UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

# Pharmacology

**2324-4-H4101D040**

## Aims

The main goal of the course is to provide the students the necessary knowledge to execute an optimal pharmacological therapy according to evidence-based medicine. Following the initial acquisition by students of an integrated view of the pharmacokinetic and pharmacodynamic principles, required for the study of special pharmacology, the learning process is aimed at acquiring the knowledge of the drugs with greater therapeutic relevance, their pharmacokinetic properties, their mechanism of desired and undesired actions. Upon completion of the course the student will be able to define the rationale basis of pharmacological therapy according to individual patient's characteristics and scientific evidences and to recognize putative side effects. In addition, the student will learn the clinical phases of drug study needed to approach a therapeutic usage based on evidences, to critically judge the experimental design and the results of clinical experimentation. Furthermore, the student will learn the basic principles of pharmaco-economy, drug surveillance, and professional ethics, and the risks of drug improper use, abuse, and dependence. The pharmacological intervention must constantly subjected to revision according to the new scientific discoveries and the therapeutic availability of novel active principles. The lectures, seminars, and small-group activities will stimulate the student's ability to autonomously study and the progressive development of abilities toward a constant updating that represent the main approach of the correct use of drugs during the future professional career.

## Contents

The program of Pharmacology 2 focusses on the pharmacotherapy of most relevant diseases of the peripheral and central nervous system, the cardio-circulatory, genitourinary, gastrointestinal, respiratory and muscular systems, and on hormonal and chemotherapeutic therapies.

## Detailed program

DRUGS ACTING ON THE CENTRAL NERVOUS SYSTEM – Opioid analgesics: full and partial agonists, and antagonists – Drugs used to treat cognitive disorders – General and local anesthetics – Anti-epileptics – Drug and substance abuse and dependence. ANTI-INFLAMMATORY DRUGS AND AUTACOIDS – Non-steroidal anti-inflammatory drugs – Antihistamines – Drugs used to treat cephalea and hemicranic forms – Non-opioid analgesics – Anti-rheumatics – Anti-gout. DRUGS THAT INFLUENCE CARDIOVASCULAR AND KIDNEY FUNCTIONS – Diuretics: loop, thiazides, potassium-sparing, carbonic anhydrase inhibitors, osmotic – ACE-inhibitors and angiotensin II receptor antagonists – Calcium channel blockers – Vasodilators – Nitrates – Digitalis glycosides and other positive inotropes – Anti-arrhythmics – Inhibitors of platelet aggregation, anticoagulants, thrombolytics – Drugs used against bleeding – Anti-dyslipidemic – Drugs used to treat heart failure – Antianginals – Drugs used to prevent and treat myocardial infarction – Anti-hypertensives and drugs used to treat cardiovascular risk factors. GASTROINTESTINAL DRUGS – Anti-histamine 2 receptor, proton pump inhibitors, anti-acids, prostaglandins – Prokinetics, laxatives, anti-diarrhoeals. RESPIRATORY DRUGS – Drugs used to treat allergic rhinitis, chronic obstructive pulmonary disorder, cough – Adrenergic, cromon, and xanthine drugs – Guidelines to choose anti-asthmatic drugs. HEMOPOYETIC DRUGS – Classification of anti-anemics (iron, folic acid, vitamin B12, erythropoietin) according to mechanisms of action. IMMUNOPHARMACOLOGY – Drug mechanisms of immune system regulation - Main immune-stimulants and immune-depressants. ENDOCRINE DRUGS – Hypothalamic and pituitary hormones, thyroid hormones – Insulins and oral anti-diabetics – Estrogen, progestin, and adrenal steroids – Oral and implantable contraceptives – Menopausal substituent therapy – Androgens, improper use and abuse of androgen and anabolic steroids – Drugs that affect bone metabolism: parathyroid hormone, vitamin D, calcium, bisphosphonates, estrogens, SERMs, calcitonin. CHEMOTHERAPEUTICS. Classification of antimicrobials – Spectrum of activity, mechanisms of action and specific targets of the main classes of bacteriostatic and bactericidal antibiotics – Antimicrobial resistance, associations, prophylaxis – Complications of antibiotic therapy – Guidelines to use appropriate antibiotic/chemotherapeutic drugs according to pathogens and patient types – Penicillin, cephalosporin, and other beta-lactam antibiotics – Other cell-wall antibiotics – Tetracyclines, chloramphenicol, aminoglycosides, macrolides, lincosamines – Sulphamides, trimethoprim, cotrimoxazole – Chinolones and urinary antiseptics – Antituberculars – Anti-micotics – DNA and RNA antivirals - HIV anti-retrovirals – Anti-malarials – Principles of anticancer chemotherapy – Antimetabolite, antibiotic, alkylating, mitotic spindle inhibitor and other chemotherapeutic agents – Steroidal and non-steroidal chemotherapeutics - Targeted anti-cancer therapy. TOXICOLOGY – Experimental methods to check drug and xenobiotic toxicities – Dose-response and time-response relationships of toxic reactions to drugs and xenobiotics – Poison antidotes and other treatments. CLINICAL PHARMACOLOGY – Experimental and clinical development of active principles and clinical testing phases - Criteria and methods to evaluate the clinical efficacy of drugs – Essential elements and ethical problems concerning clinical drug testing – Methods of continuous updating in pharmacotherapy.

## Prerequisites

Knowledge acquired during all preparatory courses indicated in the medical degree course plan.

## Teaching form

Lessons will be provided in attendance.

Lessons will be formal lectures, seminars, practical demonstrations, interactive discussion of simulated clinical cases, and small-group teaching.

## Textbook and teaching resource

- Bertram G. Katzung. Farmacologia generale clinica. Edizione italiana, Piccin Nuova Libraria.
- Rang & Dale, Farmacologia. Edizione italiana, edra.
- Goodman e Gilman, Le basi farmacologiche della terapia. Edizione italiana, Zanichelli.

## Semester

First semester of the fourth year.

## Assessment method

The exam is written and oral. The written exam will be carried out using the "esamionline" platform and consists of open questions and multiple choice quizzes. Sufficiency in the written test allows access to the oral test.

The oral test is inherent both in general knowledge of pharmacology and specific for individual classes of drugs with therapeutic implications

## Office hours

By appointment to be requested by e-mail

## Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY