# Course Outline

## General

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>School of Engineering, University of Patras</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACADEMIC UNIT</td>
<td>Department of Computer Engineering and Informatics</td>
</tr>
<tr>
<td>LEVEL OF STUDIES</td>
<td>Undergraduate Core Elective</td>
</tr>
<tr>
<td>COURSE CODE</td>
<td>CEID_NE548</td>
</tr>
<tr>
<td>SEMESTER</td>
<td>EASTER</td>
</tr>
<tr>
<td>COURSE TITLE</td>
<td>INTRODUCTION TO BIOINFORMATICS</td>
</tr>
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</table>

### 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.

<table>
<thead>
<tr>
<th>Lectures, Recitation sections, Project</th>
<th>2, 2, 1</th>
<th>5</th>
</tr>
</thead>
</table>

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).

<table>
<thead>
<tr>
<th>COURSE TYPE</th>
<th>Specialised general knowledge and skills development.</th>
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</table>

### Prerequisite Courses:

Recommended prerequisite knowledge are the courses of data structures (CEID_NE233), algorithms (CEID_NY205) and data base development (CEID_NY334).

### Language of Instruction and Examinations:

Greek. Instruction may be given in English if foreign students attend course.

### Is the Course Offered to Erasmus Students:

Yes.

### Course Website (URL)

- [https://www.ceid.upatras.gr/webpages/courses/cppplusplus/bioinfo/index.htm](https://www.ceid.upatras.gr/webpages/courses/cppplusplus/bioinfo/index.htm)
- [https://eclass.upatras.gr/courses/CEID1047/](https://eclass.upatras.gr/courses/CEID1047/)

## 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

Learning outcomes:

At the end of this course the student should be able to:

1. present the main principles and notions of Bioinformatics,
2. understand the connection that exists between the problems in managing biological macromolecules, and techniques for managing strings
3. design and implement algorithms for string processing in order to solve biological problems,
4. understand the basic principles of computer aided drug design,
5. present the main clustering and classification algorithms as they are applied in order to solve biological problems.

At the end of the course the student will have further developed the following skills/competences:

1. ability to exhibit knowledge and understanding of the basic principles and notions of bioinformatics and string processing algorithms
2. ability to apply methodologically this knowledge and understanding in order to solve problems in bioinformatics
3. Ability to cooperate with others in order to solve complex problems in the area of bioinformatics

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

(3) SYLLABUS

First Part

Second Part
The theoretical base of Molecular Design
Molecular Models and Biochemical Information
Structure Based Drug Design
Open problems

Third Part
Techniques for biological data classification and clustering targeting at predicting the behavior of biological molecules.

(4) TEACHING and LEARNING METHODS - EVALUATION

| DELIVERY |  
| Face-to-face, Distance learning, etc. | Face-to-face |
| USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY | We use Information and Communications Technology in communicate with students. We use e_class, e_mail and forum |
| 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 |

<table>
<thead>
<tr>
<th>Activity</th>
<th>Semester workload</th>
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<tbody>
<tr>
<td>Lectures</td>
<td>60</td>
</tr>
<tr>
<td>Recitation sections</td>
<td>60</td>
</tr>
<tr>
<td>Projects</td>
<td>30</td>
</tr>
<tr>
<td>Course total</td>
<td>150</td>
</tr>
</tbody>
</table>
## 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.

<table>
<thead>
<tr>
<th>No.</th>
<th>Evaluation Activity</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>1</td>
<td>Delivering and solving a set of exercises in string processing topics</td>
<td>30% of the total grade</td>
</tr>
<tr>
<td>2</td>
<td>Composing and presenting an essay by groups of 1-2 students, concerning the critical presentation and analysis of a set of scientific papers that deals with a specific topic of the course, and an oral examination on the notes of the course</td>
<td>70% of the final grade</td>
</tr>
</tbody>
</table>

## ATTACHED BIBLIOGRAPHY

- **Suggested bibliography:**

  2. Σοφία Κοσσίδα “Βιοπληροφορική, Δυνατότητες και Προοπτικές”, Εκδόσεις Νέων Τεχνολογιών Μον. ΕΠΕ 2009