

Degree in Biomedical Laboratory Techniques

Teaching: CLINICAL BIOCHEMISTRY AND PHARMACEUTICAL TOXICOLOGY

Number CFU: 5

Responsible Teacher: Claudia Ceci

e-mail: claudia.ceci@unicamillus.org

Module: Special Clinical Biochemistry

SSD: BIO/12

CFU number: 2

Teacher: Costanza Montagna

E-mail: costanza.montagna@unicamillus.org

Module: Pharmaceutical Toxicology and galenic Pharmacology

SSD: BIO/14

CFU number: 3

Teacher: Claudia Ceci

E-mail: claudia.ceci@unicamillus.org

Student's reception hours: via e-mail appointment

PREREQUISITES

In order to learn the contents of both modules and for an effective comprehension of the teaching, basic concepts of chemistry, general biochemistry, clinical biochemistry, molecular biology, cell biology, genetics, physiology, and general pathology are required.

LEARNING OBJECTIVES

The educational objectives of the module Special Clinical Biochemistry are aimed at acquiring knowledge of the main methodologies used in clinical biochemistry, understanding the significance of alterations in biochemical-clinical relevant profiles.

The module Pharmaceutical Toxicology and galenic Pharmacology aims at acquiring the fundamental principles of pharmacokinetics, pharmacodynamics, toxicology and galenic pharmacology, that underlie the execution of biochemical and pharmacogenetic tests carried out in the analysis and research laboratories, and the theoretical bases for the preparation of galenic drugs. The students must know the scientific rigor and methodological approach underlying the development of new drugs, and have to learn the fundamental aspects connected with the therapeutic use of the most frequently used classes of drugs.

These objectives will be achieved through lectures, seminars and interactive teaching activities, designed to facilitate learning and improve the ability to address and resolve the main questions of the pharmaceutical industry, toxicology and pharmaceutical galenics.

LEARNING OUTCOMES

Expected learning outcomes are conform to the European Framework of qualification (Dublin descriptors), as follows:

Knowledge and understanding

At the end of the integrated course, the student should know the importance of alterations in biochemical processes as the cause of various disease conditions.

The must student must also have developed the ability to keep up to date by critically reading and

understanding scientific articles, published in reviewed international journals.

The student must demonstrate knowledge and understanding of laboratory analytical techniques, with reference to the techniques used in pharmacology laboratories.

At the end of the module Special Clinical Biochemistry the student should know the steps from biological sample collection to the reports; know the analytical groupings and profiles of biochemical-clinical relevance.

At the end of the module Pharmaceutical Toxicology and galenic Pharmacology, the student must demonstrate the knowledge and understanding of the mechanisms of action, adverse effects, relevant drug interactions, of the treated classes of drugs, and the ability to link the acquired knowledge on pharmacokinetics and pharmacodynamics with toxic and therapeutic effects of the various classes of drugs.

The student must understand the activity of drugs in relation to their interaction with specific targets, at both cellular and systemic level.

Applying knowledge and understanding

At the end of the integrated course the student will be able to use the acquired knowledge for an autonomous in-depth study of aspects related to the professional activity to which he will devote himself.

This should also be done with autonomy of judgment that will enable to make broad assessments related to the topics covered, regarding the biochemistry and its links with other fundamental disciplines such as clinical biochemistry and physiology. In addition, the student will need to know the steps from biological specimen collection to the final reporting; know the analytical groupings; know The biochemical-clinical relevance profiles.

Communication skills

The student must be able to expose the acquired knowledge in a clear and appropriate technical language, by using the specific scientific terminology in a suitable manner.

Making judgements

At the end of the integrated course the student will be able to make general assessment of the treated topics.

COURSE SYLLABUS

SPECIAL CLINICAL BIOCHEMISTRY

From biological sample collection to reporting

Pre-pre-analytical phase, pre-analytical phase, analytical phase, post-analytical phase, interpretation of results.

Analytical groupings

Blood, urine, feces, CSF, hair, and saliva.

Profiles of biochemical-clinical significance

Glucose profile, protein profile, lipid profile, profile. vitamin profile.

PHARMACEUTICAL TOXICOLOGY AND GALENIC PHARMACOLOGY

Definition of drug; drugs classification and nomenclature; desired and undesired effects of drugs

General principles of pharmacodynamics: receptors and mechanism of action of drugs

Development of new drugs: general principles of *in vitro* drug sensitivity tests; preclinical studies and clinical trials

General principles of pharmacokinetics: routes of drug administration, absorption, distribution, metabolism, elimination of drugs.

