflichtpraktikum in Pharmakologie / Klinische Pharmazie - Kardiovaskuläre Pharmakologie / Specialization of choice - Pharmacology : Cardiovascular pharmacology							Kockskämper
17	7./8.	LV-16-126-030 17. Parallelgruppe	Wahlpflichtpraktikum in Pharmakologie / Klinische Pharmazie - Speciialization of choice in Clinical Pharmacy							Radziwill
18	7./8.	LV-16-126-030 18. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Technologie - Kolloidale Wirkstoffträger / Specialization of choice – Pharmaceutical technology and biopharmacy							Bakowsky

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19	7./8.	LV-16-126-030 19. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Technologie - „Nanocarrier zur optimierten Wirksamkeit schwerlöslicher Substanzen" - Nanocarriers with improved biopharmaceutical efficacy							Keck
20	7./8.	LV-16-126-030 20. Parallelgruppe	Wahlpflichtpraktikum in Pharmazeutische Technologie / Specialization of choice in Pharmaceutics							Runkel
21	7./8.	LV-16-126-030 21. Parallelgruppe	Wahlpflichtpraktikum an einem Institut außerhalb des Fachbereichs Pharmazie / Specialization of choice outside the Department of Pharmacy							Diederich

Ringvorlesung, FB16 (Stand: 2019) / Lecture Series, Faculty of Pharmacy (Status: 2019)

For the actual number please have a look into the course overview

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1	5. - 7.	LV-16-126-115	Pharmazeutische Biologie A: Arzneipflanzen / Biology A: Medicinal plants	Pharmazeutische Biologie III (Biologische und phytochemische Untersuchungen) The main focuses of the lecture are medicinal plants. In the first part, the chemical structures, detection reactions, biosynthesis as well as biological and pharmacological activities of the important plant metabolite groups will be discussed. In the second part, the details of important medicinal plants will be presented. This includes short description of the plant and drugs derived thereof, the main and effective constituents of the drugs and indications in the phytotherapy	3	Vorlesung Lecture	3 for each part	Li
		LV-16-126-116	Pharmazeutische Biologie B: Phytopharmaka und Antiinfektiva / Pharmaceutical Biology B: preparations from plants and antiinfectives from microorganisms and Plants	The first part of the lecture deals with preparations from medicinal plants: the extraction procedures and quality controls, their use in the modern medicine for diverse indication fields. The focuses of the second parts are drugs from microorganisms and plants, which are used for treatment of infection diseases. They include antibiotics, antifungal and antimalarial agents. The chemical structures, technical production, mode of actions, biosynthesis and applications will be summarized. In addition, the resistance problem, mechanisms as well as prevention will also be discussed				
		LV-16-126-117	Pharmazeutische Biologie C: Immunologie und Gentechnologie / Pharmaceutical Biology C= Immunology and Gene technology	The basic knowledge of immunology will be treated. This includes the immune system, immune cells, activation of T- and B-lymphocytes, antibody production and memory cells. The importance and principle of immunization with diverse vaccines as well as production and quality control of vaccines will also be discussed. The part of Gene technology deals with the new trends of pharmaceutical biology, i.e. production of recombinant drugs including insulin, growth factors, antibodies and cytokines. After introduction for basic knowledge and technology for protein production, the different classes of recombinant drugs for different indications with representatives will be discussed in the lecture				

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2	5. - 7.		Pharmaceutical medical Chemistry Part A,B,C	Pharmazeutisch medizinische Chemie (Ringvorlesung) This part of the course discusses the molecular fundamentals on the interactions between ligands and pharmaceutical constituents (such as, for example, enzymes and receptors). It also looks thoroughly at the synthesis of pharmaceuticals and pharmaceutical analysis and the chemical properties of pharmaceuticals and their development in detail.	3	Vorlesung Lecture	3 for each part	Hartmann, Keusgen, Klebe, Schlitzer, Steinmetzer
		LV-16-126-102	Pharmazeutisch medizinische Chemie III (Arzneistoffe A)					
		LV-16-126-103	Pharmazeutisch medizinische Chemie III (Arzneistoffe B)					
		LV-16-126-104	Pharmazeutisch medizinische Chemie III (Arzneistoffe C)					

