

# Detailinhalte Curriculum Bachelorstudiengang Medical Science

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# CURRICULUM BACHELOR MEDICAL SCIENCE

## 1. STUDIENJAHR

### Module BM01 Basics of Medical Science

<i>Module number and name</i>	BM01 Basics of Medical Science
<i>Coordinator</i>	Assoc. Prof. Dr. Manfred Wieser, MSc, MME
<i>Semester</i>	1
<i>ECTS</i>	5,0
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses Part of Integrated Exam I

This module contains the introductory events and lectures at Campus Krems including an inter-professional exchange with students of the University of Applied Sciences, as well as getting to know the three university hospitals Krems, St. Pölten and Tulln. In the courses, the key medical skills are described and experienced in relation to a specific case or a leading symptom (typical, frequent, multidimensional problem such as CHD, icterus, shortness of breath, etc.) and assigned to the various specialist areas using this case as an example.

The module contains a lecture on cell biology. The structural and functional organization of eukaryotic cells and the dynamics of intracellular organelles and vesicles will be introduced. Further it contains a practical laboratory course where the most important lab safety rules and basic laboratory tasks are introduced.

The module contains a lecture on the basics of signal transduction. Students will be exposed to the principal pathways of communication within the body. More precisely, concepts of chemical signalling (hormones, transmitters), electrical signalling (electrical excitability), the importance of ions for cellular functions with a particular emphasis on calcium. Finally, the concept of systemic vs. local action will be introduced.

A further focus is set with the introductory lecture and the hands-on practical course in first aid.

At the end of the module, the students have a detailed understanding of the formal and content-related requirements of the BA course and an overview of the requirements of the MA course. They are basically familiar with the various learning tools and methods and have experienced different ways of working in large groups, in small groups (incl. peer-teaching) and in self-study as well as some of the forms of assessment used in the curriculum.

Module Code	Section Code	Module Section	ECTS
BM01	BM01.01	Introduction Medical Science	2,0
BM01	BM01.02	Basic Lab Works	0,5
BM01	BM01.03	Elements of life	1,0
BM01	BM01.04	First Aid	1,5
ECTS to be obtained			5,0

## Module BM02 Locomotion: From Form to Function

<i>Module number and name</i>	BM02 Locomotion: From Form to Function
<i>Coordinator</i>	Univ.-Prof. Dr. med. Johannes Streicher
<i>Semester</i>	1
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ, short answer questions Part of Integrated Exam I

This module introduces into the structural and functional organization of the human body by using the example of the locomotory system.

General Osteology, arthrology and myology is followed by specific anatomy of bones, joints and groups of head, trunk and limb musculature. Lectures in Anatomy are supplemented by practical exploration of bone- and joint-specimens employing tutor-guided peer-to-peer teaching. On a microscopic level students are introduced to fundamentals of tissue morphology and function, combining lectures and virtual microscopy. Diagnostic imaging of the locomotory system introduces into the clinical competence of distinguishing regular morphology from pathological findings. In advance, fundamentals of imaging modalities and radioprotection are presented.

The knowledge on fundamentals in cell biology (BM01) and signal transduction (BM03) is extended to understand the entire physiological process, namely skeletal muscle functions. The physiology part of this module thus introduces the general properties of muscle tissue and the different types of muscle (skeletal, cardiac, smooth muscles). The muscle architecture and structure as well as the principles of force generation will be introduced. With excitation-contraction coupling students will be exposed to a detailed molecular process and the role of calcium for muscle contraction. The course consists of lectures and practical courses. Preparation for practical courses is performed with guiding questions (flipped classroom).

Module Code	Section Code	Module Section	ECTS
BM02	BM02.01	Macroanatomy of the Locomotory System	2,5
BM02	BM02.02	Microanatomy of the Locomotory System	1,0
BM02	BM02.03	Basics of Diagnostic Imaging of the Locomotory System	0,5
BM02	BM02.04	Physiology of the Locomotory System	1,0
ECTS to be obtained			5,0

## Module BM03 From Cell to Organism

<i>Module number and name</i>	BM03 From Cell to Organism
<i>Coordinator</i>	Mag. <sup>a</sup> Ursula Föger-Samwald, PhD
<i>Semester</i>	1
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ, short answer questions Part of Integrated Exam I

Lectures in this module provide fundamental knowledge on chemistry and on the physicochemical nature of the most important macromolecules, namely proteins, carbohydrates, lipids, and nucleic acids. This serves as a prerequisite to understand the roles of these molecules as building bricks and major protagonists in physiological processes within the cell and the organism. The major nutrients, proteins, carbohydrates, and lipids are discussed in the context of metabolic processes at the cellular level. Thereby students are given an overview and an understanding of the interconnections between the most important anabolic and catabolic pathways and of metabolic processes in the context of whole organisms and diseases. Following an integrative approach, an introduction into the systematic anatomy of the digestive system is also given at this point. Additionally, fundamentals on the kinetics of biochemical reactions and the way enzymes modulate these processes are discussed.

Knowledge on fundamentals in cell biology (cell organization and compartmentalization) gained in module BM01 is extended by lectures on important cell physiological processes such as signal transduction, cell division, and cell death. Transport across membranes and exchange between cellular compartments is discussed in the context of exchange processes between the capillary system and different organs such as the kidney, the brain, or the muscle. This will further substantiate the understanding of the key role of cellular membranes in cell-to-cell communication, particularly the importance of the electrochemical gradient and its basic role in signal transduction. Moreover, it will facilitate a better understanding of physiological processes at the level of the whole organism to be provided in module BM04. Finally, basic knowledge on gene expression is presented. In a practical laboratory training, state-of-the-art molecular and cell biology techniques are presented and applied by the students.

Lectures in anatomy introduce the systematic anatomy of the digestive system at a propaedeutic level, from the oral cavity way through to the anal opening.

Module Code	Section Code	Module Section	ECTS
BM03	BM03.01	Basics of Chemistry, Biomolecules, and Metabolism	2,0
BM03	BM03.02	Basics of Molecular Cell Biology	2,0
BM03	BM03.03	Introduction to Molecular and Cellular Laboratory Techniques	1,0
ECTS to be obtained			5,0

## Module BM04 Essential Human Body Functions

<i>Module number and name</i>	BM04 Essential Human Body Functions
<i>Coordinator</i>	Univ.-Prof. Mag. Dr. Gerald Obermair
<i>Semester</i>	2
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ, short and medium answer questions Part of Integrated Exam I

Lectures in anatomy deal with the systematic anatomy of the cardiovascular and respiratory organs, as well as the nervous system and the sensory organs. Diagnostic imaging introduces the clinical competence of distinguishing regular morphology from pathological findings in the cardiovascular and respiratory system. Ultrasound of the heart focuses on the comprehension of the regular spatiotemporal activity of the heart.

After being introduced to the anatomy of the respective organs and systems, lectures in neurophysiology will provide an introduction into general, specific, and integrative functions of the nervous system. The lectures will first focus on the regulatory components and levels of the nervous systems first (CNS, PNS, receptors, effectors). It will subsequently cover basic neurophysiology including the principles of cellular excitability and signal transduction with a particular focus on synaptic transmission, the various forms of neuronal plasticity, as well as the molecular basics of learning and the formation of memory. It will cover the somatosensory system, movement control and basic functions of the autonomic nervous systems. The lectures will also introduce the sensory systems (proprioception, sensations, vision, hearing, taste, and olfaction) and the basic signal transduction processes. Lectures will be supplemented by self-study tasks (flipped classroom exercises) and practical courses on neuronal excitability (including synaptic transmission) and sensory physiology.

