UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Farmacology

2627-2-I0302D034

Aims

At the end of the course, the student will have acquired fundamental knowledge of general pharmacology, including the main mechanisms of action of drugs, their therapeutic effects and adverse reactions, with particular reference to the principles required to understand laboratory analyses and possible interactions between drugs and biological systems.

The student will also acquire basic knowledge of anesthesiology and the management of medical emergencies, with focus to the main drugs and techniques used in these contexts, understanding their physiological effects and possible implications for diagnostic processes and laboratory parameters.

At the end of the course, the student will be able to apply the acquired knowledge to interpret the effects of the main drugs on biological systems and to recognize variables that may influence laboratory test results, including drug-related interferences, drug metabolism, and inter-individual variability in drug response.

The student will also be able to correlate the principles of anesthesiology and emergency medicine with possible changes in physiological and laboratory parameters, understanding their implications within diagnostic activities.

Contents

During the integrated course, students will explore the fundamental principles of general pharmacology, with particular reference to drug mechanisms of action, pharmacokinetics and pharmacodynamics, major adverse drug reactions and factors influencing inter-individual variability in drug response.

Students will also be provided with the tools to understand the main interactions between drugs and biological systems and their potential impact on the interpretation of diagnostic results and laboratory tests.

Finally, the basic principles of anesthesiology and the management of medical emergencies will be addressed, with

particular attention to the main drugs used in these contexts, their physiological effects, and their possible implications for biological parameters and laboratory analyses.

Detailed program

The course consists of two integrated modules:

Pharmacology
The Pharmacology module will begin with an overview of the historical development of the discipline and the main stages of drug development, distinguishing between preclinical and clinical studies, with reference to the role of pharmacovigilance.
The principles of pharmacokinetics (ADME) will then be explored, with reference to routes of administration, bioavailability, first-pass effect, tissue distribution, and the main processes of drug metabolism and excretion, including the role of cytochrome P450 enzymes and enterohepatic circulation.
The module will continue with pharmacodynamics, focusing on the main mechanisms of drug action, dose–response relationships, the concepts of therapeutic index and therapeutic window, and drug–receptor interactions.
Finally, inter-individual variability in drug response will be addressed, with reference to physiological, pathological, and genetic factors, sex- and gender-related differences, and the main adverse drug reactions (hypersensitivity, idiosyncrasy, and allergy). The main factors that may influence the interpretation of laboratory test results in relation to pharmacological therapy will also be discussed.

Anaesthesiology
The basic principles of anaesthesiology and the management of medical emergencies and urgent conditions will be addressed, with particular reference to shock, acute respiratory failure, and acute alterations in consciousness.
The principles of cardiopulmonary resuscitation and first aid will also be covered, with attention to the early recognition of emergencies, activation of the emergency response system, and basic life-saving manoeuvres.
Finally, the mechanisms of action of local and systemic anaesthetics will be illustrated, including an overview of local anaesthesia techniques, sedation, general anaesthesia, and sedoanalgesia, with particular attention to patient safety and the possible implications for physiological and laboratory diagnostic parameters.

Prerequisites

Knowledge of the preparatory courses specified in the regulations of the Degree Programme is required.

Teaching form

The integrated course includes lectures and interactive teaching activities aimed at promoting active learning of course contents.

During some lectures, digital tools for student interaction will be used, including the Wooclap platform, through quizzes, polls and real-time discussions. Audiovisual materials may also be used to support understanding of the course contents, including educational video resources (e.g., JoVE).

Teaching activities are delivered in person.

The course is taught in Italian, with possible use of English-language teaching materials.

Gender medicine principles will be integrated during teaching activities, with particular attention to sex- and gender-related differences in drug response, in the management of medical emergencies, and in their implications for physiological and diagnostic-laboratory processes.

Textbook and teaching resource

For an in-depth and comprehensive study of the topics covered in the course, the following textbooks are recommended:

1. Pharmacology module

- Cella, Di Giulio, Gorio, Scaglione, “Farmacologia generale e speciale per le lauree sanitarie triennali”, Piccin.
  This textbook provides a comprehensive overview of the fundamental principles of both general and special pharmacology, with a specific focus on undergraduate healthcare degree programmes.

- Collino, Cicala, Ialenti, “Farmacologia generale”, UTET.
  A reference textbook covering the fundamental concepts of general pharmacology, providing a solid theoretical and practical foundation for students

2. Anesthesiology module

- Ranieri, Mascia, Terragni, Urbino, “Elementi di Anestesiologia e Terapia Intensiva”, C.G. Edizioni Medico Scientifiche.
  A key textbook for understanding the main concepts and clinical practice in anesthesiology and intensive care medicine, essential for the management of medical emergencies and urgent conditions.

In addition to the recommended textbooks, lecturers will provide supplementary teaching materials, including lecture slides and any additional resources deemed useful for further study of the topics covered in the course.

Semester

Second semester.

Assessment method

The examination is divided as follow:

- 22 multiple-choice questions and open-ended questions for the Pharmacology module;
- 11 multiple-choice questions for the Anesthesiology module.

Knowledge related to the mechanisms of action of drugs, their effects on biological systems and their possible interference with physiological and laboratory parameters may be assessed across the different parts of the

examination, in accordance with the course contents.

The Pharmacology and Anesthesiology modules are taken in a single examination session.

Assessment is based on the correctness, relevance and completeness of the answers, in order to ensure a fair and consistent evaluation of the competences acquired within the integrated course.

Sex- and gender-related differences in drug response and in pathophysiological conditions may also be assessed across the different parts of the examination, in accordance with the course contents.

Office hours

Lecturers are available upon appointment, either in person or online.

Sustainable Development Goals

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