UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Medical Physics

1920-1-H4102D008-H4102D024M

Aims

Students will be able to understand the basic biochemical techniques, to prepare a biochemistry assay of protein, lipid or sugar, under the supervision of qualified laboratory staff and by using an "on field" approach. The last lesson will consist in the discussion of clinical cases based on the biochemical knowledge learned during the course "Biochemistry"

Students will be able to understand the basic histological techniques, to prepare histological samples for the observation of the structure and ultrastructure of the main biological tissues, under the supervision of qualified laboratory staff and by using an "on field" approach.

Students will receive the practical, theoretical and IT skills to analyse and to correctly understand the experimental data. This knowledge will form the primary basis for a rationale approach to the knowledge of medical sciences.

Students will be able to demonstrate the position of palpable landmarks of the different regions and will acquire knowledge of the characteristic features, organ content and 3-D arrangement of the head, neck, thorax, abdomen, pelvis and limbs.

The general features of the systems further described in detail in “Locomotor system diseases”, “Cardiovascular and Respiratory diseases”, Digestive health”, “Endocrine, Kidney and Urinary tract diseases” and “Mother and Child” will be addressed.

Contents

The students are introduced to the main biochemical techniques and to the instruments, reagents and materials needed for biochemistry assay (to analyse protein, lipid and sugar).

The students are introduced to the main histological techniques and to the instruments, reagents and materials needed for histological analysis.

Introduction to OriginLab Program

Data import procedures

Data Visualization

Mathematical models and fitting procedures

Analysis of patient data to determine physiological parameters.

Students will be introduced to the principles of regional anatomy and general principles of systematic anatomy, with specific reference to clinical anatomy

Detailed program

Protein assay.

Lipid assay: Thin Layer Chromatography (TLC)

Sugar assay: Blood sugar level

Clinical cases discussion.

Flow cytometry to describe tissues properties

Principles of light microscopy

Principles of electron microscopy

Principles of confocal microscopy

Preparation of biological samples for immunohistochemistry, immunofluorescence, histological analysis

Instruments for hematological and blood chemistry analysis

Data import procedures

Importing simple text files

Recognition of different data storage formats

Generation of numerical matrices for data management

Displaying data

Introduction to the different ways of graphic representation

Graphs in linear logarithmic and bilogarithmic scale

Mathematical models and methods of fit

Analysis of patient data to determine physiological parameters

Analysis of respiratory data

Analysis of data of blood parameters

Analysis of Electrophysiological data

Principles of regional anatomy of:

- head and neck
- thorax
- abdomen
- pelvis and perineum
- lower limb
- upper limb

Principles of radiologic anatomy.

Principles of clinical anatomy

Prerequisites

College-level scientific knowledge and basic knowledge of mathematics and analysis and IT.

Teaching form

Lessons, seminars, laboratory practice

Textbook and teaching resource

See each module for specific textbooks and teaching resources

Semester

2nd term

Assessment method

Assessment of the achievement of planned objectives on the basis of the attendance/participation to the laboratory activities.

Knowledge and skills will be further assessed during the “Basic sciences” and “Fundamentals of Human Morphology” examinations, with the modalities there described

Office hours

Mon-Fri 9AM-5PM, by appointment