CONSTRUCTION TECHNOLOGY II

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	BACHELOR		
COURSE CODE	40301	**SEMESTER**	3rd
COURSE TITLE	CONSTRUCTION TECHNOLOGY 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**
	2+2	4
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:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (ENGLISH)
COURSE WEBSITE (URL)	

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 students should be able to choose and design the appropriate method of restoration of a historic building, but also to implement it themselves on the site.

Upon successful completion of the course the student will be able to:

- Implement the most important restoration methods based on the knowledge of the construction of the respective buildings.
- Recognize problems.
- Select the appropriate restoration method based on them.
- Apply the restoration method in design form, but also in the restoration site.

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…

…….

Autonomous work

Group work

3. SYLLABUS

Restoration and maintenance of traditional building systems. Investigation of their construction and construction depiction. Analysis, with full documentation, of the damages and causes that caused them. Rehabilitation of buildings with an emphasis on methods of repair and reinforcement. Design and application to the construction site.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In classroom
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Yes
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	25
Practice exercises that focus on the application of methodologies and analysis of studies in smaller groups of students	25
Group work on a study	50
Course total	***100***

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*	i. Written final examination ii. Presentation of group work

given, and if and where they are accessible to students.	

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Τ.Ε.Ε. Μαγνησίας, Συντήρηση και Αναβίωση Παραδοσιακών Κτιρίων και Συνόλων, Εκδόσεις UNIVERSITY STUDIO PRESS, ISBN 960-12-120.

Μπούρας Χ., Τουρνικιώτης Π., Συντήρηση, αναστήλωση και αποκατάσταση μνημείων στην Ελλάδα, 1950-2000, Εκδόσεις Πολιτιστικό Ίδρυμα Ομίλου Πειραιώς ISBN: 978-960-244-146-6.

Σκουλικίδης, Διάβρωση και Συντήρηση Δομικών Υλικών Μνημείων, Εκδόσεις Γιαννικούλας, ISBN 960-524-076-9.

Κωτσιόπουλος, Συντήρηση και Αναβίωση Ιστορικών Κτιρίων, Εκδόσεις Τ.Ε.Ε.

COMPUTER PROGRAMMING AND COMPUTATIONAL APPLICATIONS IN CIVIL ENGINEERING I

1. GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40302	**SEMESTER**	3rd
COURSE TITLE	COMPUTER PROGRAMMING AND COMPUTATIONAL APPLICATIONS IN CIVIL ENGINEERING 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 (ECTS)**
LecturesandLaboratoryExercises	5 hours/week *(LECTURES 3 hours&LABORATORY EXERCISES 2 hours)*	6
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*	**Specialized General Knowledge course / Scientific Area course**
PREREQUISITE COURSES:	There are no prerequisite courses, however, the students should already have attended the previous semesters' courses and must also attend the current semester courses.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (In English)
COURSE WEBSITE (URL)	YES in the Open eClass platform (Asychronous eLearning platform) : https://eclass.uop.gr/modules/auth/opencourses.php?fc=82 https://eclass.uop.gr/courses/CIVIL104/ (For students with entrance before 2019 : https://eclass.pat.teiwest.gr/eclass/modules/auth/opencourses.php?fc=86

	https://eclass.pat.teiwest.gr/eclass/courses/768115/)

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*

Upon successful completion of this course, the students should be able to:

- Know the basics of computer structure and operation.
- Know the computer number systems and can convert numbers from one number system to another number system.
- Know the modern operating systems and can skillfully use a modern computer.
- Use the Internet and its services (World Wide Web, e-mail, etc.).
- Know the free software and the open source software.
- Create and edit Civil Engineering technical documents by using a computer.
- Create Civil Engineering technical presentations by using a computer.
- Use computer spreadsheets to perform simple and advanced calculations on problems of the Civil Engineering specialty as well as to create graphs on problems of the Civil Engineering specialty.
- Know which are the computer programming languages.
- Know the basic principles of computer programming.
- Know the capabilities of computer programming.
- Realize the importance of computer programming for the Civil Engineer.
- Compile and run computer programs in Basic programming language.
- Compile and run computer programs in Basic language for problems in the Civil Engineering specialty.
- Apply the useful numerical methods by programming in Basic to solve Civil Engineering problems.
- Perform computational applications in subjects of the Civil Engineering specialty.

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… …….*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology.
- Working independently.

- Team work.
- Working in an interdisciplinary environment.
- Production of new research ideas.
- Production of free, creative and inductive thinking.

3. SYLLABUS

Introduction to computers. Computer number systems. Modern operating systems.The Internet and its services (World Wide Web, e-mail, etc.).Creating and editing electronic technical documents and electronic presentations.Electronic spreadsheets for performing calculations and creating graphs for problemsof the Civil Engineering specialty.Introduction to computer programming languages.Basic principles of computer programming. The BASIC programming language. Creating and executing computer programs in BASIC for Civil Engineering problems. Computational applications in subjects of the Civil Engineering specialty.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face. Lectures. Exemplary solving of exercises. Practice exercises and exercises using a computer. Laboratory exercises using a computer. Use of Information and Communication Technologies in Teaching. Classroom and Computer Center B4. Office hours for additional student support. A Textbook is provided (with a choice among 5 books) through the "Evdoxos" Electronic Service. Additional printed educational material is provided in the classroom. Additional educational electronic material is provided during teaching and / or through the Open eClass eLearning Platform. Laboratory exercises are distributed, and their solutions are commented in detail in class. The additional educational material (printed and electronic) is updated and enriched (if required) on an annual basis. The laboratory exercises are enriched (if required) on an annual basis. The students are trained in the research process through weekly exercises and additional optional projects.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of the Information and Communication Technologies (ICT) in Teaching. Use of open source software. Support of the learning process through the electronic e-class platform.

	The Laboratory education takes place at the Computer Center B4. Open source software for creating and editing electronic technical documents, electronic presentations as well as electronic spreadsheets for performing calculations and creating graphs in problems of the Civil Engineering specialty. The open source software Qbasic QB64 (Free and open source software), etc. Additional educational electronic material is provided during the teaching and through the Open eClass eLearning Platform (Electronic presentations/powerpoint, electronic multiple-choice exercises, exercises, etc.) All weekly laboratory exercises are performed by the students using a computer.

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***
Attendance of Lectures (3 hours x 13 weeks)	39
Participation in optional practice exercises that are given in the classroom and focus on Civil Engineering applications	13
Preparation for the laboratory exercises	13
Laboratory exercises using computer on computational applications in Civil Engineering (2 hours x 13 weeks)	26
IndependentStudy	56
Final examination (3 hours)	3
Coursetotal	***150***
(25 hours workload per credit)	***(6 ECTS x25) = 150***

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

Written Final Examination at the end of the semester. Delivery of weekly laboratory exercises in the computer center B4, intermediate laboratory examination in the computer center B4and final laboratory examination in the computer center B4: all together will contribute "positively" the grade "**E**" in a total percentage of 10% in the final grade.
Active systematic attendance of the Lectures of the course by the students and their successful participation in optional practice exercises can contribute "positively" the additional grade "**A**" at a rate of 5% in the final grade.
The final grade of the course is calculated as follows :
Final Course Degree = min **[(FE** + 0.1**E** + 0.05**A)**, 10 **]**

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	where "**FE**" is the grade of the Written **F**inal **E**xamination which is not allowed to be less than 4 in order the grades "E" and "A" to be activated. The above applies to the academic year in which the students declare the course for the first time. In case of failure or non-attendance at the Written Final Examination (in January and September), in each subsequent academic year the students are graded only on the basis of the written final examination of the course.

5. ATTACHED BIBLIOGRAPHY

- M. Kouimtzis, "Computational Developments using Excel in the work of the engineer", Ziti Pelagia&CoP.C. Publications, Thessaloniki, 2006. (Book Code in Eudoxus: 11391). [In Greek].
- D. Tolikas, T. Hatzigogos, D. Tsakalidis, M. Vafiadis, K. Grammenidou, A. Sextos, P. Savaidis, I. Yfantis, "Applications of Information Technology on Civil Engineering topics", Charalambos Nik. Aivazis Publications, 2011. (Book Code in Eudoxus: 1349). [In Greek].
- A. G. Sextos, E. E. Katsanos, "Programming techniques and use of computer software in structures", Charalambos Nik. Aivazis Publications, 2014. (Book Code in Eudoxus: 41963246). [In Greek].
- S. Panetsos, "Introduction to Programming with QBASIC", Ion Publications - STELLA PARIKOU & Co G.P., 2000. (Book Code in Eudoxus: 14525). [In Greek].
- T. R. Chandrupatla& A. D. Belegundu, "Introduction to Finite Elements in Engineering" 3rd edition (includes CD-ROM with computer programs), Kleidarithmos Publications, Athens, 2006. (Code in "Eudoxos" 13671).[Translation in Greek].The original English 3rd edition by Prentice Hall, 2002 &the new 4th edition by Pearson, 2012.
- D.-P. N. Kontoni, "Computer Programming and Computational Applications in Civil Engineering I:Solved Problems and Applications", T.E.I. of Patras, T.E.I. of Western Greece, University of the Peloponnese, Patras, 1998-2019.
- D.-P. N. Kontoni, "Scientific-Educational Computer Programs for the Civil Engineering Specialty", Patras, 1985-2019.
- Extensive relevant Bibliography in the English Language, majoring in Civil Engineering applications.

SURVEYING

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40303	**SEMESTER**	3rd
COURSE TITLE	SURVEYING		

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**
	2 (Theory)	5
	3 (Laboratory)	
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*	Skill development course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (in English)
COURSE WEBSITE (URL)	

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 course is a basic introductory learning tool in topography, geodesy and mapping.It aims atfamiliarizing students of surveying instruments operation and also to learning procedures of coordinate calculation. Furthermore it aims, to familiarize them with all the latest technology and research achievements in the scientific field of Geoinformatics.

Upon successful completion of the course the student will be able to:

- Knows the basic subject of geodesy – topography
- Be able to use traditional measurement techniques
- Knows the use of instruments (tape measure, level instrument, modern theodolite, GPS, etc.)
- Be able to solve routing measurements
- Be able tocalculate coordinates of route's surveying points
- Be able to design grid.

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…*
	…….

- Individual Work (working independently)
- Team Work

3. SYLLABUS

Theory

Introduction to basic concepts of topography and cartography. Surface's reference of distances and altitudes in topography. Measurements (units, accuracy, angular and linear error comparison). Signing and Marking surveying point's methods. Straight line implementation. Description and detailed presentation of instruments (Modern Theodolite, Tilting Level). Distance measurement (Mechanically Optically, Electromagnetically). Measurements of horizontal and vertical angles with Total Station (measurements at two telescope positions, Iterative Method, Direction's Method). Topography's Fundamental Problems. Solving of polygonal routes and method of error correction. Altimetry (geometric, trigonometric). Surveys (tape measurements, use of goniometrical instruments, modern theodolite method – total station). Topographical Drawings (design and use of grid, scales). Introduction to Geoinformatics, Geographic Information Systems (GIS) and Spatial Analysis.

Laboratory

Use of topographic javelins and plumb, javelin alignment. Straight line implementation by using javelins. Distance measurement using tape and javelins. Terrain measurement using tape measure: Method of triangles, Method of rays, Method of Cartesian coordinates. Use of Level instrument, routing measurements, solving and error correction. Use of Modern Theodolite: Centering – Leveling – Target Acquisition – Reading horizontal and vertical circle. Routing implementation, measurements of distances and angles, sketch. Ensure of surveying points. Total Station surveying. Calculate coordinates of route's surveying points.

4. TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face to Face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Learning process support through

e-class electronic platform</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>26</td></tr>
<tr><td>Fieldwork</td><td>39</td></tr>
<tr><td>Essay Writting</td><td>30</td></tr>
<tr><td>Laboratory Practice</td><td>30</td></tr>
<tr><td>Course total</td><td>125</td></tr>
</table>
</td></tr>
<tr><td>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.</td><td>Final Written Exam 50%

Essay/Report (Theory) 20%

Laboratory Grade (essay and exam) 30%</td></tr>
</table>

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography (in Greek):

Bantelas et al. (2010) Geodesy I, Kyriakides Publications, Athens.[Μπαντέλας Άνθιμος, Σαββαϊδης Παρασκευάς, Υφαντής Ιωάννης, Δούκας Ιωάννης (2010), Γεωδαισία τ. Ι:Γεωδαιτικά όργανα και μέθοδοι μέτρησης και υπολογισμών, Εκδοτικός οίκος Αδελφών Κυριακίδη Α.Ε. – Κωδικόςστον Εύδοξο: 6201]

