Educational objectives  
Clinical Pharmacology/Pharmacotherapy

For the clinical pictures and symptoms that are discussed in this course and that are listed below, students are expected to

1. be able to find a pharmacologically and clinically founded selection of appropriate pharmaceuticals and pharmaceutical combinations,

2. be able to critically evaluate an intended/existing/proposed pharmaceutical therapy and to optimize it with regards to efficacy and safety,

3. know appropriate selection criteria when several similar pharmaceuticals are available,

4. know the modes of drug application,

5. be able to estimate the interaction potential with regards to combination therapies of the utilized pharmaceuticals,

6. be able to adjust the pharmacotherapy to individual characteristics (e.g. age, concomitant disease, pregnancy / lactation period),

7. be able to recognize and interpret drug side effects and to know appropriate treatments for them,

8. to know the contraindications of the pharmaceuticals.

A prerequisite is the knowledge of the (patho-)physiological basics.  
Specifically, for the following topics students are expected to

1. Antiarrhythmic drugs
   - know the classification of antiarrhythmic drugs, know examples for the different groups and be able to distinguish their modes of action.
   - be able to specify the indications for pharmacotherapy in emergency situations and for preventive therapy of supraventricular and ventricular cardiac arrhythmias,
   - be able to outline alternative treatment options for antiarrhythmic drug therapy,
   - be able to detail the therapeutic principles of chronic atrial fibrillation.

2. Coronary artery disease, heart failure
   - have detailed knowledge about the pharmacotherapeutic principles of the acute coronary syndrome,
   - be able to detail the up-to-date pharmacotherapeutic concepts for long-term therapy of coronary artery disease and prevention of myocardial reinfarction,
   - have profound knowledge about the pharmacotherapeutic principles of acute decompensated heart failure,
   - be able to initialise a detailed pharmacotherapy of chronic heart failure in due consideration of the disease severity (NYHA-classification) and to be able to explain the impact of this therapy on the prognosis of the disease.
3. Psychiatric disorders
- differentiate the pharmacologic options for the treatment of major depression and bipolar disorders depending on the severity of the disease,
- know the differences between acute therapy and prophylaxis of major depression,
- know relevant adverse effects, contraindications and drug interactions of drugs used for the treatment of major depression and bipolar disorders,
- know the pharmacological options for the treatment of anxiety disorders,
- know the pharmacological and non-pharmacological options for the treatment of attention deficit hyperactivity disorders,
- classify antipsychotic drugs on their antipsychotic potency and adverse effects,
- make a reasonable therapeutic proposal for the acute and the long-term treatment of psychosis,
- know the adverse effects of antipsychotics and their implications for therapy.

4. Cancer
- understand the principles of adjuvant, neo-adjuvant and palliative therapy of tumors,
- understand mechanisms of tumorigenesis and tumor growth as well and to know basics of polychemotherapy and individualized chemotherapy,
- know primary antineoplastic drugs, their mode of action and their adverse effects,
- know principles and examples for the multimodal pharmacological treatment of colorectal cancer,
- classify cytostatics for their emetic potency and to know the adequate pharmacological treatment of CINV (cytostatics induced nausea/ vomiting).

5. Gastrointestinal diseases
- manage and classify differentiatial drug treatment strategies of gastritis and gastroesophageal reflux disease in acute situations as well as for relapse prevention,
- understand and explain differentiatial drug treatment strategies of gastrointestinal peptic ulcer disease and related disorders,
- understand and explain the selection of an appropriate antiemetic for the prophylaxis and treatment of emesis depending on the triggering factor,
- name and explain drugs for the treatment of chronic inflammatory bowel diseases,
- understand why and when drugs of choice are used for the treatment of chronic inflammatory bowel diseases. Here, the students should be able to recommend the drug treatment regime for acute and chronic disorders. For the treatment of chronic inflammatory bowel diseases, the indications and contra-indications of various drugs have to be understood.

6. Chronic pain
- be able to describe the WHO-classification for analgesic therapy and the different groups of analgesics,
be able to compare the pharmaceuticals with regards to analgesic potency, duration of action, mode of application and side effects,

have basic knowledge of the indication and execution of coanalgesic / adjuvant therapies.

7. Therapeutical concepts for chronic pain syndromes
- be able to conduct the differential diagnosis of headache and initiate an appropriate therapy,
- be aware of the clinical-pharmacological issues and risks of non-opioid analgesics and 5HT-antagonists,
- know the indications of and be able to conduct a pharmacological migraine prophylaxis,
- be able to conduct a pharmacological therapy of tension-headache,
- be aware of the clinical pharmacology of opioids in tumor-therapy, especially concerning prescription, action, tolerance and comediations,
- be able to medicate the side-effects of opioid therapy,
- have basic knowledge about the design of plans for analgesic therapy.

8. Endocrine diseases
- be able to differentiate available forms of insulin and insulin analogues according to their pharmacological properties and their clinical use as part of different patterns of insulin therapy,
- to appreciate pharmacological interaction or external factors which influence insulin need,
- be able to treat osteoporosis according to current guidelines considering the use of Ca/Vit. D, bisphosphonates, SERMs, Strontium Ranelate or PTH,
- be familiar with prophylaxis and treatment of goiters,
- be able to treat hypothyroidism, acknowledge as well special clinical circumstances such as adrenal insufficiency, subclinical hypothyroidism and pregnancy,
- be able to treat hyperthyroidism,
- be able to treat acromegaly,
- know available options of hormonal contraception.

9. Metabolic syndrome therapy
- be familiar with the basic therapy approaches when facing metabolic syndrome – reduction of weight, lifestyle changes,
- be able to define and argument a reasonable effective mono- and combined antihypertensive drug therapy, dependent on obesity grade, primary and secondary hypertension, as well as accompanying diseases,
- be able to identify lipid metabolism disturbances and recommend therapy,
- be able to conduct a personalized step-therapy of disordered glucose metabolism conditions by means of biguanides, sulphonylurea derivatives/glinides,
10. Antiviral therapy
- know the therapeutic mechanism of a virostatics (inhibition of viral entry, inhibition of uncoating, inhibition of transcription and/or translation, inhibition of viral maturation/ release),
- be familiar with the following pharmacological classes and agents:
  - chemokine-antagonists
  - fusion-inhibitors
  - amantadine
  - HIV-, HSV-, VZV-, CMV-, HBV-, HCV-nucleosidanalogs
  - interferone
  - HIV-protease-inhibitors
  - neuraminidase-inhibitors,
- be able to conduct a HIV/AIDS and hepatitis B/C therapy according to the present guidelines.

11. Therapeutic concepts pneumonias, urinary tract infections
- know pharmacological strategies to treat infections of the respiratory tract (bronchitis, pneumonia), the urinary tract (urethritis, cystitis, pylonephritis) and urosepsis,
- be able to select the most adequate antibiotics combination for each indication,
- know indications and contraindications of antibiotics for a specific setting,
- know the ideal duration of antibiotic treatment for each infection,
- choose the correct initial antibiotic therapy depending on the expected pathogens,
- know the basics of antibiotic escalation therapy,
- provide profound alternatives for a failing antibiotic therapy.