The lectures in cardiovascular physiology will first introduce the heart and its different modes of regulation (autonomous, neural, and systemic). In particular, the lectures will introduce the cardiac cycle and hemodynamic, discuss cardiac excitation-contraction coupling and autonomous pace making. Cardiac electrical excitability and ECG recordings will be introduced. The lectures will further discuss all other functional components of the cardiovascular systems and particularly focus on autonomous regulation and the physical bases (law of La Place, Frank-Starling mechanism, Bayliss effect). Finally, the lecture will provide a basic introduction into blood function and provide an introduction into respiration. An outlook on the physiological interplay between all regulatory systems, which will be extensively introduced in module BM06, will be provided. Lectures will be supplemented by self-study tasks (flipped classroom exercises) and practical courses in respiratory physiology and heart function and electrical properties (understanding the physiology underlying ECG recordings).

Module Code	Section Code	Module Section	ECTS
BM04	BM04.01	Anatomy of the Organs of Essential Human Body Functions	2,0
BM04	BM04.02	Neurophysiology	2,0
BM04	BM04.03	Cardiovascular Physiology	1,0
ECTS to be obtained			5,0



## Module BM05 Molecular Control

<i>Module number and name</i>	BM05 Molecular Control
<i>Coordinator</i>	Mag. <sup>a</sup> Ursula Föger-Samwald, PhD
<i>Semester</i>	2
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ, short answer questions Part of Integrated Exam I

Building on basic knowledge of biochemistry and molecular biology gained so far in module BM03, lectures in this module focus on the organization of the genome and regulatory processes within the body on the genetic and molecular level. Gene expression including transcription, posttranscriptional modifications, translation, and posttranslational modifications are discussed in detail and basic knowledge on how gene expression can be regulated at different levels of the process including epigenetic mechanisms is provided. Moreover, the role of gene expression as part of molecular circuits and complex regulatory loops within the body (e.g. cell cycle clock, iron metabolism) is discussed.

Another focus of this module is set on human genetics. Information on the most important alterations of the genome at different levels (genome mutations, chromosome aberrations and gene mutations) and on exemplary diseases associated with these alterations is given. Basic terms used in human genetics (e.g. genotype and phenotype, dominant and recessive alleles, homozygote and heterozygote, genetic polymorphism, monogenetic versus polygenetic diseases, germline mutation versus somatic mutation) are discussed. Moreover, basic knowledge on population genetics and different modes of inheritance for single gene diseases (e.g. recessive versus dominant inheritance) is provided. Possible causes and pathophysiologic mechanisms of atherosclerosis and the metabolic syndrome as examples of polygenetic, multifactorial diseases are discussed, and the concept of personalized medicine is introduced.

Finally, in a practical laboratory training, state-of-the-art molecular and genetic techniques are presented and applied by the students.

Module Code	Section Code	Module Section	ECTS
BM05	BM05.01	Organization of the Genome and Molecular Control of Gene Expression	1,5
BM05	BM05.02	Human Genetics and Genetics in the Context of Diseases and Therapeutics	1,5
BM05	BM05.03	Molecular Analysis of Cellular Systems	2,0
ECTS to be obtained			5,0

## Module BM06 Homeostasis

<i>Module number and name</i>	BM06 Homeostasis
<i>Coordinator</i>	Univ.-Prof. Mag. Dr. Gerald Obermair
<i>Semester</i>	2
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ, short and medium answer questions Part of Integrated Exam I

Lectures in anatomy deal with the systematic anatomy of the urinary system, the reproductive system and the endocrine glands. Diagnostic imaging introduces the sonographic competence of distinguishing regular morphology from major pathological findings in the urogenital and endocrine system. After being introduced to the anatomy of the respective organs and systems, the goal of module BM06 is to understand the interactions of all physiological systems for the regulation of body homeostasis.

To this end, the module will first discuss the physiological systems, which have not yet been extensively discussed in modules BM01, BM02, and BM04. Thus, this module first provides a basic overview on nutrition, energy supply and metabolism.

Next in renal physiology all functions of the kidney will be introduced. The lectures and self-study will particularly focus on urine concentration mechanisms and the role of the kidney as an endocrine control organ in tight interplay with the cardiovascular system.

The CNS will be discussed in the context of its integrative functions, the role of the CNS in homeostasis and the sleep-wake cycle. A section on systemic homeostasis will focus on the interplay between autonomic, local, and systemic regulatory mechanisms and discuss the importance of acid-base regulation in the systemic context. In module BM04, students were introduced to the basic features and mechanisms of cardiovascular physiology. Module BM06 will build upon this knowledge and discuss the interplay of cardiovascular physiology with neuronal, renal, and systemic homeostatic regulation.

The lectures and self-study blocks will be supplemented by practical courses on kidney functions and cardiovascular homeostasis (short and long-term regulation of blood pressure, adaptation of circulation to static and dynamic exercise). Finally, in the seminar in integrative physiology the students will be required to summarize physiological sub-topics in short papers and get the chance to voluntarily present their acquired knowledge in short presentations. Mandatory paper assignments and voluntary presentations will be integral components of the assessment in addition to the module exam.

Module Code	Section Code	Module Section	ECTS
BM06	BM06.01	Anatomy of the Urogenital System and Endocrine Organs	0,5
BM06	BM06.02	Interplay of Physiological Systems	4,5
ECTS to be obtained			5,0

## Line Biomedical Physics

<i>Line number and name</i>	BMP1 & 2 Line Biomedical Physics
<i>Coordinator</i>	Univ.-Prof. DI Dr. Dieter Pahr
<i>Semester</i>	1 & 2
<i>ECTS</i>	5,5 (4,0 + 1,5)
<i>Assessment</i>	Line exams: MSC, short answer questions BMP Line exam Mathematics, BMP Line exam Physics I, BMP Line exam Physics II

Biomedical physics (BMP) is the conjugation of Physics and Biology in Medicine. It is an interdisciplinary field of science that involves the application of different subspecialties of Physics, Mathematics and Computer Sciences for the growth and development of medical science and healthcare. These are increasingly being applied in everyday clinical practice in the areas of diagnostics, monitoring, and therapy. Interdisciplinary knowledge transfer in this field is therefore an essential part of the program to prepare graduates for this future challenge, so the physical basics are incorporated into clinical examples.

In year 1 the focus will be on basics of mathematics, mechanics, solids & fluids, and thermodynamics.

Line Code	Section Code	Line Section	ECTS
BMP1	BMP1.01	Mathematics for Medical Sciences	1,5
BMP1	BMP1.02	Physics for Medical Sciences I	2,5
BMP2	BMP2.02	Physics for Medical Sciences II	1,5
ECTS to be obtained			5,5

## Line Public Health and Economics

<i>Line number and name</i>	PHE 1 & 2 Line Public Health and Economics
<i>Coordinator</i>	Dr. <sup>in</sup> phil. Valentina Mitgutsch, BA, MA
<i>Semester</i>	1 & 2
<i>ECTS</i>	4,0 (2,0 + 2,0)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses Part of Integrated Exam II

Health economics is a branch of economics concerned with issues related to efficiency, effectiveness, value and behaviour in the production and consumption of health and healthcare. Health economics is important in determining how to improve health outcomes and lifestyle patterns through interactions between individuals, healthcare providers and clinical settings.

Public health refers to all organized measures (whether public or private) to prevent disease, promote health, and prolong life among the population as a whole. Its activities aim to provide conditions in which people can be healthy and focus on entire populations, not on individual patients or diseases. Thus, public health is concerned with the total system and not only the eradication of a particular disease.

The three main public health functions are:

- the assessment and monitoring of the health of communities and populations at risk to identify health problems and priorities.
- the formulation of public policies designed to solve identified local and national health problems and priorities.
- to assure that all populations have access to appropriate and cost-effective care, including health promotion and disease prevention services.

The teaching and learning contents are dealing with Public-Health and Health Economics-specific fundamentals and focus on certain policies, strategies, and skills in the field of Life-style management.

Line Code	Section Code	Line Section	ECTS
PHE1	PHE1.01	Basics of Public Health and Health Economics	2,0
PHE2	PHE2.02	Health Care Systems and Models in an International Comparison	1,5
PHE2	PHE2.03	Public Health Skills	0,5
ECTS to be obtained			4,0

## Line Professional Development and Skills

<i>Line number and name</i>	PDS1 & 2 Line Professional Development and Skills
<i>Coordinator</i>	Ass.-Prof. Dr. Michael Schmidts, MME
<i>Semester</i>	1 & 2
<i>ECTS</i>	7,0 (4,0 + 3,0)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses (including Summative Evaluation*)

This series of courses teaches communication, collaboration and medical professional skills that are indispensable for the practice of the medical profession in addition to specialist knowledge.

- As Communicators, physicians effectively facilitate the doctor-patient relationship and the dynamic exchanges that occur before, during, and after the medical encounter.
- As Collaborators, physicians effectively work within a healthcare team to achieve optimal patient care.
- As Professionals, physicians are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, cultural awareness, and high personal standards of behaviour.

In addition, the line offers opportunities for students to develop personally and fosters self-organisational skills.

In year one, students get general insight into basic frameworks of communication, teamwork, and medical ethics. Theories are applied in role-play or case studies. Findings are linked to individual learning goals using a portfolio.

- In Basics of (Self) Management, students learn how to learn (individual and in groups) by applying modern learning theory. They get some insight how to organize their learning in terms of work-life-balance. They explore their own competencies (strength and weaknesses) and develop strategies how to improve.
- Focus on Basics of Communication is how to establish a relationship in an interview, how to detect hidden messages beyond the factual level (like self-revelation or appeal), how to interpret non-verbal behaviour and how to show empathy.
- Basics of Collaboration introduces the different roles, professions and disciplines of health professionals and their collaboration. Students learn how teams work by performing group work assignments, which are reflected by theory guided observation and feedback.
- In Medical Professionalism, Ethics and Law students learn about the modern physician patient relationship, societal attitudes towards health, medical professionalism and values and fundamentals of gender and cultural diversity.

Line Code	Section Code	Line Section	ECTS
PDS1	PDS1.01	Basics of (Self)Management	1,5
PDS1	PDS1.02	Basics of Communication	1,0
PDS1	PDS1.03	Basics of Collaboration	1,0
PDS1	PDS1.04	Medical Professionalism, Ethics and Law	0,5
PDS2	PDS2.01	Basics of (Self)Management	1
PDS2	PDS2.02	Basics of Communication	0,5
PDS2	PDS2.03	Basics of Collaboration	0,5
PDS2	PDS2.04	Medical Professionalism, Ethics and Law	1,0
ECTS to be obtained			7,0

- \* Summative Evaluation: Students are required to write short reflection reports (personal reports) on the courses in the line. At the end of the year, these reports are summarized and evaluated by the teachers according to the following criteria: complete submission, continuous delivery and quality of content.

## Line Science and Research

<i>Line number and name</i>	SRE1 & 2 Line Science and Research
<i>Coordinator</i>	Dr. <sup>in</sup> Sophie Schober
<i>Semester</i>	1 & 2
<i>ECTS</i>	5,5 (2,0 + 3,5)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses Part of Integrated Exam I

This line provides students with basic academic skills, including thesis writing, group discussion, and presentation skills. For successfully completing the scheduled courses, students have to demonstrate the intellectual, time- and resource-management, and technical requirements for productive, rigorous, and responsible scientific investigation and reporting. The aim of this line is to produce graduates that apply research findings to improve the lives of the patients in their care.

At the beginning of their studies, students will have their first contact with scientific literature. Different workshops will introduce students to library facilities, literature searching, and citing. In detail, that means introduction to the public library of the university and available online libraries. Various formats of literature (books, articles, other scientific contributions) will be presented. Furthermore, different ways of literature procurement via the internet are taught. Students will get an overview about the most common search engines (PubMed, Scirus, ...) and databases in medicine (such as Medline, Embase, Scopus or the Cochrane library).

The courses address the correct way of using already published information according to good scientific practice (GSP). This also includes correct citing (direct and indirect citations, citations in the reference list) as well as an overview on different citation styles and correct naming of authorship. To be able to process and present all the information in a sufficient way, KL provides templates in different office formats. A short instruction on KL templates and CI forms the conclusion of the first semester.

Besides the different ways of how to find a required source, a workshop on literature managing is set. Students should learn how to handle the increasing amount of information by using the reference manager EndNote.

Additionally, students are introduced to different research methods important in medical sciences. In the first year, the main focus will be on quantitative study methods such as observational or retrospective studies and randomised controlled trials. A brief overview on the basics of clinical trials will be given. In this context, a course about research ethics is set. Students learn about the necessity of an ethics committee, its work, and its legal basis.

After completion of the first year, students will become adept at working with primary research literature and thereby become increasingly critical of what they read in books and of what they are told in lectures.

Line Code	Section Code	Line Section	ECTS
SRE1	SRE1.01	Literature	1,0
SRE1	SRE1.02	Scientific Presentation Techniques	0,5
SRE1	SRE1.03	Research Ethics	0,5
SRE2	SRE2.01	Literature	1,0
SRE2	SRE2.03	Research Ethics	0,5
SRE2	SRE2.04	Scientific Methods	2,0
ECTS to be obtained			5,5



## 2. STUDIENJAHR

### Module BM07 From Health Maintenance to Disease

<i>Module number and name</i>	BM07 From Health Maintenance to Disease
<i>Coordinator</i>	Mag. <sup>a</sup> Ursula Föger-Samwald, PhD
<i>Semester</i>	3
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ, short answer questions Part of Integrated Exam II

By presenting a continuum from health to disease, lectures of this module provide fundamental knowledge on basics of pathology and pathophysiology, on tumour cell biology and pathology, and on immunology.

Lectures on tumour cell biology and pathology provide information on cancer epidemiology and biology. The hallmarks of cancer development are discussed with a focus on pathophysiological aspects of cancer development and potential targets for cancer therapy. Additionally, tumour pathology is discussed, thereby providing basic knowledge on morphological changes of tumours, tumour nomenclature and classification, and possibilities to stage and grade tumours and their metastasis.

Lectures on Immunology provide basic knowledge on innate and adaptive immunity, the two different types of immune responses. Moreover, structures, cells, and humoral factors involved in immunological reactions are discussed. Knowledge acquired from lectures on tumour biology and lectures on immunology are combined by providing information on the interplay of tumour growth and immune reactions. Switching from the protective role to potential harmful reactions of the immune system, basics of transplant immunology and the four types of hypersensitivity reactions including autoimmune diseases and allergic reactions are discussed.

Throughout the module, with the help of selected diseases (e.g. primary and acquired immunodeficiency syndromes) basic and important pathophysiologic mechanisms leading to the development of pathologies are exemplified.