Pharmacogenomics: individual variability of drug response, variation of target proteins, variation in enzymes responsible for drug metabolism.

Autonomic pharmacology (parasympathomimetics and cholinergic antagonists; sympathomimetics and

adrenergic antagonists)

Special pharmacology; general characteristics of the following classes of drugs: antiinflammatory drugs, opioids, antirheumatic drugs (traditional and biological DMARDs), antimicrobial agents, anticancer agents (antimitotics and antimetabolites), gastrointestinal pharmacology, pulmonary pharmacology, endocrine pharmacology.

Principles of toxicology; toxicokinetics; toxication and detoxification mechanisms; main sources of toxicity; toxic drug effects.

Principles of pharmaceutical galenic, magisterial and officinal galenic, auxiliary substances in galenic preparations: solvents, excipients, preservatives.

COURSE STRUCTURE

The module of Special Clinical Biochemistry is structured in 2 or 3 hours lessons (20 hours in total.)

The module of Pharmaceutical Toxicology and Galenic Pharmacology is structured in 30 hours of frontal teaching, divided into lessons of 2-4 hours, according to the academic calendar.

Lectures will include theoretical lessons and supplementary seminars on the topics covered.

COURSE GRADE DETERMINATION

For Special Clinical Biochemistry module, final exam consists of a multiple-choice test.

The grade will be expressed in thirtieths, ranging from a minimum of 18 to a maximum of 30 cum laude.

For the module of Pharmaceutical Toxicology and Galenic Pharmacology, grade determination will take place with a written exam followed by an oral exam. The written test will consist of 30 multiple-choice questions; for each correct answer, a point will be assigned. The final score of the written test will be given by the sum of the partial scores assigned to each question answered correctly. To access the oral exam the student must have totalled at least a minimum of 18 points.

During the oral exam, the student will have to demonstrate adequate skills related to the teaching. In particular, the student will have to demonstrate: I) understanding of the topics learned; ii) appropriate use of the technical terms related to pharmacology iii) clarity of exposition; iv) ability to link together the acquired knowledge; v) in-depth study of the treated topics. In the evaluation mark knowledge and understanding represents up to 40%, applying knowledge and understanding represents up to 40% and making judgements represents up to 20% of the final mark.

The evaluation criteria are as follows:

Not suitable: Poor or lacking knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalizations of the requested contents; inability to use technical language.

18-20: Just sufficient knowledge and understanding of the topics, with obvious imperfections; just sufficient capacity for analysis, synthesis and autonomy of judgment; poor ability to use technical language.

21-23: Sufficient knowledge and understanding of the topics; sufficient ability to analyze and synthesize with the ability to reason with logic and coherence the required contents; sufficient ability to use technical language.

24-26: Fair knowledge and understanding of the topics; discrete ability to analyze and synthesize with the ability to rigorously argue the required contents; good ability to use technical language.

27-29: Good knowledge and understanding of the required contents; good ability to analyze and synthesize with the ability to rigorously argue the required contents; good usability

30-30L: Excellent level of knowledge and understanding of the required content with an excellent ability to analyze and synthesize with the ability to argue the required content in a rigorous, innovative and original way; excellent ability to use technical language

OPTIONAL ACTIVITIES

N.A.

READING MATERIALS

- 1) Biochimica clinica essenziale, dal laboratorio ai quadri di patologia clinica. Elisabetta Albi Tommaso Beccari Samuela Cataldi. Zanichelli 2019.
- 2) Di Giulio et al. Farmacologia generale e speciale per le lauree sanitarie. Piccin, second edition.
- 3) Clementi F., Fumagalli G. FARMACOLOGIA GENERALE E MOLECOLARE. 5th edition EDRA, 2018.
- 4) C. Colombo, F. Alhaique, C. Caramella, B. Conti, A. Gazzaniga, E. Vidale. Principi di Tecnologia Farmaceutica. Zanichelli 2015.
- 5) Other material and scientific articles indicated by the teacher.

STUDENT RECEPTION

The teacher will reply to all booking requests that will arrive via e-mail. Receive by appointment.
Prof. Claudia Ceci
email claudia.ceci@unicamillus.org
Phone. +39-06400640