COURSE OUTLINE

(1) GENERAL

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>NATURAL SCIENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACADEMIC UNIT</td>
<td>BIOLOGY</td>
</tr>
<tr>
<td>LEVEL OF STUDIES</td>
<td>UNDERGRADUATE</td>
</tr>
<tr>
<td>COURSE CODE</td>
<td>BIO_AY03</td>
</tr>
<tr>
<td>SEMESTER</td>
<td>First</td>
</tr>
<tr>
<td>COURSE TITLE</td>
<td>MATHEMATICS</td>
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</tbody>
</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>WEEKLY TEACHING HOURS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

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

COURSE TYPE
- Basic Background

PREREQUISITE COURSES:

LANGUAGE OF INSTRUCTION and EXAMINATIONS:
- Greek

IS THE COURSE OFFERED TO ERASMUS STUDENTS:
- Yes

COURSE WEBSITE (URL):
- https://eclass.upatras.gr/courses/BIO370/

(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

The subject of Mathematics has as a goal to provide to the students of the Department of Biology basic knowledge of upper-applied mathematics, that are needed in their science, in the fields of differential and integral calculus of one variable and of differential equations.

During the lessons the students become familiar with applications of mathematics in topics of Biology and of Environmental Sciences. These studies are basic and are used in many subjects of speciality of the next academic years of the Department of Biology.
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 the natural environment |
| Decision-making | Showing social, professional and ethical responsibility and sensitivity to gender issues |
| Working independently | Criticism and self-criticism |
| Team work | Production of free, creative and inductive thinking |
| Working in an international environment | Others... |
| Working in an interdisciplinary environment | ...... |
| Production of new research ideas | ...... |

Generally, by the end of this course the students will, furthermore, develop the following general abilities (from the list above):

• Search, analysis and synthesis of facts and information using the necessary technologies
• Decision making
• Adaptation to new situations
• Working in an interdisciplinary environment
• Autonomous Work
• Teamwork
• Production of new research ideas
• Promotion of the free, creative and inductive thinking

(3) SYLLABUS

A) Elements of Set Theory and Combinatorics (Sets, Operations between sets, Permutations, Arrangements, Combinations).
B) Differential calculus of a function of one variable (Functions, Limit, Continuity and Derivative of a function, Rate of change, Trigonometrical functions, Inverse trigonometrical functions, Exponential and logarithmic functions, Study of functions, Differential, Applications in Biology).
C) Integral calculus of a function of one variable (Indefinite and definite integral of a function, Computation of integrals of rational functions, Integrals of special form, Computation of surfaces and volumes, Generalized integrals, Applications in Biology).
D) Sequences - Series (Basic definitions, Sequences of Fibonacci, Applications in Biology).
F) Applications of differential equations (Population mathematical models, Applications of the accounting equation, Fermentation, Botany, Competition of species, Diffusion, Dating of objects).
## TEACHING and LEARNING METHODS - EVALUATION

### DELIVERY
Face-to-face, Distance learning, etc.

### USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students.

### 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.

### 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>Activity</th>
<th>Semester workload</th>
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<tbody>
<tr>
<td>Lectures</td>
<td>52</td>
</tr>
<tr>
<td>Solving suggested exercises</td>
<td>50</td>
</tr>
<tr>
<td>Hours for private study of the student</td>
<td>45</td>
</tr>
<tr>
<td>Final examination</td>
<td>3</td>
</tr>
<tr>
<td><strong>Course total</strong></td>
<td><strong>150</strong></td>
</tr>
</tbody>
</table>

### ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Related academic journals: