## Subject Guide

### Clinical Physiology and Biochemistry

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<th>Module</th>
<th>Content</th>
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<td>Medicine and Pharmacology</td>
<td>Clinical Physiology and Biochemistry</td>
<td>4th</td>
<td>2nd semester</td>
<td>6 ECTS (4.5 T+ 1.5 P)</td>
<td>Compulsory</td>
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### Lecturers

**Clinical Physiology**

1. Francisco Lisbona Delgado (Grupo A y C)
2. Mª Inmaculada López Aliaga (Grupo B)
3. Javier Díaz Castro (Grupo E)
4. Mª José Muñoz Alférez (Grupo E)

**Clinical Biochemistry**

4. Antonio Sánchez Pozo (Grupo C)
5. Mª Carmen Ramírez Tortosa (Grupo B)
6. Mª Dolores Mesa García (Grupos A y E)

### Degree within Which the Subject is Taught

**Degree in Pharmacy**

- Teachers of Clinical Physiology:
  - Francisco Lisbona Delgado:
    - T y Th: 9:30-11:30 h. y V: 11:30-13:30 h.
  - Mª Inmaculada López Aliaga:
    - M, W and F: 11:30-13:30 h.
  - Javier Díaz Castro:
    - T: 15:00-16:00 h., W: 16:00-17:00 h. y 18:00-19:00 h., Th: 17:00-18:00 h. y F: 16:00-17:00 h. y 18:00-19:00 h.
  - Mª José Muñoz Alférez:
    - W y F: 10:30-13:30 h.
The schedule of tutorships of every teacher of Clinical Biochemistry will be exposed in the bulletin boards of Biochemistry and Molecular Biology II Department, as well as in the respective web pages.

**PREREQUISITES and/or RECOMMENDATIONS (if necessary)**

- It is recommended to have a previous basic knowledge (background knowledge) of Human and Cell Physiology (I and II), Physiopathology, Structural Biochemistry, Metabolic Biochemistry and Human Anatomy.
- A good level of English and Informatics skills are also required.
- Ability to process and to elaborate documents in virtual format and on paper.

**BRIEF ACCOUNT OF THE SUBJECT PROGRAMME (ACCORDING TO THE DEGREE ??)**


**GENERAL AND PARTICULAR ABILITIES**

**GENERIC SKILLS:**

- **CG9.** To participate in the activities of promotion of the health, prevention of disease, in the individual, familiar and community area; with the integral and multiprofessional vision of the process health - disease.
- **CG10.** To design and to evaluate reagents, methods and analytical clinical technologies, knowing the basic foundations of the clinical analyses and the characteristics and contents of the laboratory diagnosis.
- **CG13.** To develop skills of communication and information, both oral and written, to deal with patients and users of the center where to perform his professional activity. To promote the capacities of work and collaboration in multidisciplinary teams and the related ones to other sanitary professionals.
- **CG15.** To recognize the own limitations and the need to support and update the professional career, giving special importance to the independent learning of new knowledge being based on the scientific available evidence.

**SPECIFIC SKILLS:**

- **Cognitive (Knowledge):**

  Those outlined by the MEC as for the competencies of the pharmacist related to the public health, knowledge of sanitary education and of clinical analyses. And those outlined by ANECA relating to the development of the clinical analyses (biochemical, microbiological, parasitological, physiological) and to issue the corresponding judgments of laboratory diagnostic. See also section II.

- **Procedural/Instrumental (Learn how):**

  - Sampling for clinical analyses.
  - Processing of the samples according to the section (Physiology, Biochemistry, Microbiology and Parasitology).
  - Interpretation of results.
  - Resolution of clinical cases.

- **Attitudinal (Behaviour):**

  - To give information of the diagnosis and clinical results as to increase the knowledge of the citizens.
OBJECTIVES (EXPRESSED IN TERMS OF EXPECTED RESULTS OF THE TEACHING PROGRAMME)

- To integrate the knowledge obtained in the Clinical subjects of Physiology and Biochemistry.
- To interpret the laboratory tests used in the diagnosis and follow-up of common diseases.
- To apply the interpretation of laboratory information in the follow-up of the efficiency and of the therapeutic safety.
- To be able to accomplish of reports with the results of the physiological and biochemical diagnosis of laboratory.
- To introduce the specialization in the clinical matters of Clinical Analyses, Clinical Biochemistry, Microbiology and Clinical Parasitology.

DETAILED SUBJECT SYLLABUS

THEORETICAL PROGRAM

BLOCK I. CLINICAL PHYSIOLOGY

THEMATIC UNIT 1. METHODS OF BLOOD’S EXTRACTION

THEMATIC UNIT 2. HEMATOPOYETIC ORGANS
Blood cells, origin, differentiation and cellular maturation. Morphologic characteristics of the blood cells.

THEMATIC UNIT 3. BASIC HEMATIMETRY

THEMATIC UNIT 4. INTRODUCTION TO THE STUDY OF THE ERITROCYTARY PATHOLOGY

THEMATIC UNIT 5. MICROCYTIC ANEMIAS

THEMATIC UNIT 6. MACROCYTIC ANEMIAS
Megaloblastic anemias by vitamin B12 and folic acid deficiency. Non-megaloblastic macrocytic anemias.

THEMATIC UNIT 7. NORMOCYTIC ANAEMIAS

THEMATIC UNIT 8. INTRODUCTION TO THE STUDY OF THE LEUKOCITARY FUNCTIONALISM

THEMATIC UNIT 9. CHRONIC MYELOPROLIFERATIVE SYNDROMES
Chronic myeloid leukaemia. Chronic myeloproliferative syndromes with hemo-peripheral expression. T and B-cell chronic lymphocytic leukaemia.

THEMATIC UNIT 10. CLASSIFICATION OF THE ACUTE LEUKAEMIAS
Secondary acute leukemias. Linfoproliferative syndromes without hema-peripheral expression. Lymphomas and myelomas.
THEMATIC UNIT 11. HEMOSTASIS: COAGULATION AND FIBRINOLYSIS
Elements that intervene in the hemostasis. Platelets. Plasmatic factors of the coagulation and fibrinolytic system. Analytical tests of the exploration of the different components.

THEMATIC UNIT 12. FUNCTIONAL ALTERATIONS OF THE PLATELETS

THEMATIC UNIT 13. RENAL FUNCTION: PRINCIPLES OF THE RENAL CLEARANCE
Methods to determine the renal clearance. Measures of glomerular filtration, renal blood flow and effective renal plasma flow. Tubular function tests. Dilution and concentration tests.

THEMATIC UNIT 14. EXAMINATION OF URINE
Composition of the urine. Methods for the systematic investigation of the abnormal compounds of the urine. Automatic analyzers. Methods for the systematic investigation of the normal compounds of the urine. Examination of the urinary sediment.

THEMATIC UNIT 15. EXAMINATION OF THE ACID-BASE BALANCE
Arterial gasometry. Interpretation of information in respiratory and metabolic acidosis. Respiratory and metabolic alkalosis. Effects of compensation.

THEMATIC UNIT 16. CEPHALORAQUID LIQUID
Formation, circulation and composition. Obtaining sample. Cells count and leukocitary formula. Biochemical tests

THEMATIC UNIT 17. SEMINAL FLUID

LABORATORY PRACTICE PROGRAM

Practice 1. Blood cells count: red cells, white cells and platelets
Practice 3. Leucocitary formula.
Practice 4. Reticulocyte count.

BLOCK II. CLINICAL BIOCHEMISTRY

THEMATIC UNIT 1. CLINICAL BIOCHEMISTRY.
Diagnostic semiology. Analytical and biological variability control.

THEMATIC UNIT 2. MOLECULAR PATHOLOGY AND DIAGNOSTIC TECHNIQUES.

THEMATIC UNIT 3. HYPERGLYCEMIA AND HYPOGLYCEMIA. Diagnosis and monitoring of the diabetic patient.

THEMATIC UNIT 4. LIPOPROTEINS. Evaluation of the atherogenic risk

THEMATIC UNIT 5. ALTERATIONS OF THE NON-PROTEIN NITROGENOUS METABOLISM: urea, uric and creatinin. Pathological consequences and diagnostic techniques. No-protein nitrogenous and renal function

THEMATIC UNIT 6. DISPROTEINEMIAS AND DIAGNOSTIC TECHNIQUES.

THEMATIC UNIT 7. CLINICAL ENZYMOLOGY.

THEMATIC UNIT 8. BIOCHEMICAL RISK MARKERS OF THE HEPATIC FUNCTION
THEMATIC UNIT 9. TUMORAL BIOCHEMICAL RISK MARKERS

LABORATORY PRACTICE PROGRAM

Practice 1. Glucose determination
Practice 2. Total cholesterol, HDL-cholesterol and triacylglycerides determination
Practice 3. Uric acid, urea and creatinin determination
Practice 4. G6PD and G6P determination

READING

FUNDAMENTAL BIBLIOGRAPHY:

- G. Gaw, Cowan B O’ Reilly, Bioquímica Clínica. Ed Harcourt
- Ruiz Reyes G Ruiz Argüelles. Fundamentos de interpretación clínica de los exámenes de laboratorio. Ed Panamericana
- González de Buitrero JM, Aría Ferreiro A, Rodríguez-Segade M G Sánchez Pozo A. Bioquímica Clínica. McGraw-Hill / Interamericana de España
- Sánchez de Medina Contreras F, Sánchez Pozo A B Suárez Ortega MD. Apuntes de Bioquímica Clínica. ICE, Universidad
- A. González. Principios de Bioquímica Clínica y Patología Molecular. Elsevier España 2010

COMPLEMENTARY BIBLIOGRAPHY:


RECOMMENDED INTERNET LINKS

- ASH Educational Materials http://www.hematology.org/education/index.html
- Blood Outline http://www.mc.vanderbilt.edu/hista/blood/
- Bloodline http://www.bloodline.net/