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3	5. - 7.	LV-16-126-130	Pathophysiologie/Pathobiochemie I	Pathophysiologie und Pathobiochemie I (Ringvorlesung) This lecture is distributed over three semesters and covers the foundations of pathophysiological and pathobiochemical changes in disease.	2h	Lecture series	2 for each part	Bünemann, Krasel
		LV-16-126-131	Pathophysiologie/Pathobiochemie II					
		LV-16-126-132	Pathophysiologie/Pathobiochemie III					
		LV-16-126-133	Einführung in die medizinischen Grundlagen I Part A	Einführung in die medizinischen Grundlagen I (Ringvorlesung) This lecture is distributed over three semesters and gives an introduction to the medicinal foundations	1 h	Vorlesung Lecture	1 for each part	
		LV-16-126-134	Einführung in die medizinischen Grundlagen I Part B					
		LV-16-126-135	Einführung in die medizinischen Grundlagen I Part C					
		LV-16-126-105	Pharmakologie und Toxikologie I	Pharmakologie und Toxikologie This lecture is distributed over three semesters and covers both the principles of pharmacology and toxicology as well as the pharma-cology and toxicology of various organ systems. The emphasis is on the foundations of disease treatment	2 h	Vorlesung Lecture series	2 for each part	
		LV-16-126-106	Pharmakologie und Toxikologie II					
		LV-16-126-107	Pharmakologie und Toxikologie III					

Nr. / No.	Semester	Kursnummer Course number	Kursname Course title (German title)	Kursbeschreibung Course description	h pro Wo./Sem. h per week/Sem.	Kurstyp Course type	ECTS / ECTS points	Verantwortlicher Name of the person/ people responsible for the course
3	5. - 7.	LV-16-126-130 LV-16-126-131 LV-16-126-132 LV-16-126-133 LV-16-126-134 LV-16-126-135 LV-16-126-105 LV-16-126-106 LV-16-126-107	Pathophysiologie/Pathobiochemie I Pathophysiologie/Pathobiochemie II Pathophysiologie/Pathobiochemie III Einführung in die medizinischen Grundlagen I Part A Einführung in die medizinischen Grundlagen I Part B Einführung in die medizinischen Grundlagen I Part C Pharmakologie und Toxikologie I Pharmakologie und Toxikologie II Pharmakologie und Toxikologie III	Pathophysiologie und Pathobiochemie I (Ringvorlesung) This lecture is distributed over three semesters and covers the foundations of pathophysiological and pathobiochemical changes in disease. Einführung in die medizinischen Grundlagen I (Ringvorlesung) This lecture is distributed over three semesters and gives an introduction to the medicinal foundations Pharmakologie und Toxikologie This lecture is distributed over three semesters and covers both the principles of pharmacology and toxicology as well as the pharma-cology and toxicology of various organ systems. The emphasis is on the foundations of disease treatment	2h 1 h 2 h	Lecture series Vorlesung Lecture Vorlesung Lecture series	2 for each part 1 for each part 2 for each part	Bünemann, Krasel
4	6. - 7.	LV-16-126-136 LV-16-126-137	Pharmazeutische Technologie einschließlich Medizinprodukte (Teil A) Pharmazeutische Technologie einschließlich Medizinprodukte (Teil B)	Pharmazeutische Technologie Acquisition of expertise in the fields of classical and modern dosage forms, particularly the manufacture, testing and assessment, evaluation and properties of excipients and additives, incompatibilities, stabilities of medicines and the essential foundations of homoeopathic pharmaceuticals, medical devices, sera and vaccines	4 h	Vorlesung Lecture	4 for each part	Bakowski