Graikousis G. – Lagos A. (2011), Principles of Surveying and Geoinformatics, SigchroniEkdotiki Publications, Athens.[Γραικούσης Γ, Λαγός Αιμ. (2011), Αρχές Τοπογραφίας και Γεωπληροφορικής, Σύγχρονη Εκδοτική ΕΠΕ, – Κωδικόςστον Εύδοξο: 7949825]

Kofitsas J. (2009), Surveying Courses, Ion Publications, Athens.[Ι. Κοφίτσα (2009), ΜαθήματαΤοπογραφίας, Σ. ΠΑΡΙΚΟΥ&ΣΙΑΟΕ – ΚωδικόςστονΕύδοξο: 14844ΓεωργόπουλοςΓεώργιοςΔ. (2007), ΜαθήματαΤοπογραφίας, ΕκδόσειςΑ. Τζιόλα&ΥιοίΑ.Ε.- ΚωδικόςστονΕύδοξο: 18549084]

PROBABILITY AND STATISTICS

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40304	**SEMESTER**	3rd
COURSE TITLE	PROBABILITY AND STATISTICS		

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	3	4
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:	There are no prerequisite courses.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in English)
COURSE WEBSITE (URL)	https://eclass.uop.gr/courses/CIVIL103/

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 course is the main introductory course in the concepts of Probability and Statistics. Specifically, the course aims to acquaint students with the basic principles of Combinatorial Analysis, the Probability Theory, the random variables, the probability and distribution functions, the distribution measures and the basic distributions. The course also includes a detailed reference to Descriptive Statistics, statistical intervals and tests of hypotheses.

Upon successful completion of the course, students will be able to:

- Effectively use the basic Probability laws.
- Use apropriate distributionsfor the calculation of probabilities.
- Analyze data by using Descriptive Statistics.
- Use statistical intervals and tests of hypotheses to make decisions.

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 idependently
- Team work
- Search for, analysis and synthesis of data and information

3. SYLLABUS

1. Combinatorial Analysis: Rules of sum and product, permutations, arrangements and combinations. Probability Theory:Sample space and events, axioms and theorems of probability. Independent events, conditional and total probability, Bayes' theorem.
2. Random Variables: Basic concepts, probability mass and density functions, distribution function, mean, variance, standard deviation, basic discrete and continuousdistributions.
3. Descriptive Statistics: Frequency distributions and histograms, data summary and display.
4. Point estimation, statistical intervals of means, variances and proportions. Tests of hypotheses.

4. 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*	Support of the learning process through the e-class platform
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*	Written examination that includes problem solving

Activity	***Semester workload***
Lectures	39
Final exams	3
Personal study	58
Course total	***100***

5. ATTACHED BIBLIOGRAPHY

1. Ν. Μυλωνάς, Β. Παπαδόπουλος, «Πιθανότητες και Στατιστική για Μηχανικούς». Εκδόσεις Α. Τζιόλα & Υιοί Α.Ε. (2016).
2. Γ. Ζιούτας, «Πιθανότητες και Στατιστική για Μηχανικούς». Εκδόσεις Σοφία, ανώνυμη εκδοτική & εμπορική εταιρεία (2016).
3. A. Alfredo, T. Wilson, «Εφαρμογές πιθανοτήτων και στατιστικής». Αφοί Κυριακίδη Εκδόσεις Α.Ε. (2016).
4. D. C. Montgomery, G. C. Runger, «Εφαρμοσμένη Στατιστική και Πιθανότητες για Μηχανικούς». Εκδόσεις Α. Τζιόλα & Υιοί Α.Ε. (2017).

APPLIED STATICS

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40305	**SEMESTER**	3rd
COURSE TITLE	APPLIED STATICS		

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	4	6
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*	Specialised general knowledge
PREREQUISITE COURSES:	There are no prerequisite courses. Students must have at least knowledge of Statics and Strength of Materials.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in English)
COURSE WEBSITE (URL)	

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*

After the end of the course, students will be able to:

- calculate the diagrams of internal loadings on sloped surfaces
- calculate the influence lines of isostatic structures
- calculate the elastic curve of a beam
- calculate displacements of isostatic systems with energy methods
- analyze indeterminate trusses
- analyze indeterminate structures
- analyze cable and arch structures.

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…*
	…….

- Working independently

3. SYLLABUS

- Diagrams of axial forces, shear forces and bending moments on sloping surfaces.
- Principle of superposition - symmetry.
- Influence lines.
- Elastic-beam theory.
- Energy methods.
- Principle of conservation of energy, principle of virtual work.
- Force method.
- Displacement method of analysis. Slope-deflection equations.
- Moment distribution method - ΜέθοδοςCross.
- Cable structures. Arch structures.

4. TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Lectures face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>• Part of the teaching material is presented using PowerPoint.
• Supporting learning process using e-class on line platform and email</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Application of methods solving practical problems in class</td><td>16</td></tr>
<tr><td>Independent Study</td><td>82</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course Load

(25 hours of workload per credit unit)</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>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.</td><td>The students will be evaluated as follows:
• final exam (including problem solving and answering questions)
• individual practice tasks.

The degree of the final exam will be multiplied by a factor greater than or equal to one depending on the student's performance in the exercises. This maximum value of the factor will be 1.20 for students who will get an A in the exercises.</td></tr>
</table>

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Statics of Linear Structures'. Th. Valiasis. Publisher:Ziti (in Greek)
- Applied Statics'.W. Wagner, G. Erlhof. Publisher:Kleidarithmos
- Statics of StructuresIandII'. Publisher:J. Avramidis (in Greek)
- Structural Analysis'.R. C. Hibbeler. Publisher: Foundas

DIFFERENTIAL EQUATIONS

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40306	**SEMESTER**	3rd
COURSE TITLE	DIFFERENTIAL EQUATIONS		

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	4	5
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:	There are no prerequisite courses.However, students must possess the relevant knowledge of the courses Applied Mathematics I and Applied Mathematics II.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in English)
COURSE WEBSITE (URL)	https://eclass.uop.gr/courses/CIVIL102/

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 course is a basic course of Differential Equations.Itaims to introduce students to basic concepts of Ordinary and Partial Differential Equations and to basic analytical methods of solving them.The course also includes an introduction to Laplace and Fourier transforms and Fourier series and their use in solving specific problems.The knowledge covered is necessary for many specialty courses of Civil Engineering.

Upon successful completion of the course, students will be able to:

- Analytically solve Ordinary and Partial Differential Equations.
- Use Laplace and Fourier transforms and Fourier series.
- Recognize various problems of the Civil Engineer that are modeled with Differential Equations.

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 idependently
- Team work
- Search for, analysis and synthesis of data and information

3. SYLLABUS

5. Ordinary Differential Equations (ODEs): Basic concepts. First order ODEs: Separation of variables, homogeneous equations, exact equations, integrating factors, linear and Bernoulli's equation.Higher order ODEs: Linear equations with constant coefficients, Euler's equations. Initialandboundaryvalueproblems. Systems of ODEs.
6. Partial Differential Equations (PDEs): Basic concepts,general solution of special cases.Introduction to Fourier series, application in the separation of variables.
7. Laplace and Fourier transfoms: Introduction, application in the solution of ODEs and PDEs.

4. 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*	Support of the learning process through the e-class platform
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*	Written examination that includes problem solving

Activity	***Semester workload***
Lectures	52
Final exams	3
Personal study	70
Course total	***125***

5. ATTACHED BIBLIOGRAPHY

5. Ε. Ν. Πετροπούλου, «Διαφορικές Εξισώσεις και Εφαρμογές αυτών». Εκδόσεις Gotsis (2017).
6. Ν. Μυλωνάς, Χ. Σχοινάς, «Διαφορικές Εξισώσεις, Μετασχηματισμοί & Μιγαδικές Συναρτήσεις». Εκδόσεις Α. Τζιόλα & Υιοί Α.Ε. (2015).
7. W. E. Boyce, R. C. Di Prima, «Στοιχειώδεις Διαφορικές Εξισώσεις και Προβλήματα Συνοριακών Τιμών». Πανεπιστημιακές Εκδόσεις ΕΜΠ (2015).
8. Ν. Σταυρακάκης, «Διαφορικές Εξισώσεις: Συνήθεις και Μερικές. Θεωρία και Εφαρμογές από τη Φύση και τη Ζωή». Εκδότης: Τσότρας Α. Αθανάσιος (2017).