COURSE OUTLINE

(1) GENERAL

FACULTY	SCIENCES		
SCHOOL	CHEMISTRY		
LEVEL OF STUDY	UNDERGRATUATE		
MODULE CODE	EN5	**ΕΞΑΜΗΝΟ ΣΠΟΥΔΩΝ**	7th
TITLE	Clinical Chemistry		

INDEPENDENT TEACHING ACTIVITIES In case the credits are awarded in distinct parts of the course e.g. Lectures, Laboratory Exercises etc. If the credits are awarded uniformly for the entire course, indicate the weekly teaching hours and the total number of credits	**WEEKLY TEACHING HOURS**	**CREDITS**
THEORY	3	3
TUTORIAL		
Add rows if necessary. The teaching organization and teaching methods used are described in detail in (d)		

MODULE TYPE general background, specialist background, specialization, general knowledge, skills development	specialist background, specialization, skills development
PREREQUISITE MODULES:	NO
LANGUAGE OF LECTURING-TUTORING and EXAMS:	GREEK
THE MODULE IS OFFERED TO ERASMUS STUDENTS	NO
WEBPAGE OF MODULE (URL)	

(2) LEARNING OUTCOMES

Learning Outcomes

The learning outcomes of the module are described as the specific knowledge, skills and abilities of an appropriate level that students will acquire after successful completion of the course.

Consult Appendix A

• Description of the Level of Learning Outcomes for each cycle of study according to the Qualifications Framework of the European Higher Education Area

• Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B

- *• Summary Guide for Writing Learning Outcomes*

The module aims to introduce students to the basic concepts of the science of Clinical Chemistry. At the end of the module, the student will have acquired the following skills:

1. Understand the importance of the basic principles and methods of biochemistry, biological chemistry and cell biology in Clinical Chemistry and clinical-biochemical investigation in medicine
2. Understand the structure and function of blood components (plasma/serum, blood cells – Plasma proteins and enzymes) and Circulation and gas exchange (hydrogen ion homeostasis and blood gases)
3. Understand the basic principles of the immune system for the production of antibodies, and their use as tools in modern clinical analysis techniques, as well as other modern molecular and biochemical

clinical analysis techniques and their applications in the determination and evaluation of laboratory tests in biological fluids
4. Understand the role of hormones and the endocrine system (Hypothalamus and Pituitary – Adrenal glands – Thyroid gland) and their analysis in all systems with the example of the gonads and the Reproductive system and their related biochemical analyses
5. To understand the basic functions of the kidneys (Osmoregulation and excretion - Water, sodium and potassium) and the related biochemical analyses
6. To understand the basic functions of the liver, the gastrointestinal system, clinical nutrition and disorders of carbohydrate, lipid, lipoprotein metabolism and their involvement in cardiovascular disease and diabetes mellitus
7. To understand and describe the principles of clinical analyses concerning the homeostasis of calcium, phosphate and magnesium and bones and joints
8. To understand the importance of Neurons, synapses and nerve signals in the Nervous systems - Sensory and motor mechanisms -Muscular, nervous and psychiatric disorders, and their related analyses
9. To understand the molecular, genetic and metabolic basis of certain diseases
10. To understand the evaluation of analyses for the diagnosis and monitoring of Inherited metabolic diseases
11. To understand the basic principles of clinical Biochemistry of Cancer - Metabolic aspects of malignant disease
12. To understand the importance of clinical-biochemical analyses in blood and other biological fluids and samples for the assessment and monitoring of homeostasis or any pathological condition of the above and other systems and the effect of medication
13. To understand the importance of clinical-biochemical analyses in blood and other biological fluids and samples for the assessment and monitoring of therapeutic drugs and chemical aspects of toxicology
14. To understand the analyses and applications of clinical chemistry-biochemistry in sensitive population groups (immunosuppression, pregnancy, fetal development, childhood, aging, cancer treatment, etc.)
15. To acquire critical thinking for the evaluation of clinical cases through the application-ordering of specific laboratory tests, and to be able to communicate these effectively in a medical environment, by applying the principles of skills and knowledge of evidence-based Clinical Biochemical Diagnostics and the life sciences.
16. To recognize the importance of Clinical Chemistry in everyday life in the 21st century.

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Supplement and listed below), which of these does the module aim to achieve?

Searching, analyzing and synthesizing data and information, using the necessary technologies	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Respect for the natural environment*
Autonomous work	*Demonstration of social, professional and ethical responsibility and sensitivity to gender issues*
Teamwork	*Exercise of criticism and self-criticism*
Working in an international environment	*Promotion of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Generating new research ideas	*Other…*
	…….

At the end of this module the student will have further developed the following skills (generic competencies):
1. Ability to demonstrate knowledge and understanding of essential data, concepts, theories and applications related to Clinical Chemistry.
2. Ability to apply this knowledge and understanding to the solution of problems of an unfamiliar nature.
3. Ability to adopt and apply methodology to the solution of unfamiliar problems.
4. Study skills needed for continued professional development.
5. Ability to interact with others on problems of an interdisciplinary nature.

More generally, upon completion of this course the student will have further developed the following generic competencies:

Search, analysis and synthesis of data and information, using the necessary technologies
Adaptation to new situations.
Decision-making.
Autonomous work.
Group work.
Exercise of criticism and self-criticism.
Respect for the natural environment.
Promotion of free, creative and inductive thinking

(3) MODULE CONTENT

THEORY

1. Basic principles of biochemistry and cell biology in Clinical Chemistry – Biochemical investigation in clinical medicine

2. Circulation and gas exchange - Blood, plasma/serum, blood cells – Plasma proteins and enzymes - hydrogen ion homeostasis and blood gases

3. Antibodies and the immune system – Modern techniques of Clinical Chemical Analysis

4. Hormones and the endocrine system - Hypothalamus and Pituitary Gland – Adrenal Gland – Thyroid Gland – Gonads and Reproductive System

5. The kidneys - Osmoregulation and excretion - Water, sodium and potassium

6. The liver - The gastrointestinal system - Clinical nutrition - Disorders of carbohydrate metabolism, Lipids, lipoproteins and cardiovascular disease

7. Calcium, phosphates and magnesium - Bones and joints

8. Neurons, synapses and neural signals - Nervous systems - Sensory and motor mechanisms - Muscular, nervous and psychiatric disorders

9. Diagnosis and monitoring of inherited metabolic diseases

10. Clinical Biochemistry of Cancer - Metabolic aspects of malignant disease

11. Monitoring of therapeutic drugs and chemical aspects of toxicology

12. Clinical Chemistry in Fetal Development - Childhood

13. Molecular, genetic and metabolic basis of certain diseases

(4) TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHODOLOGY *Face to face, Distance learning, etc.*	Face-to-face lectures	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) *Use of ICT in Teaching, Laboratory Education, and Communication with Students*	• Organization of the material in ppt slides. • Learning process support through the electronic platform e-class • Communication via email.	
TEACHING ORGANIZATION	***Activity***	***Semester Workload***

The teaching methods and methods are described in detail. *Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Artistic Laboratory, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing of Paper/Thesis, Artistic Creation, etc.* *The student's study hours for each learning activity are listed as well as the hours of unguided study according to the principles of ECTs*	Attending Lectures: 39 Literature study & analysis: 15 Assignment of an Essay: 15 Interactive Teaching: 6 **Total: 75 hours /Semester**
STUDENT ASSESSMENT *Description of the assessment process* *Assessment Language, Assessment Methods, Formative or Summative, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Examination of a Patient, Artistic Interpretation, Other / Others* *Evaluation criteria are explicitly stated and whether and where they are accessible to students.*	• Written Exam (Progress: performance on the progress corresponds to 20% of the final grade) • Written Exam (Final Exam: performance on the final exam corresponds to 50% of the final grade) • Written Assignment Assessment (Bibliographic Assignment: performance on the final exam corresponds to 30% of the final grade)

(5) RECOMMENDED BIBLIOGRAPHY

1. Clinical Chemistry 9th English/ 3rd Greek edition, Evdoxos Book Code: 112691131, Edition: 3rd/2023, Authors: Marshall W.J., Lapsley M., Day A., Shipman K., ISBN: 9789925350896, Type: Book, Publisher: BROKEN HILL PUBLISHERS LTD
2. Biology: Form and function in animals, Evdoxos Book Code: 102076767, Edition: 1st/2021, Authors: Neil A. Campbell, Jane B. Reece, Lisa A. Urry, Steven A. Wasserman, ISBN: 9789605246167, Type: Book, Publisher: FOUNDATION OF TECHNOLOGY & RESEARCH-UNIVERSITY PUBLICATIONS OF CRETE
3. Clinical Biochemistry, Evdoxos Book Code: 94689642, Edition: 3rd British-1st Greek/2021, Authors: William J. Marshall, Marta Lapsley, Andrew P. Day, Ruth M. Ayling, ISBN: 9786185173609, Type: Book, Publisher: UTOPIA PUBLICATIONS M. EPE.
4. Clinical Biochemistry, Evdoxos Book Code: 122090289, Edition: 6th/2023, Authors: Gaw Allan,Cowan Robert A.,O'Reilly Dennis S. J.,Stewart Michael J.,Shepherd James, ISBN: 9789605835958, Type: Book, Publisher: PARISIANOU SINGLE-PERSON PUBLISHING COMPANY, INTRODUCING TRADING COMPANY OF SCIENTIFIC BOOKS
5. Various scientific papers or commentary articles which may be of general interest or include recent developments in the subject of Clinical Chemistry-Biochemistry (but also more broadly in the biomedical sciences), which (as is the case everywhere) are slow to be incorporated into textbooks and which may change every year, are posted on the e-class platform.

- Relevant Scientific Journals:

- Clinical Biochemistry
- Journal of Biological Chemistry
- Prostaglandins & Other Lipid Mediators
- International Journal of Molecular Sciences
- Frontiers in Biosciences Landmark
- Blood
- Blood Reviews
- Clinica Chimica Acta
- Cell Chemical Biology

- Mediators of Inflammation
- Life Sciences
- Journal of Inflammation
- Infectious Disorders – Drug Targets
- Trends in Immunology
- The Journal of Molecular diagnostics