ADVANCED DIAGNOSTIC METHODS (A000369)

1. language

Italian

2. course contents

Coordinator: Prof. STRANO ROSSI SABINA

Academic Year: 2022/2023

Year Course: 2

Semester: 1

UFC: 10

Modules and lecturers:
- DIAGNOSTICS IN GENOMIC MEDICINE (A000262) - 3 cfu - ssd MED/03 Prof. Emanuela Lucci Cordisco
- ANATOMO-PATHOLOGICAL DIAGNOSTICS (A000281) - 2 cfu - ssd MED/08
- CLINICAL BIOCHEMICAL DIAGNOSTICS (A000282) - 2 cfu - ssd BIO/12
Prof. Silvia Baroni
- MEDICO-LEGAL DIAGNOSTICS (A000283) - 1 cfu - ssd MED/43
Prof. Sabina Strano Rossi
- MICROBIOLOGICAL DIAGNOSTICS (A000284) - 2 cfu - ssd MED/07
Prof. Luca Masucci

3. bibliography

a) Articles and reviews assigned in class by the lecturer.b) Scarpa, Ruco: Anatomia Patilogica, Le basi.2017 EDRA; Rubin: Anatomia Patologica L'essenziale, 2015 Piccin

c) Ciaccio. Elementi di Biochimica clinica e medicina di laboratorio. EdiSES 2020

d) Materials made available by the lecturer (slides, scientific articles)

e) MICROBIOLOGIA MEDICA Patrick R. Murray, Michael A. Pfaller, Ken S. Rosenthal

4. learning objectives

- Knowledge of the main advanced diagnostic methodologies in the different disciplines covered by the integrated chorus through understanding of models based on evidence-based precision medicine.

- In this way, the course aims to obtain in the students an autonomous judgment ability that will make them able to face and solve with the appropriate methodologies the various clinical cases with a personalized evidence-based approach. These skills must, by the end of the course be part of the cultural background of the student who must be able to illustrate and argue the various advanced diagnostic solutions suitable for solving specific problems

- This will be achieved through lectures that provide the basic elements of the various disciplines and through interactive discussion of concrete clinical cases.

5. PREREQUISITES

Knowledge of Basic Chemistry, Molecular Biotechnology, and the molecular basis of disease are required.

6. teaching methods

The teaching methodology is based on face-to-face lectures delivered by providing both the basic elements of the various disciplines aimed mainly at understanding the main advanced methods of analysis with application perspectives for case solving. Lectures are based on interactive modes, integrating activities marked by active learning, such as: "problem-based learning," "self-learning," and "case study" to standard teaching. Teaching consists of face-to-face lectures conducted with the use of power-point slides. The lectures involve the active participation of students in order to develop critical thinking skills and autonomy of judgment through solving concrete cases, and their argued exposition. It is possible to transform the in-person lecture into online lecture with use of dual-mode blackboard collaborate ultra methodology with also Online interactive lecture scenario.

7. other informations

I Docenti sono a disposizione per informazioni sul Corso e chiarimenti sulle lezioni con appuntamento fissato tramite posta elettronica o, per una richiesta veloce, alla fine delle lezioni.

8. methods for verifying learning and for evaluation

An oral examination is provided with the teachers of the various disciplines. The score will be given in thirtieths and the arithmetic average of the scores obtained in the various disciplines will be taken

It is also possible, if necessary, the performance of a written examination with multiple-choice quizzes, 6 quizzes for each module. The correct answer to all quizzes will correspond to the score of 30/30; each wrong answer will be deducted a grade.

9. program

a) Diagnostics in Genomic Medicine:

Next Generation Sequencing (NGS) analysis technologies and their diagnostic application in genomic medicine. Main sequencing platforms, bioinformatic data analysis, variant filtering and prioritization, genomic reference databases, classification and interpretation of clinical significance of variants. Applications to personalized medicine and prenatal diagnostics.

b) Anatomic-Pathologic Diagnostics.

- The diagnostic pathway in histopathology: Classical and needle aspiration cytology. Thin layer cytology. Endoscopic biopsy and needle biopsy surgery.

-Processing of diagnostic material: Freezing. Fixation. Inclusion. Cutting. Histomorphologic staining. Histochemical staining. Immunohistochemical staining. Ultrastructure.

-Molecular biology in advanced anatomic-pathologic diagnostics.

In situ hybridization: DNA hybridization. RNA hybridization. FISH and study of chromosomal translocations. The extraction and purification of DNA and RNA from paraffin-embedded tissues. Micro dissection.

PCR in histopathological diagnostics: RT-PCR. Semiquantitative PCR. Real Time PCR. Methylation Specific PCR. Mutational analysis and study of gene polymorphisms:

*SSCP-PCR; Automated sequencing. Analysis of gene polymorphisms. Study of microsatellite instability. Tumor genotyping and application of NGS in advanced diagnostics in Pathological Anatomy.***c) Diagnostica di biochimica Clinica**

c) Clinical Biochemical Diagnostics

Laboratory Medicine and Clinical Biochemistry: biochemical testing and laboratory organization. Preanalytic, analytic, and postanalytic variability. Internal quality control and VEQ . Principal analytical techniques. Immunochemistry and interferences. Laboratory medicine and dyslipidemia. Diabetes mellitus. Biomarkers of cardiac damage. Laboratory and kidney; chemical and microscopic urine examination.

d) Medico-Legal Diagnostics.

Forensic toxicology and analytical methods; Screening and confirmatory methods. Biological sample preparation. Evidentiary value of analytical data. Diagnosis of intoxication/poisoning. Substances of forensic medical interest, their identification in biological samples, interpretation of analytical data: classical drugs of abuse and new psychoactive substances, psychotropic drugs, doping drugs and counterfeit drugs, ethyl alcohol. Application in forensic medicine.

e) Microbiological Diagnostics.

- Diagnosis of infectious diseases: definition of viral, bacterial, parasitic pathogens.

- Classical laboratory diagnosis: culture examination, microscopic examination, serological examination.

- Molecular diagnostics.