COURSE OUTLINE	FROM GENES TO THERAPIES

1. GENERAL

SCHOOL	HEALTH SCIENCES		
DEPARTMENT	MOLECULAR BIOLOGY AND GENETICS		
LEVEL OF STUDIES	LEVEL 7		
COURSE CODE	PHABIOTECH 1	**SEMESTER**	A
COURSE TITLE	FROM GENES TO THERAPIES		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits. Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
	3	**15**

COURSETYPE *Background, General Knowledge, Scientific Area, Skill Development*	BACKGROUND
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	GREEK
COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE URL	

2. LEARNING OUTCOMES

LEARNING OUTCOMES

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire upon successful completion of the course are described.
Refer to Appendix A
• Description of the Level of Learning Outcomes for each cycle of study in accordance with the Qualifications Framework of the European Higher Education Area
• Descriptive Indicators for Levels 6, 7 and 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
• Guidelines for writing Learning Outcomes

Aim of the course

The aim of the course is to provide graduate students with an in-depth understanding of the molecular mechanisms underlying biological processes in higher organisms. Emphasis is placed on the regulation of gene expression, epigenetics and cell signalling pathways, which are critical for elucidating the pathophysiology of diseases and for the design of novel therapeutic strategies.

Upon successful completion of the course, the postgraduate students will:

- Understand the organization of genomes in higher organisms and explain the mechanisms regulating gene expression and epigenetics.
- Understand and describe key cell signalling pathways and their roles in development and disease.
- Know how to utilize animal models (mouse, zebrafish, *Drosophila melanogaster* and *Caenorhabditis elegans*) to study human diseases and explore the genetic and biochemical factors involved.
- Categorize and explain the various types of genetic, metabolic, oncological, neurodegenerative and infectious diseases, as well as the mechanisms underlying their pathophysiology.

- Explain the fundamental principles of molecular drug targets, mechanisms of drug action (*e.g.* G-proteins, kinases and phosphatases) and strategies for drug development.
- Assess the target validation process and identify critical stages in the development of novel therapeutic agents.
- Integrate molecular biology with pharmacology, achieving a holistic understanding of disease treatment at the molecular level.

GENERAL SKILLS

Considering the general competencies that the graduate should have acquired (as outlined in the Diploma Supplement and presented below), which of these skills does the course aim to achieve?

Search, analysis and synthesis of data and information, ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project design and management
Respect for diversity and multiculturalism
Respect for the natural environment
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking and self-reflection
Promoting free, creative and inductive reasoning

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3. COURSE CONTENT

1. Genomes of higher organisms
2. Regulation of gene expression
3. Epigenetics and Epigenomics
4. Cell signaling pathways
5. Animal models for human diseases (Mouse, Zebrafish, Drosophila melanogaster, and *Caenorhabditis elegans*)
6. Types of genetic diseases
7. Thalassemias and Metabolic Disorders
8. Cancer
9. Neurodegenerative diseases & Aging
10. Infectious diseases
11. Molecular drug targets and mechanisms of drug action (G-protein-coupled receptors, protein kinases, phosphatases, *etc*.)
12. Target validation
13. Drug development

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	The teaching includes face-to-face classes, group work, case studies and/or flipped classroom approaches, combined with lectures delivered through synchronous distance learning methods. In addition to attending lectures, postgraduate students are expected to study the relevant literature and participate in educational activities.
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT)	Use of ICT in Teaching and in Communication with students. On the asynchronous e-learning platform: • course material is made available • supporting resources for assignments are provided

Use of ICT in Teaching, in Laboratory Education, in Communication with students

TEACHING ORGANIZATION

The ways and methods of teaching are described in detail.
Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research& analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. etc.
The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.

- students submit their assignments

Avtivity	*Workload/Semester*
Courses	39
Literature Review	210
Preparation/Implementation of educational activities	120
Assessment	10
Total workload	**379**

STUDENT EVALUATION

Description of the evaluation process

Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others

Please indicate all relevant information about the course assessment and how students are informed

Assessment Language: Greek

Assessment Method: Formative

Individual or group written assignments (25%), in-class activities (10%), Final Examination: Written exam and/or written assignment and/or presentation (65% of the final grade).

The assessment criteria are accessible to students as they are posted on eclass. The assessment criteria for the written assignments are as follows:

ASSESSMENT CRITERIA FOR THE WRITTEN ASSIGNMENTS	max
Introduction	15
Topic development into sections and subsections (degree of alignment with the requirements of the assignment)	40
Conclusions (summary of the work)	10
Critical thinking, use and presentation of data, hypotheses and sources (depending on the topic)	15
Proper use of bibliography and citation formatting	10
Presentation, Formatting, Composition and Spelling	10
Total	**100**

5. SUGGESTED BIBLIOGRAPHY

- The materials from the instructors' presentations.
- Original research articles and review papers published in reputable academic journals.

Selected chapters from textbooks (available in the Library of the School of Health Sciences-indicative list).

- Dickenson, J., Freeman, F., Lloyd Mills, C., Sivasubramaniam, S., & Thode. *Molecular Pharmacology: From DNA to Drug Discovery* (1st ed.). Broken Hill Publishers 2019.
- Trop B.E. *Principles of Molecular Biology*. Academic Publications 2015.

- Strachan, T., & Read, A.P. *Human Molecular Genetics.* Crete University Press 2017.
- Katzung, B.G., & Trevor, A.J. *Basic and Clinical Pharmacology.* Litsas Publications 2019.
- Brown, T.A. *Genomes* (4th ed.). Garland Science 2020.