COURSE OUTLINE

(1) GENERAL

SCHOOL	NATURAL SCIENCES		
ACADEMIC UNIT	BIOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	BIO_ΔΥ03	**SEMESTER**	4rd
COURSE TITLE	GENETICS I		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Theory and practicals (laboratory exercises)	6	8
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific
PREREQUISITE COURSES:	There is no prerequisite course
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek language
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes, in English language
COURSE WEBSITE (URL)	http://www.biology.upatras.gr/

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon course completion, the students should be able to know the following subjects: 1. chromosomes and cellular division, 2. mendelian inheritance and extensions, 3. the chromosome theory of inheritance, gene linkage and recombination, 4. quantative genetics, 5. point and chromosomal mutations, 6. introduction to genetics of viruses and bacteria, 7. inheritance of organelles, 8. pharmacogenetics. The students will also have further developed the following competences: 1. the competence to demonstrate knowledge of essential facts, concepts, principles and theories relating to inheritance, 2. the competence to apply and understand that knowledge to Mendelian and non-Mendelian inheritance, 3. the competence to apply this knowledge for solving relative problems, 4. the competence to apply that knowledge in cases such as improving animal and plant races, as well as in pharmacogenetics and applications on humans.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Autonomous work
- Teamwork
- Search, analyze and synthesize data and information, using the necessary technologies
- Promote free, creative and inductive thinking

(3) SYLLABUS

Theory

1.Mendelian analysis General genetical approaches.

2. Fidelity of transmission of the genetic information. Mitosis-Meiosis

3. Mendelism. Relative experiments and Mendel's law. Modern conception of Mendel's rules.

4. Chromosomal theory Genes and chromosomes. Sex linked traits – Cellular evidence of the chromosomal theory.

5. Extensions to Mendelian analysis. Multiple alleles. Epistasis. Genotype – phenotype.

6. Recombination, linkage, mapping The linkage phenomenon. Methods for genetic mapping in haploid and diploid eukaryotic organisms. Cellular evidence of the recombination. Mitotic crossing-over. DNA markers mapping.

7. Quantitative Genetics Basic statistical means. Methods of statistical analysis of genetical data. Quantitative traits loci.

8. Mutations. A general approach of gene mutation phenomenon. Chromosomal alterations.

9. Exonuclear inheritance Inheritance of chracters located on the cytoplasmic organelles mitochondria and chloroplasts.

10. Pharmakogenetics. The genetics of drugs metabolism. Examples of pharmakogenetic polymorphism in human.

Laboratory Exercises

1. Monohybrid or dihybrid crosses using D. melanogaster strains.

2. Human chromosomes and karyotype synthesis.

3. Mutations in Human hemoglobin genes, Electrophoresis, Interpretation of results.

Methodology and Implementation of the teaching and pedagogical approach in Genetics.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lectures using slides and Power-Point presentations and support of learning through the e-class platform.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	***Activity*** / ***Semester workload*** Lectures and seminars: 40 Laboratory exercises: 15 Independent Study: 145 Course total: ***200***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Theoretical written examinations at the end of the semester (70% of the final grade), which evaluates student's acquired knowledge and critical and creating thinking. Greek grading scale: 1 to 10. Minimum passing grade: 5 2. Written examinations on the laboratory exercises at the end of the experimental training (30% of the final grade, taken into account only if the student takes the minimum grade of 5 in the theoretical written examinations). The evaluation is accessible to students through the electronic secretariat and internal announcements from the course professors.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. P. J. Russell: iGenetics, A mendelian approach
2. W.S. Clug et al.: Concepts of Genetics
3. L. Hartwel al. : Genetics: from Genes to Genomes

- Related academic journals: