



Degree Profile

Master in Drug Science

Organizational unit	Faculty of Science, Department of Pharmaceutical Sciences
Degree	MSc Drug Science
Range, Duration, Start	120 ECTS, 4 semesters (if full-time), autumn semester
Language of instruction	English

Program Goals

Students develop a solid theoretical and practical knowledge of the discovery, development, efficacy and safety of substances with a main focus on drugs/medicines. Further, they acquire the scientific skills and analytical expertise to understand and independently conduct laboratory research studies in early drug discovery and development as well as in pharmacology and toxicology.

Program Characteristics

Orientation	Scientific-oriented education
Subject area	Pharmaceutical Sciences
Majors	–
Program structure	The curriculum consists of the modules: Introduction and Basis of Human Diseases (9 ECTS); General Skills and Experimental Tools (6 ECTS); Target Identification/Validation to Discovery of Modulators (8 ECTS); Translating Pharmacology and Drug Safety to Humans (12 ECTS); Clinical Drug Development: the Basis for Market Approval (8 ECTS); Electives (15 ECTS); Practical Training (8 ECTS); Master's Thesis (50 ECTS); Master's examination (4 ECTS).
Distinctive Features	Developed in close collaboration with Basel's pharmaceutical industry, the Swiss Centre of Applied Human Toxicology (SCAHT), and the Swiss federal authorities the Master Drug Sciences fosters industry collaborations, mentoring opportunities as well as talks given by industry professionals.

Career Opportunities

Employment	Basic or applied research at universities or in industry, regulatory affairs in government authorities or industry, marketing and consulting in the field of pharmaceuticals
Further Studies	Doctorate

Teaching

Approaches	Problem and project based learning, autonomous learning, research-oriented learning, practical training
Assessments	Written examinations, practical training, master's thesis, master's examination

Competences

Generic Attitude / Communication Approach / Management	Students acquire the skills to ... <ul style="list-style-type: none"> - carry out independent, creative scientific research. - develop and execute research projects autonomously as well as in collaboration with a research group. - organize the scientific work process efficiently through prior planning and priority setting. - analyze and critically evaluate scientific literature and research results. - derive research-relevant questions from case studies and design research. - present scientific results and theories concisely and in a well-structured manner in oral and written form to specialist as well as public audiences. - communicate ideas and results effectively in English. - lead discussions and deal constructively with criticism. - deal responsibly with ethical aspects of scientific work.
Subject related Knowledge / Understanding Application / Judgment Interdisciplinarity	Students acquire the skills to ... <ul style="list-style-type: none"> - obtain a broad overview of different drugs and drug classes. - understand the interactions of drugs and bioactive substances with living organisms at the molecular, cellular, systemic and population level. - apply principles and concepts of medicinal chemistry and basic immunology to drug discovery. - understand pathophysiological mechanisms of disease processes. - understand the mechanisms of drug action. - assess the pharmacological effects and side-effects in exposed individuals as well as propose preventive and therapeutic measures. - estimate the effects of pharmaceuticals on entire populations. - recognize the importance of pharmaceuticals for the individual and society. - formulate drug science related hypotheses and test them through experimentation. - analyze and document experimental data. - apply biostatistical methods and principles of experimental design. - apply computer modelling to problems in drug science. - understand regulatory and safety aspects in animal experimentation and drug development. - collaborate with other drug development specialists and health care professionals.

Learning Outcomes

Graduates of the master's program in Drug Science...

- are able to select appropriate concepts in drug sciences research to systematically develop adequate scientific hypotheses and test them through experimentation.
- are able to independently carry out a complete research project in the field of drug sciences, including literature searches, the framing of research questions in the context of current research of the field, conduct appropriate experimental work and laboratory practices and can concisely present their results to peers as well as to the public in written and oral form according to scientific standards.
- understand molecular, cellular and systemic mechanisms of the interactions of drugs and bioactive substances with living organisms as the fundamental basis to correctly measure the effects of pharmaceuticals on whole populations.
- are able to correctly apply experimental and biostatistical methods in order to provide scientifically-grounded positive and negative arguments regarding a given experimental research approach in drug discovery and development.
- possess a broad and profound scientific knowledge of the principles and concepts of medicinal chemistry, basic immunology as well as pathophysiological mechanisms of disease processes and are able to appropriately apply this knowledge to predict and assess the pharmacological effects in drug therapy.
- possess the ability to appropriately apply current computer modelling techniques to estimate the toxic potentials of drugs and environmental chemicals.
- understand the ethical, regulatory and safety aspects of research in animal experimentation and can apply this knowledge to distinctly argue for the appropriate and responsible use of animal experimentation in drug development.
- are able to understand research on antibody-based drugs at the laboratory and industrial level and can apply this knowledge to further develop standards for good clinical and laboratory practice.
- describe topical areas of pharmaceutical research and development based on their knowledge of the importance of pharmaceuticals for the individual and society as well as their experience in interdisciplinary collaboration with other drug discovery and development specialists as well as with health care professionals.