Finally, in an autopsy training and an excursion to the pathologic-anatomic collection of the Narrenturm, students have the possibility to visualize and expand knowledge on selected contents of module BM07.

Module Code	Section Code	Module Section	ECTS
BM07	BM07.01	Introduction to Pathology and Pathophysiology	1,0
BM07	BM07.02	Tumor Biology and Pathology	2,0
BM07	BM07.03	Immunology	2,0
ECTS to be obtained			5,0

## Module BM08 Basics of General Medicine

<i>Module number and name</i>	BM08 Basics of General Medicine
<i>Coordinator</i>	Dr. <sup>in</sup> Susanne Rabady
<i>Semester</i>	3
<i>ECTS</i>	5,0
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses Part of Integrated Exam II

General Medicine: Students should acquire terminology as well as a basic knowledge of the professional field of General Medicine. The module deals with its main issues and the tasks and roles of health professionals in primary health care.

An understanding of the profession as the specialty dealing with the whole person over its life cycle should be reached. This will comprise the basic principles of medicine:

Studying the ways, methods, and aims of health maintenance, students shall experience the correlation between lifestyle, life within a community, environmental factors, and individual health.

They will be introduced to frequent acute health problems and their management within the health care system and gain first insights into the principles of clinical decision making.

Basic knowledge on the topic of chronic illness in its wide scope of aspects (physiological, psychological, economic impact) will be conveyed, including methods of disease management and care.

Holistic approach, interprofessional cooperation, continuity of care and structured care are the central strategies in dealing with chronic disease and multimorbidity. Students will gain basic knowledge and skills in these fields and get opportunities to develop and form their attitudes towards comprehensive individual health care within a community.

Module Code	Section Code	Module Section	ECTS
BM08	BM08.01	Health Maintenance - Self Care	1,5
BM08	BM08.02	Acute Health Problems	1,5
BM08	BM08.03	Chronic Care	1,5
BM08	BM08.04	Beyond Curative Medicine: Rehabilitation/Palliation in General Medicine	0,5
ECTS to be obtained			5,0

## Module BM09 Basics of Pharmacological Treatment

<i>Module number and name</i>	BM09 Basics of Pharmacological Treatment
<i>Coordinator</i>	Univ.-Prof. <sup>in</sup> Priv.-Doz. <sup>in</sup> MMag. <sup>a</sup> Dr. <sup>in</sup> Dagmar Stoiber-Sakaguchi
<i>Semester</i>	3
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ, short answer questions Part of Integrated Exam II

The lectures within this module provide fundamental knowledge on the basic principles of pharmacology and toxicology. This includes pharmacokinetics and pharmacodynamics and related principles such as tolerance and adaptation or the principles of drug development and drug admission. This serves as the basis of pharmacology and a prerequisite to understand drug treatment and safety. With the theoretical background and application-orientated examples of drugs (including calculation examples) these basic principles are trained.

In order to deepen the understanding of these contents, two important areas of pharmacology will be introduced here in these courses in more detail: This is on the one hand the pharmacotherapy of infectious diseases, and on the other hand the pharmacotherapy of tumor diseases. Pharmacotherapy of infectious diseases covers antibiotics and antifungal drugs, and pharmacotherapy of tumors includes cytostatic drugs as well as signal interceptors such as monoclonal antibodies and kinase inhibitors. With drugs that are used for the treatment of these disease entities as examples, the previously trained basic principles of pharmacology can be linked and applied, significantly contributing to the understanding of these basic principles.

In addition, an overview of toxicology will also be topic of the lectures in this module.

Finally, in a seminar with small groups the contents of the lectures will be discussed in detail, and students will apply their knowledge. Also, drug prescriptions for the discussed disease entities will be practiced, which is based on the selection of the right drug, dosage regimen, route of administration, drug effects and side effects and the consideration of disease and patient characteristics as well as co-morbidities.

Module Code	Section Code	Module Section	ECTS
BM09	BM09.01	Principles of Drug Therapy	3,0
BM09	BM09.02	Applied Pharmacology and Drug Prescriptions	2,0
ECTS to be obtained			5,0

## Module BM10 Microbiology and Hygiene

<i>Module number and name</i>	BM10 Microbiology and Hygiene
<i>Coordinator</i>	Prim. <sup>a</sup> Dr. <sup>in</sup> Barbara Ströbele Univ.-Prof. PD Dr. Andreas Farnleitner, MSc.Tox.
<i>Semester</i>	4
<i>ECTS</i>	3,0
<i>Assessment</i>	Module exam: MCQ Part of Integrated Exam II

Microbes and viruses are fundamental for human health and disease, showing both positive and negative interactions. Recent research increasingly demonstrates the beneficial role of the human microbiome on the well-being of the individual. On the other hand, many microbes and viruses are known to act as *obligatory notorious pathogens* and are responsible for the spread and occurrence of infectious diseases in the human population throughout the environmental and clinical setting. Moreover, *facultative pathogens* can cause infections and diseases if the immune status and the respective situation permits. Appropriate hygienic measures and practices are important for the prevention and control of direct negative impacts from microbes and viruses on human health. In addition, awareness must be raised that microbes affect human health also indirectly: environmental microbiomes are essential for almost all ecosystems and ecosystem services, being involved in the transformation of organic and inorganic substances in the environment (e.g. mineralization, toxification).

The module BM10 Microbiology and Hygiene conveys the basic knowledge required by physicians and health scientists to understand the complex interactions between the microbial world and human health. The module also introduces the essential concepts on hygienic measures and strategies to prevent and control for the spread of infectious diseases. The theory covers the fields of general and environmental microbiology, clinical microbiology, hospital hygiene, and environmental hygiene with a focus on food and water. The practical laboratory course will introduce and apply essential diagnostic methods in microbiology and hygiene (sampling, cultivation, isolation and enumeration of microbes, microscopy, antimicrobial resistance testing, molecular diagnostics, microbiomics). For further details on the laboratory course see **laboratory handout BM10**.

Module Code	Section Code	Module Section	ECTS
BM10	BM10.01	Microbiology and Hygiene	3,0
ECTS to be obtained			3,0

## Module BM11 Prevention of Lifestyle Diseases

<i>Module number and name</i>	BM11 Prevention of Lifestyle Diseases
<i>Coordinator</i>	Prim. <sup>a</sup> Assoc. Prof. <sup>in</sup> Dr. <sup>in</sup> Andrea Podolsky
<i>Semester</i>	4
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: oral Part of Integrated Exam II

The goal of this course is to understand how bodily systems work during physical activity. Only if this has been understood one can appreciate why regular exercise is important to preserve health.

In this course the most relevant bodily systems like energy metabolism, the physiology of the skeletal and the locomotor system, muscle physiology regulation and control of macronutrient metabolism and basic exercise physiology of the cardiovascular and breathing organs will be discussed.

In "Exercise Prescription in Health and Disease" students learn how to apply principles of exercise physiology in order to protect health and improve health related physical fitness. During practice units' students will get the opportunity to get hands on instructions on how to perform health related fitness testing and exercise prescription.

The aim of the lectures in "Life Style Diseases" is to understand how poor life style habits can cause or promote chronic disease. The focus will be on the skeletal and locomotor system, the cardiovascular and pulmonary system and on metabolism. These are the bodily systems affected most frequently by lifestyle diseases.

Another goal will be to learn about similarities and differences between physiologic ageing and disease processes regarding physical performance and the role of physical activity and training in these contexts.

