**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | HEALTH SCIENCES | | | | |
| **ACADEMIC UNIT** | BIOLOGICAL APPLICATIONS & TECHNOLOGIES | | | | |
| **LEVEL OF STUDIES** | UDERGRADUATE | | | | |
| **COURSE CODE** | **BEY 103** | **SEMESTER** | | **1st** | |
| **COURSE TITLE** | GENERAL MATHEMATICS | | | | |
| **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 and tutorials | | | 3+2 | | 6 |
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| *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* | General background. | | | | |
| **PREREQUISITE COURSES:** | None. | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek. | | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes. | | | | |
| **COURSE WEBSITE (URL)** |  | | | | |

1. **LEARNING OUTCOMES**

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| **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 are:  (i) understanding important topics of Calculus and solving Differential Equations, together with their applications in Biology and other sciences,  (ii) familiarity with concepts that appear in “Biostatistics” next semester. | |
| **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…*  *…….* |
| Working independently. Production of free, creative and inductive thinking. Decision making. | |

1. **SYLLABUS**

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| 1. **Basic functions.** Characteristics, properties and graphs of the functions: exponential, logarithmic, trigonometric and hyperbolic, trigonometric and hyperbolic identities and Osborn’s rule. 2. **Differentiation.** Point derivative and interpretation, left and right derivatives, first and second derivative functions, differentiation in a closed interval, differentiation and continuity, derivatives of elementary functions, rules of differentiation, derivatives of basic functions, implicit differentiation, the mean Value and Rolle’s theorems and applications, applications of differentiation: indetermined limit forms, study of a function (monotonicity, stationary points, convexity-concavity and inflexion points, asymptotic lines and curve sketching). 3. **Integration.** Indefinite integral and integrals of basic functions, definite integral and interpretation, improper integrals, integration techniques (change of variable, integration by parts, partial fractions, integration of irrational functions, integration of trigonometric functions in powers), the Gamma and Beta functions (properties and related integrals). 4. **First order differential equations.** General and particular solutions, initial value problem, applications of first order differential equations in Biology and other sciences, categories of first order differential equations (variables separable, homogeneous, linear, Bernoulli’s), various methods for solving particular first order differential equations. 5. **Elements of functions of two variables and partial differentiation.** Functions of two variables (domain and range), limits and iterated limits, continuity, partial derivatives (first and second order and mixed), Schwarz’s theorem, partial derivatives of compound functions, interpretation of the first partial derivative, stationary and saddle points. |

1. **TEACHING and LEARNING METHODS - EVALUATION**

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| **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* | Delivery of extra exercises and solutions using the department’s web page. Immediate communication using e-mail. |
| **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 | 40 | | Tutorials | 30 | | Extra exercises (4 sets) | 50 | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | Course total | ***120*** | |
| **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.* | The evaluation is based on a three hour written examination on solving problems at the end of semester, in the Greek language. |

1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:*  *- Related academic journals:*   1. Moysiadis, Ch., *Advanced Mathematiccs*, Kyriakidis Bros. Publications, Thessaloniki 2016. 2. Dugias, S., *Mathematics: Calculus*, University of Ioannina, Ioannina 2002. 3. Tsamatos, P., *Elements of Advanced Mathematics*, University of Ioannina, Ioannina 2002. |