



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

HELLENIC REPUBLIC

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ΕΘΝΙΚΗ ΑΡΧΗ ΑΝΩΤΑΤΑΤΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

HELLENIC AUTHORITY FOR HIGHER EDUCATION

## **University of West Attica**

**School of Health and Care Sciences**

**Department of Biomedical Sciences**

### **Undergraduate Studies**

## **“Biomedical Methods and Technology in Diagnosis”**

Course Outline

**HOLISTIC MOLECULAR APPROACHES. TECHNIQUES AND TRANSLATIONAL MEDICINE**



ATHENS 2023

## COURSE OUTLINE

### (1) General

<b>SCHOOL</b>	SCHOOL OF HEALTH AND CARING SCIENCES		
<b>DEPARTMENT</b>	BIOMEDICAL SCIENCES		
<b>LEVEL OF STUDY</b>	MASTER PROGRAM		
<b>COURSE CODE</b>	IA8	<b>SEMESTER OFFERED</b>	B
<b>COURSE TITLE</b>	HOLISTIC MOLECULAR APPROACHES. TECHNIQUES AND TRANSLATIONAL MEDICINE		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>in case the credits are awarded in discrete parts of the course e.g. Lectures, Laboratory Exercises etc. If credit is awarded for the whole course, indicate the weekly teaching hours and the total number of credits</i>		<b>WEEKLY TEACHING HOURS</b>	<b>ECTS</b>
LECTURES AND WORKSHOPS		4	7
<i>Add rows if necessary. The teaching organisation and the teaching methods used are described in detail in (d).</i>			
<b>TYPE OF COURSE</b> general background, specific background, specialisation general knowledge, skills development	SPECIFIC BACKGROUND - GENERAL KNOWLEDGE TRAINING		
<b>PREREQUISITE COURSES:</b>	NOSOLOGY, PATHOPHYSIOLOGY		
<b>LANGUAGE OF TEACHING AND EXAMINATION:</b>	Greek		
<b>THE COURSE IS OFFERED TO ERASMUS STUDENTS</b>	OXI		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uniwa.gr/courses/DML105/">https://eclass.uniwa.gr/courses/DML105/</a>  <a href="https://eclass.uniwa.gr/courses/TIE229/">https://eclass.uniwa.gr/courses/TIE229/</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning Outcomes</b></p> <p>The learning outcomes of the course describe the specific knowledge, skills and competences of an appropriate level that students will acquire after successful completion of the course.</p> <p>Consult Annex A</p> <ul style="list-style-type: none"> <li>- Description of the Level of Learning Outcomes for each cycle of study according to the Qualifications Framework of the European Higher Education Area</li> <li>- Descriptive Indicators for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Annex B</li> <li>- Comprehensive Guide to the Writing of Learning Outcomes</li> </ul>
<p>After completion of the course the students will be able to:</p> <ul style="list-style-type: none"> <li>• Compare and contrast the physiology, the pathophysiology in the form of allostasis and finally disease progression for all human systems</li> <li>• Apply the basics of precision medicine and compare and contrast genomics, transcriptomics, proteomics and metabolomics in the validation of biomarkers of understanding the pathophysiology of a disease</li> <li>• Apply the knowledge of translational medicine to make informed decisions of what can be transferred to human disease</li> <li>• Construct experimental protocols, clinical trials or laboratory tests aiming at a clear hypothesis, specific materials and methods, appropriate study design and clear presentation of the results</li> <li>• Create proposals which can be funded from external competitive sources</li> </ul>

### General skills

Taking into account the general competences that the graduate should have acquired (as listed in the Diploma Supplement and listed below), which one(s) does the course aim at?

*Search, analysis and synthesis of data and information, using the necessary technologies*

*Adaptation to new situations*

*Decision-making*

*Autonomous work*

*Teamwork*

*Working in an international environment*

*Working in an interdisciplinary environment*

*Generating new research ideas*

*Project planning and management*

*Respect for diversity and multiculturalism*

*Respect for the natural environment*

*Demonstrate social, professional and ethical responsibility and gender sensitivity*

*Exercise of criticism and self-criticism*

*Promotion of free, creative and deductive thinking*

.....

*Other...*

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*Search, analysis and synthesis of data and information, using the necessary technologies*

*Adaptation to new situations*

*Decision-making*

*Autonomous work*

*Teamwork*

*Working in an international environment*

*Working in an interdisciplinary environment*

*Generating new research ideas*

### (3) COURSE CONTENT

1. Physiology and Pathophysiology in Medicine (Endocrinology, Embryology, Gynaecology, Gynaecology, Andrology, Neurology, Psychiatry, Cardiology and Pulmonology).
2. Evolution of the modern general diagnostic laboratory (haematological, biochemical and other parameters). Measurements of peptide and steroid hormones - Modern quality control - RIA, IRMA, Elisa techniques. Receptor study techniques and applications. Modern chromatography techniques.
3. Modern techniques of psychoneurological diagnosis and research. Neurophysiology techniques (diagnostic and experimental), evolution of EEG, potentials.
4. Genetic techniques-molecular biology in endocrinology, neurology, psychiatry, psychiatry, cardiology, embryology and reproduction (gynecology and andrology). Molecular biology of cancer-markers-applications and implications.
5. Respiratory physiology and pathophysiology - Modern laboratory
6. Molecular Nutrition and applications.
7. Imaging methods CT, MRI, fMRI, PET and nuclear medicine (scans) today. Applications of Medical Physics and particularly imaging and optical media, laser techniques and flow cytometry. Image laboratories, reference to nanotechnology.
8. Regenerative Medicine - Laboratory and applications. Stem cell techniques (therapeutic and research).
9. Methods of processing medical measurement and gene parameter data with modern computer systems, algorithms and neural networks in application and research. Interface of modern laboratory and computing techniques in the understanding of cellular and especially genetic data on the one hand, and brain function and cognition on the other hand -Contemporary views in neurosciences.
10. Holistic theoretical explanation of the parameters of physical and mental health and illness as presented clinically and as investigated by traditional and most modern methods. Evaluation of the contribution of older applied techniques and the future of diagnostics through technological advances.