Module Code	Section Code	Module Section	ECTS
BM11	BM11.01	Exercise Physiology	1,5
BM11	BM11.02	Exercise Prescription in Health & Disease	2,0
BM11	BM11.03	Life Style Diseases	1,5
ECTS to be obtained			5,0

## Module BM12 Elective Module

<i>Module number and name</i>	BM12 Elective Module
<i>Coordinator</i>	Mag. <sup>a</sup> Ursula Föger-Samwald, PhD
<i>Semester</i>	4
<i>ECTS</i>	3,0
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses

In Elective courses, specific in-depth knowledge is acquired. In addition, Elective courses can also serve as introduction for practical realization and writing of the BA thesis. They can be chosen from a range of different elective modules and have an immanent examination character.

An exemplary elective module is structured as follows.

- Introduction
- Practical part
- Tasks for students, delivery or presentation of the task
- Feedback and discussion

Information on the Elective Modules offered in a specific academic year (Learning and qualification outcomes, Course outlines) will be announced via the study management system.

Module Code	Section Code	Module Section	ECTS
BM12	BM12.01	Example Elective	3,0
ECTS to be obtained			3,0

\* may vary in specific electives

## Line Biomedical Physics

<i>Line number and name</i>	BMP3 & 4 Line Biomedical Physics
<i>Coordinator</i>	Univ.-Prof. DI Dr. Dieter Pahr
<i>Semester</i>	3 & 4
<i>ECTS</i>	5,0 (3,0 + 2,0)
<i>Assessment</i>	Line exams: MSC, short answer questions BMP Line exam Physics III, BMP Line exam Physics IV, BMP Line exam Physics V

Biomedical physics (BMP) is the conjugation of Physics and Biology in Medicine. It is an interdisciplinary field of science that involves the application of different subspecialties of Physics, Mathematics and Computer Sciences for the growth and development of medical science and healthcare. These are increasingly being applied in everyday clinical practice in the areas of diagnostics, monitoring and therapy. Interdisciplinary knowledge transfer in this field is therefore an essential part of the program to prepare graduates for this future challenge, so the physical basics are incorporated into clinical examples.

In year 2 the focus will be on electricity, sound & optics, radiation & health.

Line Code	Section Code	Line Section	ECTS
BMP3	BMP3.02	Physics for Medical Sciences III	1,0
BMP3	BMP3.02	Physics for Medical Sciences IV	2,0
BMP4	BMP4.02	Physics for Medical Sciences V	2,0
ECTS to be obtained			5,0

## Line Public Health and Economics

<i>Line number and name</i>	PHE 3 & 4 Line Public Health and Economics
<i>Coordinator</i>	Dr. <sup>in</sup> phil. Valentina Mitgutsch, BA, MA
<i>Semester</i>	3 & 4
<i>ECTS</i>	4,0 (1,0 + 3,0)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses Part of Integrated Exam II

Business Economics is the application of economic theory and methodology to business. Business involves decision-making. Decision making means the process of selecting one out of two or more alternative courses of action. The question of choice arises because the basic resources such as capital, land, labour, and management are limited and can be employed in alternative uses. The decision-making function thus becomes one of making choice and taking decisions that will provide the most efficient means of attaining a desired end, say, profit maximation.

In Global health main topics are health principles, measurements and health development, cross cutting global health topics, the burden of disease, working together to improve global health.

Infectious disease, also known as transmissible disease or communicable disease, as illness is resulting from an infection. The teaching and learning contents are dealing with Public-Health-specific fundamentals and focus on certain policies, strategies, and skills in the field of Life-style management. Considering public health skills, solutions for current scenarios and challenges in the health care system are developed in terms of experience prevention.

As defined by the World Health Organization, health promotion is the process of enabling people to increase control over and improve their health. It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions. Health Promotion uses communication, education, policy development, behaviour change, engineering, and community mobilization. Noncommunicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behaviours factors. The main types of NCDs are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes (WHO-Definition).

Line Code	Section Code	Line Section	ECTS
PHE3	PHE3.01	Basics of Public Health and Health Economics	1,0
PHE4	PHE4.03	Public Health Skills	0,5
PHE4	PHE4.04	Global Health and Communicable Diseases	1,5
PHE4	PHE4.05	Health Promotion, Public Health and Non-Communicable Diseases	1,0
ECTS to be obtained			4,0



## Line Professional Development and Skills

<i>Line number and name</i>	PDS3 & 4 Line Professional Development and Skills
<i>Coordinator</i>	Ass.-Prof. Dr. Michael Schmidts, MME
<i>Semester</i>	3 & 4
<i>ECTS</i>	8,0 (5,0 + 3,0)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses (including "Summative Evaluation"* and "OSCE Preparatory course"**)*)

This series of courses teaches communication, collaboration and medical professional skills that are indispensable for the practice of the medical profession in addition to specialist knowledge.

- As Communicators, physicians effectively facilitate the doctor-patient relationship and the dynamic exchanges that occur before, during, and after the medical encounter.
- As Collaborators, physicians effectively work within a healthcare team to achieve optimal patient care.
- As Professionals, physicians are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, cultural awareness, and high personal standards of behaviour.

In addition, the line offers opportunities for students to develop personally and fosters self-organisational skills.

Year 2 also includes the preparatory course: In this element, specific skills are taught that are essential for the completion of the clinical traineeship. These competencies include basic medical skills such as taking blood samples or measuring blood pressure, the initial hospital admissions interview, and the physical examination.

Year 2 also introduces medical law, which is the branch of law dealing with the concerns, the prerogatives, and responsibilities of medical professionals and the rights of the patient. It should not be confused with medical jurisprudence, which is a branch of medicine, rather than a branch of law.

Line Code	Section Code	Line Section	ECTS
PDS3	PDS3.01	Basics of (Self)Management	0,5
PDS3	PDS3.03	Basics of Collaboration	0,4
PDS3	PDS3.04	Medical Professionalism, Ethics and Law	1,0
PDS3	PDS3.05	Preparatory Course	3,1
PDS4	PDS4.01	Basics of (Self)Management	1,0
PDS4	PDS4.03	Basics of Collaboration	0,5
PDS4	PDS4.04	Medical Professionalism, Ethics and Law	0,7
PDS4	PDS4.05	Preparatory Course	0,8
ECTS to be obtained			8,0

\* Summative Evaluation: Students are required to write short reflection reports (personal reports) on the courses in the line. At the end of the year, these reports are summarized and evaluated by the teachers according to the following criteria: complete submission, continuous delivery and quality of content.

\*\* An OSCE is a type of examination often used in health sciences. It is designed to test clinical skill performance and competence in a range of skills. It is a practical, real-world approach to learning and assessment.

#### Objective

The OSCE content and scoring procedures are standardized. Each examination station is designed to focus on an area of clinical competence. A standardized scoring tool is used to record what you do or do not do well.

#### Structured

Every OSCE candidate experiences the same problem, and is asked to perform the same task, within the same timeframe. You will be exposed to the same level of difficulty, no matter where the examination is taken, and is marked using the same marking scheme.

#### Clinical

The tasks in each OSCE station represent real-life clinical situations. These assess your ability to apply clinical knowledge and skills when, for example, meeting with a patient, writing an admission or discharge order, conferring with a colleague, etc.

#### Examination

## Line Science and Research

<i>Line number and name</i>	SRE3 & 4 Line Science and Research
<i>Coordinator</i>	Dr. <sup>in</sup> Sophie Schober
<i>Semester</i>	3 & 4
<i>ECTS</i>	7,0 (3,0 + 4,0)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses (including a written exam at course level for Clinical Epidemiology and Evidence-Based Medicine)

During year two, students learn to use appropriate research methods. This will involve learning about scientific methods, experimental techniques, and data interpretation.

