COURSE OUTLINE	METHODOLOGY, TECHNOLOGY AND SOFT SKILLS IN PHARMACEUTICAL BIOTECHNOLOGY

1. GENERAL

SCHOOL	HEALTH SCIENCES		
DEPARTMENT	MOLECULAR BIOLOGY AND GENETICS		
LEVEL OF STUDIES	LEVEL 7		
COURSE CODE	PHABIOTECH 2	**SEMESTER**	A
COURSE TITLE	METHODOLOGY, TECHNOLOGY AND SOFT SKILLS IN PHARMACEUTICAL BIOTECHNOLOGY		

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 postgraduate students with foundational knowledge essential for understanding modern technologies utilized in the field of Pharmaceutical Biotechnology. It also emphasizes the development of key competencies, professional attitudes and practical skills essential to the field, including ethical considerations, the effective communication of scientific research, *etc.*

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

- Acquire knowledge of the technologies utilized in Pharmaceutical Biotechnology, understand the principles underlying these technologies, and recognize their applications and potential.
- Understand the foundational principles of technologies employed in the field of Pharmaceutical Biotechnology.
- Explain how these technologies can be applied to the design and development of biopharmaceuticals.
- Design experimental approaches using the technologies with which they have become familiar.
- Gain proficiency in statistical analysis methods and apply them to analyze data, ensuring the validity of results.

- Apply principles of research ethics in biomedical research and ensure that experiments are conducted within approved ethical frameworks.
- Develop skills in scientific writing, including the preparation of research articles, proposals and publications.
- Conduct literature reviews and efficiently collect relevant scientific data.
- Understand the methodology of scientific presentation, allowing them to create clear, organized, and well-structured presentations of research findings.

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. Recombinant DNA technology
2. Genome engineering and transgenic animal disease models
3. Mass Spectrometry and NMR
   - Omics Technologies
   - Genomics
   - Trasncriptomics
   - Proteomics
   - Pharmacogenomics
   - Metabolomics
4. Synthetic Biology
5. Enzyme kinetics assays
6. Cell lines, cell culture and related assays
7. Stem cell technology and tissue engineering
8. Preclinical testing: 2D/3D cell culture systems, organoids and animal testing
9. Experimental design and statistical data analysis
10. Research ethics in biomedical sciences
11. Proposal writing, scientific paper preparation and publication process
12. Literature Review
13. Scientific presentation skills

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, in Laboratory Education, in Communication with students

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
- students submit their assignments

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.

Avtivity	*Workload/Semester*
Courses	39
Literature Review	200
Preparation/Implementation of educational activities	130
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 (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**

ASSESSMENT CRITERIA FOR PRESENTATIONS	max
Introduction-Background	15
Topic development of the topic 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).

- Watson J., Witkowski J.A, Myers R.M., Caudy A.M. *Recombinant DNA.* Academic Publications 2007.
- Lehninger, A.L., Nelson, D.L., & Cox, M.M. *Principles in Biochemistry* (6th Greek ed.). Crete University Press 2015.
- Glick B.R. & Patten C.L. *Molecular Biotechnology: Principles and Applications of Recombinant DNA.* ASM Press 2022.
- Palladino M. & Thieman W. *Introduction to Biotechnology.* Pearson Education 2019.
- Renneberg R. *Biotechnology for Beginners*. Academic Press 2023.
- Baldwin G., Stan G.B., Polizzi K., Freemont P.S., Kitney R.I., Dickinson R., Ellis T., Bayer T. *Synthetic Biology*. Utopia Publishing 2017.
- Lottspeich F, Engels J. Bioanalytics, Wiley 2018.