1. Hormonal analyses and chromatographic techniques. Modern analytical developments
  2. Laboratory of respiratory physiology. Oxidative stress techniques - Electrocardiography.
  3. Demonstrations of imaging modalities (CT, MRI, fMRI, PET and nuclear isotopes).
  4. Demonstration of molecular biology, andrology, endocrinology techniques. Practical analysis of immunohistochemistry techniques. Microscopic study of tissue samples of endocrine-neuroendocrine tumors.
  5. Fluorescent in situ hybridization technique.
  6. Real time PCR technique.
  7. Quality control procedures.
  8. Demonstration and participation in a laboratory of regenerative medicine.
  9. Demonstration of and participation in laboratories of optical (laser) applications. Demonstration of applications of flow cytometry.
  10. Demonstration and participation in medical imaging workshops.
  11. Demonstration and participation in biomedical informatics systems and their applications.
- Safety in the above laboratory techniques and modern applications in general.

#### TEACHING and LEARNING METHODS - ASSESSMENT

<b>METHOD OF DELIVERY</b> Face-to-face, Distance learning, etc.	Face to face in the classroom and in the laboratory.	
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES</b> Use of ICT in Teaching, Laboratory Training, Communication with students	Videos and/or simulation of Molecular Histopathology - Oncology techniques	
<b>TEACHING ORGANISATION</b> <i>The way and methods of teaching are described in detail.</i> <i>Lectures, Seminars, Laboratory Exercise, Field Exercise, Study &amp; analysis of literature, Tutoring, Practical (Placement), Clinical Exercise, Artistic Workshop, Interactive teaching, Educational visits, Study visits, Project work, Writing of work / assignments, Artistic creation, etc.</i>  <i>The student's study hours for each learning activity are indicated, as well as the hours of unguided study according to ECTS principles</i>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	45
	Laboratory Exercises	45
	Assignment	30
	Specialised seminars	30
	Writing a project	50
	<b>Total</b>	<b>200</b>
<b>STUDENT ASSESSMENT</b> <i>Description of the evaluation process</i>  <i>Language of Evaluation, Evaluation Methods, Formative or Inferential, Multiple Choice Test, Short Answer Questions, Test Development Questions, Problem Solving, Written Work, Report/Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Examination of a Patient, Artistic Interpretation, Other / Others</i>  <i>Explicitly identified assessment criteria are stated and if and where they are accessible to students.</i>	<p>The language of examination is in Greek.</p> <p>According to the teaching organization 40% of the total grade comes from formative assessments (15% from Assignment and 25% from the creation of the project.</p> <p>The remaining 60% comes from multiple choice questions with a best single answer and 4 distractors, based on the learning outcomes. The criteria of assessment are published clearly on the course website and are analyzed to students in the beginning of the course.</p>	

## 1. References

### A. Greek

- Χανιώτης Φ., Χανιώτης Δ. «Νοσολογία – Παθολογία» (τόμος Α', Β', Γ', Δ'), εκδόσεις Λίτσας, 2002.
- Kumar P. and Clark M.: «Παθολογία» (2 τόμοι), Ιατρικές Εκδόσεις Λίτσας, Αθήνα 2007.
- Runge M., Greganti M., F. Netter : Παθολογία (2 τόμοι) εκδόσεις Π.Χ. Πασχαλίδης, Αθήνα 2006 .
- Epstein-Perkin-de Bono-Cookson. «Κλινική Εξέταση». Ιατρικές Εκδόσεις Λίτσας, Αθήνα 2000 .
- Hope R.A., et.al: Oxford Handbook Κλινικής Ιατρικής. Ιατρικές Εκδόσεις Λίτσας, Αθήνα 2002 .
- Φερτάκης Παθοφυσιολογία, Εκδόσεις Πασχαλίδη, 2009.
- Nair N, Peate I Παθοφυσιολογία, Βασικές Αρχές Εφαρμοσμένης Παθολογικής Φυσιολογίας, Εκδόσεις Πασχαλίδη, 2011.
- Atlas of Pathophysiology (Thieme), ελληνική έκδοση ως εγχειρίδιο, εκδόσεις Σιώκης, 2013.

### B. International

- McPhee S, Canong W : Pathophysiology of disease : An introduction to Clinical Medicine, The McGraw-Hill Companies Inc, N.Y. USA, fifth edition, 2006.
- McPhee S., Papadakis M. "Current Medical Diagnosis & Treatment", 2008.
- 47<sup>th</sup> International edition. The McGraw-Hill Companies Inc., N.Y. USA 2008
- Fauci A., et.al. "HARRISON'S. Principles of Internal Medicine", 17<sup>th</sup> edition. The McGraw-Hill Companies Inc., N.Y. USA 2008.
- Colour Atlas of Pathophysiology-Silbernagl and Lang Thieme Editions, NY, 2010.

*-Relevant scientific journals:*

1. Journal of Clinical Endocrinology and Metabolism,
2. Endocrinology,
3. Pituitary
4. Reproduction
5. Peptides
6. The New England Journal of Medicine
7. Lancet
8. Cell
9. The Journal of Psychiatry
10. The Journal of Neurology
11. Neuroendocrinology
12. Psychoneuroendocrinology