The courses during the fourth semester focus on the elaboration of the different parts of a study protocol.

At the beginning of the second year, students will deepen their literature search skills by learning fundamentals of developing a systematic literature search. Moreover, student learn how to use EndNote to cite references in academic texts.

Also, the basic concepts of epidemiology and public health are presented in year two.

In addition, the basics of statistics and epidemiology are taught using the statistical software SPSS. These courses include the correct gathering and recording of data, the correct classification of data and the correct testing of variables. Descriptive statistical methods and common statistical tests are demonstrated and practised. The graphical presentation of results is shown too.

To prepare students for their own study protocol and subsequently for their bachelor (BA) thesis, different study designs will be explained. Here, the main focus will be on qualitative study designs in medicine. On one hand, students will learn how to conduct interviews and how to transcribe them for the following analyses. On the other hand, those methods are compared to the most important study designs in quantitative research. The evidence as well as advantages and disadvantages of the various study designs are discussed. These courses should develop core research skills fundamental to set up a scientific research design, irrespective of discipline.

Consequently, the structure of a scientific article will be explained. Step by step the parts abstract, introduction, material and methods, results, discussion and conclusion will be discussed and reviewed.

Courses of the second year aim to provide students with the skills necessary to plan, implement, analyse and report project-based work with focus on preparation for the final BA thesis.

Students are guided in writing a study protocol for their BA thesis. Every student has to write a study protocol in accordance with the principles of GSP and the formal criteria of KL.

At the end of this semester, students will be encouraged to develop research and critical thinking skills and identify questions and find answers that are relevant to medical science. Moreover, students are able to write their own study protocol.

Line Code	Section Code	Line Section	ECTS
SRE3	SRE3.01	Literature	0,5
SRE3	SRE3.04	Scientific Methods	1,0
SRE3	SRE3.05	Clinical Epidemiology and Evidence-Based Medicine	0,9
SRE3	SRE3.07	Academic writing	0,6
SRE4	SRE4.05	Clinical Epidemiology and Evidence-Based Medicine	0,73
SRE4	SRE4.06	Statistics	1,0
SRE4	SRE4.07	Academic Writing	0,27
SRE4	SRE4.08	BA Thesis	2,0
ECTS to be obtained			7,0

### 3. STUDIENJAHR

The 3<sup>rd</sup> year of the BA program in Medical Science is an introduction to specific human medicine, clinically and epidemiologically relevant content.

The modules are already named in accordance with the MA in Human Medicine. Within the thematic blocks, the focus is primarily on the morphological, physiological and functional foundations in health, as well as the pathological and pathophysiological foundations and pharmacological therapy approaches in disease, which build on the foundations from the first two years of study.

The morphological practical course is an element accompanying all modules.

The modules of the 3<sup>rd</sup> BA year provide an introduction to clinical knowledge and understanding. Clinical propaedeutics is taught in a case-centered, problem-oriented manner - by presenting a leading case with an epidemiologically relevant clinical picture. The lead cases are supplemented with questions that the students can answer after completing the courses of the module. This module structure is designed to be used throughout the modules of the 3<sup>rd</sup> BA year.

Clinical teaching in the third year of the BA program in Medical Science is exemplary. Diagnosis-guided images are created through the centralization of the guide-cases, which are countered by lectures on the differential diagnosis of important leading symptoms.

Also, in the assessment in the third year of study, only multiple-choice questions in the guide-case format are used, analogous to the United States Medical Licensing Examination. In this format, the understanding of preclinical contents is assessed on the basis of clinical case descriptions.

## Module BM13 Circulation and Respiration

<i>Module number and name</i>	BM13 Circulation and Respiration
<i>Coordinator</i>	Assoc. Prof. Dr. Manfred Wieser, MSc, MME
<i>Semester</i>	5
<i>ECTS</i>	6,0
<i>Assessment</i>	Module exam: MCQ Part of Integrated Exam III

This module introduces into clinical knowledge and understanding of the anatomy, physiology, and pharmacology of the regular and pathologic cardiovascular and respiratory system.

The Morphology part of this module introduces into the regular and pathologic, macroscopic, and microscopic morphology of the cardiovascular and respiratory system. Diagnostic imaging completes the bouquet of perspectives on morphology. Systematic morphology and topography are integrated by accordant preparation in the dissection lab.

Module Code	Section Code	Module Section	ECTS
BM13	BM13.01	Macro- and Microscopic Anatomy	2,0
BM13	BM13.02	Physiology	0,8
BM13	BM13.03	Pathology	0,5
BM13	BM13.04	Pharmacology	1,2
BM13	BM13.05	Pathophysiology and Clinical Cases	1,5
ECTS to be obtained			6,0

## Module BM14 Metabolism

<i>Module number and name</i>	BM14 Metabolism
<i>Coordinator</i>	Mag. <sup>a</sup> Ursula Föger-Samwald, PhD
<i>Semester</i>	5
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ Part of Integrated Exam III

This module introduces into clinical knowledge and understanding of the anatomy, physiology, and pharmacology of the regular and pathologic alimentary and urinary system.

The Morphology part of this module introduces into the regular and pathologic, macroscopic, and microscopic morphology of the alimentary and urinary system. Diagnostic imaging completes the bouquet of perspectives on morphology. Systematic morphology and topography are integrated by accordant preparation in the dissection lab.

Module Code	Section Code	Module Section	ECTS
BM14	BM14.01	Macro- and Microscopic Anatomy	2,0
BM14	BM14.02	Physiology	0,8
BM14	BM14.03	Pathology	0,5
BM14	BM14.04	Pharmacology	0,5
BM14	BM14.05	Pathophysiology and Clinical Cases	1,2
ECTS to be obtained			5,0

## Module BM15 Regulatory Circuits

<i>Module number and name</i>	BM15 Regulatory Circuits
<i>Coordinator</i>	Mag. <sup>a</sup> Ursula Föger-Samwald, PhD
<i>Semester</i>	5
<i>ECTS</i>	4,0
<i>Assessment</i>	Module exam: MCQ Part of Integrated Exam III

This module introduces into clinical knowledge and understanding of the anatomy, physiology, and pharmacology of the regular and pathologic endocrine system.

The Morphology part of this module introduces into the regular and pathologic, macroscopic and microscopic morphology of the endocrine and the visceral nervous system. Diagnostic imaging completes the bouquet of perspectives on morphology. Systematic morphology and topography are integrated by accordant preparation in the dissection lab.

Module Code	Section Code	Module Section	ECTS
BM15	BM15.01	Macro- and Microscopic Anatomy	1,5
BM15	BM15.02	Physiology	0,8
BM15	BM15.03	Pathology	0,5
BM15	BM15.04	Pharmacology	0,5
BM15	BM15.05	Pathophysiology and Clinical Cases	0,7
ECTS to be obtained			4,0



## Module BM16 Mind and Sensory Systems

<i>Module number and name</i>	BM16 Mind and Sensory Systems
<i>Coordinator</i>	Mag. <sup>a</sup> Ursula Föger-Samwald, PhD
<i>Semester</i>	6
<i>ECTS</i>	5,5
<i>Assessment</i>	Module exam: MCQ Part of Integrated Exam III

This module introduces into clinical knowledge and understanding of the anatomy, physiology, and pharmacology of the regular and pathologic nervous system and the sensory organs.

The Morphology part of this module introduces into the regular and pathologic, macroscopic and microscopic morphology of the nervous system. Diagnostic imaging completes the bouquet of perspectives on morphology. Systematic morphology and topography are integrated by accordant preparation in the dissection lab.

Module Code	Section Code	Module Section	ECTS
BM16	BM16.01	Macro- and Microscopic Anatomy	2,5
BM16	BM16.02	Physiology	0,8
BM16	BM16.03	Pathology	0,5
BM16	BM16.04	Pharmacology	0,7
BM16	BM16.05	Pathophysiology and Clinical Cases	1,0
ECTS to be obtained			5,5

## Module BM17 Life Cycle

<i>Module number and name</i>	BM17 Life Cycle
<i>Coordinator</i>	Assoc. Prof. Dr. Manfred Wieser, MSc, MME
<i>Semester</i>	6
<i>ECTS</i>	5,0
<i>Assessment</i>	Module exam: MCQ Part of Integrated Exam III

This module introduces into clinical knowledge and understanding of the anatomy, physiology, and pharmacology of the regular and pathologic reproductive system as well as into the human cycle from creation to death.

The Morphology part of this module introduces into the regular and pathologic, macroscopic and microscopic morphology of the reproductive system. Diagnostic imaging completes the bouquet of perspectives on morphology. Systematic morphology and topography are integrated by accordant preparation in the dissection lab.

Module Code	Section Code	Module Section	ECTS
BM17	BM17.01	Macro- and Microscopic Anatomy	2,0
BM17	BM17.02	Physiology	0,8
BM17	BM17.03	Pathology	0,5
BM17	BM17.04	Pharmacology	0,5
BM17	BM17.05	Pathophysiology and Clinical Cases	1,2
ECTS to be obtained			5,0

## Module BM18 Emergencies and Rheumatic Diseases

<i>Module number and name</i>	BM18 Emergencies and Rheumatic Diseases
<i>Coordinator</i>	Mag. <sup>a</sup> Ursula Föger-Samwald, PhD
<i>Semester</i>	6
<i>ECTS</i>	5,5
<i>Assessment</i>	Module exam: MCQ Part of Integrated Exam III

This module introduces into clinical knowledge and understanding of the anatomy, physiology, and pharmacology of the regular and pathologic locomotory apparatus with respect to traumatology and rheumatic joint diseases.

The Morphology part of this module introduces into the regular and pathologic, macroscopic, and microscopic morphology of the locomotory apparatus. Diagnostic imaging completes the bouquet of perspectives on morphology. Systematic morphology and topography are integrated by accordant preparation in the dissection lab.

Module Code	Section Code	Module Section	ECTS
BM18	BM18.01	Macro- and Microscopic Anatomy	2,5
BM18	BM18.02	Physiology	0,8
BM18	BM18.03	Pathology	0,5
BM18	BM18.04	Pharmacology	0,5
BM18	BM18.05	Pathophysiology and Clinical Cases	1,2
ECTS to be obtained			5,5

## Line Biomedical Physics

<i>Line number and name</i>	BMP5 Line Biomedical Physics
<i>Coordinator</i>	Univ.-Prof. DI Dr. Dieter Pahr
<i>Semester</i>	5
<i>ECTS</i>	1,5
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses

Biomedical physics (BMP) is the conjugation of Physics and Biology in Medicine. It is an interdisciplinary field of science that involves the application of different subspecialties of Physics, Mathematics and Computer Sciences for the growth and development of medical science and healthcare. These are increasingly being applied in everyday clinical practice in the areas of diagnostics, monitoring and therapy. Interdisciplinary knowledge transfer in this field is therefore an essential part of the program to prepare graduates for this future challenge, so the physical basics are incorporated into clinical examples.

In biomedical engineering, methods from the engineering sciences are specifically applied to the fields of medicine and biology.

Line Code	Section Code	Line Section	ECTS
BMP5	BMP5.03	Biomedical Engineering	1,5
ECTS to be obtained			1,5

## Line Public Health and Economics

<i>Line number and name</i>	PHE 5 & 6 Line Public Health and Economics
<i>Coordinator</i>	Dr. <sup>in</sup> phil. Valentina Mitgutsch, BA, MA
<i>Semester</i>	5 & 6
<i>ECTS</i>	4,0 (2,5 + 1,5)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses Part of Integrated Exam II

Presentation of the key elements and methods of Health Technology Assessment (HTA), including technologies from different areas such as pharmaceuticals, devices, public health & prevention strategies, management programs and health information systems. Patient-relevant outcome measures. Basics in critical study appraisal, systematic reviews & meta-analysis, economic evaluation and pricing, decision-analytic modelling, context-specific application of HTA, HTA from different perspectives.

Big Data and Artificial intelligence in the context of Public Health will provide the skills in data analytics, including the preparation of data, data handling, formulating precise questions, and using tools from statistics and data mining to address those questions. This module will also cover the privacy aspects of big data and the techniques to mitigate these risks.

Threat Intelligence is emerging as a critical component in enterprise information security for combatting existing and emerging online threats. The effective application and development of threat intelligence systems requires both a clear understanding of the vulnerabilities of an organisation and the threat actors. In this module the student will develop expert knowledge of threat intelligence and utilize this knowledge to affect an improvement in security posture and combat specific advanced persistent threats.

Applying economic thinking to an understanding of resource use in patient care is challenging given the complexities of delivering health care. Health-care markets lack the characteristics needed to determine a "market" price that reflects the economic value of resources used. However, resource allocation can be analysed by using production theory to determine efficient resource use.

Together with specialists, students work through examples from different application areas.

Line Code	Section Code	Line Section	ECTS
PHE5	PHE5.06	Public Health Technologies	2,5
PHE6	PHE6.07	National and International Application of Economic Principles in Health Care	1,5
ECTS to be obtained			4,0

## Line Professional Development and Skills

<i>Line number and name</i>	PDS5 & 6 Line Professional Development and Skills
<i>Coordinator</i>	Ass.-Prof. Dr. Michael Schmidts, MME
<i>Semester</i>	5 & 6
<i>ECTS</i>	6,0 (3,0 + 3,0)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses (including "Summative Evaluation" and "Structured Oral Exam"*)

This series of courses teaches communication, collaboration and medical professional skills that are indispensable for the practice of the medical profession in addition to specialist knowledge.

- As Communicators, physicians effectively facilitate the doctor-patient relationship and the dynamic exchanges that occur before, during, and after the medical encounter.
- As Collaborators, physicians effectively work within a healthcare team to achieve optimal patient care.
- As Professionals, physicians are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, cultural awareness and high personal standards of behaviour.

In addition, the line offers opportunities for students to develop personally and fosters self-organisational skills.

Included in year 3 are task reflections. During progression in the Line PDS students learn state-of-the-art behavioural frameworks and have to apply their developing competencies in case discussions or role play with simulated patients or in the skills lab.

After the second year of their curriculum (see also preparatory course), students start to work in the hospital, where they might experience a "theory-practice gap" between the "ideal way" taught at the university and their observations in the clerkships e.g. regarding sanitary standards, patient-centred communication, team structures or ethical behaviour. As role modelling is a strong promotor for learning, students may come into conflict with behaviours deviating from our educational intentions or even adopt them.

We address this problem by trying to educate our students to become "reflective practitioners". We want them to critically observe the clinical environment by applying their theoretical frameworks. Is observed practise, that deviates from theory a reasonable shortcut? Must it be judged as unprofessional? Or is it even more professional? To stimulate those reflections students have to ...

