**COURSE OUTLINE**

1. **GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | School of Health Sciences | | | | |
| **ACADEMIC UNIT** | Faculty of Medicine | | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | | |
| **COURSE CODE** | **ΙΑΥ203** | **SEMESTER** | | **2nd** | |
| **COURSE TITLE** | **BIOLOGY-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** |
| Lectures  General overview of cells and cell biological research. The organization and sequences of cellular genomes. Basic principles of molecular biology. Recombinant DNA. Detection of nucleic acids and proteins. Functional study of eukaryotic genes. Replication, maintenance and rearrangements of genomic DNA. DNA repair. Recombination between homologous DNA sequences. DNA rearrangements. RNA synthesis and processing Cell signalling. Protein synthesis, processing and regulation of protein function. | | | 10 | | 7 |
| **LABORATORY EXERCISES**  **Microscopy**  **scRNA sequencing analysis**  **PCR** | | |  | |  |
|  | | |  | |  |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (4).* | | |  | |  |
| **COURSE TYPE**  *general background,  special background, specialised general knowledge, skills development* | GENERAL BACKGROUND | | | | |
| **PREREQUISITE COURSES:** |  | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek and English for Erasmus Students | | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES | | | | |
| **COURSE WEBSITE (URL)** | <https://ecourse.uoi.gr/enrol/index.php?id=140> | | | | |

1. **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* | |
| **Module Objective:**  **The module is considered a core module because it has as its object:**  **a) An introduction to selected and important areas of Biology and Biological research.**  **b) The study of the organization and sequences of cellular genomes**  **c) The basic principles of molecular biology related to the following:**  **Recombinant DNA Detection of nucleic acids and proteins.**  **Functional study of eukaryotic genes.**  **Replication, maintenance and rearrangements of genomic DNA.**  **DNA repair.**  **Recombination between homologous DNA sequences.**  **DNA rearrangements.**  **RNA synthesis and processing.**  **Cell signaling.**  **Protein synthesis, processing and regulation of their function.**  **The module is a mix of basic cellular and molecular mechanisms with examples of modern technologies for detecting large cellular biomolecules.**  **Teaching format and outcomes:**  **The course uses new interactive learning techniques which include:**  **The use of polling applications (example: Vevox).**  **Asynchronous communication with students via the ecourse platform.**  **Virtual laboratory (labxchange) to familiarize students with the laboratory environment before the laboratory exercises.**  **The course is taught in combination with laboratory exercises (in vitro and in silico) in the areas of:**  **A) Microscopy.**  **B) Single cell RNA sequencing data analysis (scRNA sequencing).**  **C) PCR.**  **Learning objective of module Biology - I**  **The student at the end of the semester should be able to:**  **a) Know the modes of operation of basic cellular-molecular mechanisms and ways of managing large biomolecules (DNA, RNA, Proteins) involved in them.**  **b) Understand how modern technologies and techniques work and understand basic elements of RNA sequencing data analysis.**  **c) Understand the molecular basis of some diseases**  **d) Know applications of fluorescence microscopy and PCR.**  **Training hours for each student: 91**  **Education semester: 2nd Spring**  **ECTS: 7**  **e-course** | |
| **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*  *Adapting to new situations*  *Decision-making*  *Working independently*  *Team work*  *Working in an international environment*  *Working in an interdisciplinary environment*  *Production of new research ideas* | *Project planning and management*  *Respect for difference and multiculturalism*  *Respect for the natural environment*  *Showing social, professional and ethical responsibility and sensitivity to gender issues*  *Criticism and self-criticism*  *Production of free, creative and inductive thinking*  *……*  *Others…*  *…….* |
| Research, analysis and synthesis of data and information, using novel technologies.  Adaptation to new situations.  Autonomous work.  Teamwork.  Working in an international environment.  Working in an interdisciplinary environment.  Generating new research ideas.  Practising criticism and self-criticism. | |

1. **SYLLABUS**

|  |
| --- |
| BIOLOGY-I  General overview of cells and cell biological research.  -The organization and sequences of cellular genomes.  Basic principles of molecular biology.  -Recombinant DNA.  -Detection of nucleic acids and proteins.  -Functional study of eukaryotic genes.  -Replication, maintenance and rearrangements of genomic DNA.  -DNA replication.  -DNA repair.  -Recombination between homologous DNA sequences.  -DNA rearrangements.  -RNA synthesis and processing.  -Cell signalling.  -Protein synthesis, processing and regulation of protein function.  Laboratory exercises  A) Microscopy.  B) The analysis of single-cell RNA sequencing data (scRNA sequencing).  C) PCR. |

1. **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* | Use of PowerPoint with integrated use of the Vevox polling application to support interactive learning.  RStudio + R for analysis of single-cell RNA sequencing data.  Asynchronous communication with students via the ecourse platform.  Virtual lab (labxchange) to familiarize students with the laboratory environment before the laboratory exercises. |
| **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*** | ***Workload of each students group*** | | Lectures | 52 | | Student Preparation-Study | 104 | | Laboratory Exercises | 24 | | Laboratory Exercise preparation | 22 | | Module Total | 202 | |
| **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.* | A) Written exam with long and short-form questions directed towards critical thinking(80%).  B) continuous assessment - written exam with short form questions covering part of the module material and laboratory exercises (20%). |

1. **ATTACHED BIBLIOGRAPHY**

*Reading material:*

The Cell: A Molecular Approach

Cooper, Geoffrey M.; Hausman, Robert E.

Eighth Edition