ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Α .Δ Ι .Π .
ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ & ΠΙΣΤΟΠΟΙΗΣΗΣ
ΤΗΣ ΠΟΙΟΤΗΤΑΣ ΣΤΗΝ ΑΝΩΤΑΤΗ
ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC
H .Q .A .
HELLENIC QUALITY ASSURANCE
AND ACCREDITATION AGENCY

ΤΕΧΝΟΛΟΓΙΚΟ ΕΚΠΑΙΔΕΥΤΙΚΟ ΙΔΡΥΜΑ ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ ΚΑΙ ΘΡΑΚΗΣ
ΜΟΝΑΔΑ ΔΙΑΣΦΑΛΙΣΗΣ ΤΗΣ ΠΟΙΟΤΗΤΑΣ ΤΕΙ ΑΜΘ

Quality Assurance in Higher Education
Course Data Collection Form

ΤΕΧΝΟΛΟΓΙΚΟ ΕΚΠΑΙΔΕΥΤΙΚΟ ΙΔΡΥΜΑ
ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ & ΘΡΑΚΗΣ
ΑΓΙΟΣ ΛΟΥΚΑΣ,
65404 ΚΑΒΑΛΑ

EASTERN MACEDONIA AND THRACE
INSTITUTE OF TECHNOLOGY
AGIOS LOUKAS
65404 KAVALA

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF TECHNOLOGICAL ENGINEERING		
ACADEMIC UNIT	ELECTRICAL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	BN1	**SEMESTER**	**2ο**
COURSE TITLE	MATHEMATICS II		

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	5	7
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,* *Specialised general knowledge,*
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK / ENGLISH
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	http://engmath.teiemt.gr/moodle/

(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*

With the successful completion of the course the students have to be able:

- To realize a system of linear equations and describe the set of its solutions, to realize and be able to put down the matrix of the coefficients of the unknown and also the augmented matrix.
- To use elementary operations amongst rows to convert a matrix in its echelon form, make use of the echelon form of a matrix in order to find the solution of a linear system. To perform basic operations with matrices including the addition, the scalar multiplication, and multiplication of matrices. To calculate the inverse matrix, if it exists. To determine the product of a matrix times a vector and be able to transfer the linear systems as equations of matrices. To determine the concept of the dimension ad how to use the order of a matrix.
- To determine and calculate a determinant. To use the properties of the determinants in their calculations. To find the eigenvalues and eigenvectors of square matrices. To diagonalize square matrices.
- To use appropriate techniques for the solution of differential equaions.
- To select numerical methods for the approximation of the solution of continuous mathematics. To analyze the embedded error within its numerical approximation. To

implement a variety of numerical algorithms using appropriate technology.

- To compare and apply different approaches in the numerical solution of problems that arises from the beginning in the solution of non linear equations, in the interpolation and approximation, in numerical differentiation and integration, in the solution of linear systems.

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…*
	…….

- Retrieve, analyse and synthesise data and information, with the use of necessary technologies
- Adapt to new situations and make decisions
- Work autonomously, but also work in teams
- Be critical and self-critical
- Advance free, creative and causative thinking

(3) SYLLABUS

1. Introduction to Linear Algebra
   1.1. Matrices, operations with matrices, determinants, linear systems.
   1.2. Eigenvalues, eigenvectors and order of a matrix.
2. Differential Equations
   2.1. Basic concepts of differential equations.
   2.2. Direct integration method, homogeneous DE, separable DE.
   2.3. Linear DE, DE Bernoulli, DE Riccati.
3. Numerical Analysis
   3.1. Error analysis, numerical differentiation and integration, numerical solution of non linear equations.
   3.2. Numerical solution of ordinary differential equations (ODEs), numerical solution of linear systems.
   3.3. Numerical interpolation and approximation.
   3.4. Applications in Electrical Engineering.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In classroom, distance learning via the asynchronous platform
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Presentations using Power Point transparencies. Use of Matlab software, use of other appropriate software (Microsft Matematics 4.9, etc.), material in the e-class platform (videos, exercices, quizes, etc.) use of whiteboard. Contact with the students electronically (via e-mail, a group in facebook, via Skype).
TEACHING METHODS *The manner and methods of teaching are described in detail.*	

Activity	***Semester workload***
Lectures	52

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*	Online lectures: 13 Exercices: 13 Hours of personal study/exams: 97 Course total (30 hours / ECTS): ***175***
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.*	- Final exam (50%) which includes: • Solution of problems with quantitative data - Two group assignments (40%) - Attendance of lectures / Regular visit to e-class / facebook group (10%)

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

1. Ayres F. JR, "Calculus (Theorems and Problems)", Shaum's Outline Series, 1999.
2. Budak B.M, Fomin S.V., "Multiple Integrals, Field Theory, Series", MIR Publishers, 1978.
3. Croft A., Hargreaves M., Davison P., «Engineering Mathematics, A Foundation for Electronic, Electrical, Communications and Systems Engineers», 3rd Edition, Prentice Hall, 2000.
4. Duhateau P. C., "Applied Complex Variable", Harper Collins.
5. Grossman Stanley I., "Calculus", fourth edition, Academic Press, 1988.
6. Myskis A.D., "Introductory Mathematics for Engineers", MIR Publishers.
7. Spiegel M. R., "Advanced Calculus", Shaum's Outline Series.
8. Stroud K.A., Booth D. J., "Engineering Mathematics, sixth edition, Palgrave McMillan, 2007.
9. V. Tsiantos, "Mathematics for Engineers", Tziola Publishing Co., Thessaloniki, 2015 (in Greek).