

Degree Programme, Biology for Medical Students

1. Lecture: **Biology for Medics and Dentists, 2 ECTS points** **no certificate**

The lecture is divided into 3 parts: Cell Biology (11 h), Microbiology (5 h), Genetics (10 h). It covers the basic principles of these subjects and is structured according to the standard requirements for the first medical examination defined by the „Institut für medizinische und pharmazeutische Prüfungsfragen“ (IMPP) in the „Gegenstandskatalog Biologie für Mediziner“ (<http://www.impp.de/>).

2. Practical Course: **Biology for Medical Students, 4 ECTS points** **certificate of performance: written examination**

Course programme:

- Light microscopy:
Basics in microscopy, practical introduction into microscopy (intestine and pancreas)
- Electron microscopy / Ultrastructure of cells
Basics in electron microscopy, spatial organisation of cells, function of organelles, differential analysis of the ultrastructure of cells from several tissues.
- Prokaryotes, Viruses:
Basics in microbiology, structure of prokaryotic cells, bacteria systematics, structure of the bacterial cell wall, microscopy of distinct bacteria species, principles of bacterial growth, antibiotics (types and mechanisms of action), structure and classification of viruses, virus life cycle and propagation.
- Cytoskeleton, cell migration, phagocytosis, muscle contraction:
Components and functions of the cytoskeleton, cell migration, structure and function of Cilia, phagocytosis, muscle structure, muscle contraction.
- Cell cycle, mitosis, meiosis:
Cell cycle phases and control, DNA-replication, DNA-repair, analysis of the phases of mitosis, mechanisms of cell differentiation, phases of meiosis, oogenesis, spermatogenesis
- Basics in histochemistry:
Histochemical techniques, histochemical analysis of different tissues (liver, kidney, intestine, adrenal), giant chromosome preparation.

Dept. Molecular Cell Biology

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Biology for Medical Students

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- Developmental biology:
Principals of development, stages of embryonic development exemplified by amphibian embryos (morula, blastula, gastrula, neurula), somite development, fertilisation, basics of early human development.

- Ecology, parasites:
Basics in ecology, dynamics of populations, human parasites (trypanosomes, plasmodia, fluke/trematoda, nematodes) Populationsdynamik, Parasiten des Menschen (Trypanosomen, Plasmodien, liver fluke), vector borne diseases, fungi and mycosis.

- Human genetis, inheritance traits:
Mendel Model of Inheritance, monohybrid und dihybrid cross, autosomal and gonosomal inheritance traits, human genetic disorders, pedigree analysis, Hardy-Weinberg principle, recombination (crossing over).

- Molecular genetics:
Structure of the human genome, structure of genes, DNA, types and functions of RNA, transcription and its regulation, genetic code, translation, analysis of restriction fragment length polymorphisms, haplotype, types of mutations, mutagenic agents.

- Methods in molecular biology: DNA isolation, polymerase chain reaction (PCR):
Introduction into basic methods of molecular biology, isolation of DNA from oral mucosa, PCR on template DNA, restriction analysis of a specific mutation, agarose gel electrophoresis.

- Cytogenetics
Structure of chromatin and chromosomes, histones, function of the centromer, telomer and telomerase, analysis of karyotypes, types of numeric and structural chromosome aberrations, FISH and chromosome painting, principles of prenatal diagnostics.