- keep records of their clinical experiences in a portfolio in which they document and reflect problematic situations.
- visit seminars, in which their recordings are discussed with subject experts. (PDS5.02, PDS 5.03, PDS 5.04).
- perform a final 3rd year multi-station oral examination on professionalism, in which they are again confronted with "conflicting" cases and observations and are asked to discuss them critically and on base of their learnings within the line (PDS 6.01).

Line Code	Section Code	Line Section	ECTS
PDS5	PDS5.01	Basics of (Self)Management	0,3
PDS5	PDS5.02	Basics of Communication	0,5
PDS5	PDS5.03	Basics of Collaboration	1,7
PDS5	PDS5.04	Medical Professionalism, Ethics and Law	0,5
PDS6	PDS6.01	Basics of (Self)Management	1,0
PDS6	PDS6.02	Basics of Communication	0,5
PDS6	PDS6.04	Medical Professionalism, Ethics and Law	1,5
ECTS to be obtained			6,0

- \* Summative Evaluation and Structured Oral exam: Students are required to write short reflection reports (personal reports) on the courses in the line. In addition, students are required to write reflection reports on the clinical clerkships (task reflections). Contents of the Line PDS and the reflection reports will be assessed in a Structured Oral multistation Examination.

A Structured Oral multistation Exam is a type of examination often used to reduce the subjectivity of oral examination by increasing the reliability (multiple stations (cases), multiple examiners, structured questions) and validity (real life cases). It is a practical, real-world approach to learning and assessment.

Every candidate experiences the same problems and is asked to reflect on the same case, within the same timeframe. You will be exposed to the same level of difficulty, no matter where the examination is taken, and is marked using the same marking scheme.

## Line Science and Research

<i>Line number and name</i>	SRE5 & 6 Line Science and Research
<i>Coordinator</i>	Dr. <sup>in</sup> Sophie Schober
<i>Semester</i>	5 & 6
<i>ECTS</i>	7,5 (6,5+ 1,0)
<i>Assessment</i>	Aggregation of the assessments in exam-immanent courses

In year 3, the main focus will be on undertaking an independent research project (BA thesis), which can be laboratory, literature, or clinical based, and is completed under the supervision of one of our scientists or an external supervisor.

Writing a BA thesis should train specific research skills appropriate to individual thesis requirements such as analytical techniques.

Much of the semester will be focused on the students own research projects. The research will concentrate on a completely original topic in the subject of choice (related to medicine). This will allow students to explore latest research breakthroughs on the topic of interest, accompanied by specialised academics in our laboratories or clinics.

Additionally, the third year contains courses in advanced statistics. Based on the basics gained in year two, complex statistical tests are explained. Students who have already collected their data can apply the different methods on their own data. Through the courses in statistics, students should acquire the skills required to generate and critically analyse scientific data.

In the format of a "Journal Club", design, interpretation and critical appraisal of observational studies, systematic reviews, and meta-analysis are discussed.

Also, examples of scientific fraud and misconduct will be presented and reviewed. Because no one is protected against scientific fraud and misconduct, it seems very important to address and to raise student`s awareness of this topic.

The second part of this year will include a writing workshop. At the beginning, the formal criteria of a BA thesis at KL and the principles of GSP are repeated. Afterwards, the different parts of a scientific manuscript and their respectively scientific wording are elaborated in detail. Again, students should work on their own text. After taking this course, students should be able to write scientifically at the level of a primary research paper and/or review.

Furthermore, presentation skills for presenting a scientific work at a scientific meeting are trained. The focus will be on oral poster presentation and short presentation of scientific results. This will provide students with the necessary skills for their thesis defense and beyond that for talking at conferences.

After completion of the line, students should be encouraged to think both critically and creatively.



Line Code	Section Code	Line Section	ECTS
SRE5	SRE5.02	Scientific Presentation Techniques	0,5
SRE5	SRE5.03	Research Ethics	0,5
SRE5	SRE5.05	Clinical Epidemiology and Evidence-Based Medicine	1,5
SRE5	SRE5.06	Statistics	1,5
SRE5	SRE5.08	BA Thesis	2,5
SRE6	SRE6.07	Academic Writing	0,5
SRE6	SRE6.08	BA Thesis	0,5
ECTS to be obtained			7,5

## BACHELOR-THESE

Im Rahmen der Lehrveranstaltungen der Line Science and Research sind ein Studienprotokoll und der Entwurf der Bachelor Thesis zu erarbeiten und bis zum Abschluss des BA Studiums in Form der BA-These selbständig zu finalisieren und zu verteidigen. Die BA-These kann Grundlage für das Master-Studienexposé und die darauffolgende MA-These sein. Die BA-These dient der Entwicklung und dem Nachweis theoretischer und methodischer Kompetenzen des (gesundheits)wissenschaftlichen Arbeitens. Methodisch korrektes und systematisches Erstellen einer wissenschaftlichen Arbeit sowie die wissenschaftlich korrekte Präsentation der Ergebnisse (mündlich und schriftlich) sind nachzuweisen. Der Aufbau soll einer wissenschaftlichen Arbeit entsprechen. Nähere Bestimmungen sind in der Prüfungsordnung festgelegt bzw. finden sich in den aktuellen Guidelines zum Verfassen der Bachelorthese.

## FAMULATUR

Die Pflichtfamulatur im Umfang von 16 ECTS (entspricht 16 Wochen; Umfang gilt für BA Medical Science und MA Humanmedizin zusammen) kann ab Absolvierung des Famulaturpropädeutikums inkl. Praktikum sowie positiver Absolvierung der praktischen Prüfung (in Form eines OSCE) begonnen werden.

Zur Beendigung des BA Medical Science müssen zumindest 8 ECTS (entspricht 8 Wochen Famulatur) nachgewiesen werden, die gesamten Pflichtfamulaturen müssen vor Antritt des 3. Jahres im Masterstudium Humanmedizin („Praktisches Jahr“) abgeleistet sein.

Die Pflichtfamulatur enthält folgende Elemente:

- 4 Wochen Allgemeinmedizin
- 4 Wochen Innere Medizin
- 8 Wochen frei wählbarer Famulaturfächer.

Alle Famulaturen, ausgenommen die Pflichtfamulatur in Allgemeinmedizin, können an anerkannten Famulaturspitälern/Universitätskliniken absolviert werden.

Die Famulatur in Allgemeinmedizin ist obligat in einer hierfür qualifizierten und anerkannten allgemeinmedizinischen Praxis zu absolvieren.

Für die restlichen 8 Wochen der Pflichtfamulatur können zumindest zwei und maximal vier Disziplinen frei gewählt werden. Es wird dringend empfohlen, Famulaturen auch in chirurgischen Fächern zu absolvieren.

Die Studierenden werden dazu angehalten, bemerkenswerte Situationen bzw. Fallbeispiele – diese können best practice oder auch als problematisch empfundene Beispiele sein - aus den Bereichen Hygiene, Arzt-Patienten-Kommunikation, (interprofessionelles) Teamwork, ethisch relevante Situationen bzw. Fehlerkultur in anonymisierter Form zu dokumentieren.

Diese Beschreibungen kommen gezielt in Seminaren des 3. Bachelorjahres zum Einsatz, die Erfahrungen, Reflexionen bzw. Schlussfolgerungen der Studierenden stellen auch einen Teil der praktischen Prüfung im 3. Bachelorjahr dar.

