DESIGN OF MASONRY STRUCTURES

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40801	**SEMESTER**	8th
COURSE TITLE	DESIGN OF MASONRY STRUCTURES		

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. Studentsmust have at least basic 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*

At the end of the course the student will:

- have the necessary knowledge of the basic principles of structures fromload-bearing masonry.
- be able to perform checks in compression, shear, bending of unreinforced andreinforced masonry according to Eurocode 6.
- be able to check the adequacy of a masonry structurein seismic loading.
- know the principles of fireproofing of masonry buildings.
- be able to design and analyze simple masonry 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

Project planning

3. SYLLABUS

- The stones as building materials. Mortars. Types of masonry.
- Introduction to the design of masonry structures (Eurocode 6).
- Mechanical properties of masonry
- Ultimate limit states.
- Serviceability limit states.
- Fire design
- Design of structures from unreinforced and reinforced masonry.
- Design of masonry structures in seismic regions.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face lectures
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of ICT in many lectures. Support of learning process through e-class electronic 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 final exam (100%) of problem-solving exercises with combined content.

Activity	***Semester workload***
Lectures	52
Some individual essay writing	16
Independent study	82
Course Total (25 hours of workload per ECTS credit)	150

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Masonry Structures, F. Karantoni, Papasotiriou Publications. (in Greek)
- Load-bearing Masonry Structures, K. Stylianidis, C. Ignatidis,AivazisPublications. (in Greek)
- Introduction to Eurocode 6, E. Vintzilaiou, F. Karantoni, K.Stylianidis. (in Greek)

MARITIME HYDRAULICS – HARBOUR ENGINEERING

1. GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40802	**SEMESTER**	8th
COURSE TITLE	MARITIME HYDRAULICS – HARBOUR ENGINEERING		

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 hours/week)	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*	Scientific area course
PREREQUISITE 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 (AsynchronouseLearning platform).

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*

By the end of the course students are intended to become familiar with:

•the concepts of sea hydraulics.

• the concepts of sea waves (refraction, diffraction, reflection, transmission, breaking of waves).

• the basic principles of port facilities layout and design.

• the basic design principles of basic harbour works (e.g., breakwaters, quay walls).

At the end of the course the student will have developed the following knowledge and skills:

• understanding the effect of wind waves in the coastal zone.

• computation of “design wave” of harbour works

• design of breakwaters and quay walls.

• Synthesis and application of knowledge to the preliminary design of harbour projects.

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

• Search for, analysis and synthesis of data and information, with the use of the necessary technology

•Project planning and management

•Respect for the natural environment

3. SYLLABUS

Parameters of sea hydraulics: Winds, Tides, Stratification, effect of Coriolis force.

Currents (tidal currents- wind induced currents), elements of coastal circulation.

Theories of wind waves, wind-generated waves.

Refraction, diffraction, reflectionand transmission of waves.

Wave breaking, surf zone.

Wave setup and runup.

Design wave.

Wave-driven currents.

Port site selection.

Port regulations - legal framework of Greek ports

Design ship and port layout. Operation and failure modes of harbour structures.

Principles of port design-port layout, dredging.

"External"harbour works. ''Internal'' harbour works

Rubble-mound breakwaters. Vertical-wall breakwaters.

Quay walls.

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*	Use of the Information and Communication Technologies (ICT) in Teaching. Support of the learning process through the electronic 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.*	Final written examination (100%), during which solution of problems and answer of questions is required.

Activity	***Semester workload***
Attendance of Lectures (4 hours x 13 weeks)	52
Independent Study	98
Course total	***150***
25 hours workload per credit	***(6 ECTS x25) = 150***

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Βιβλίο [33153938]: Εισαγωγή στα Λιμενικά Έργα, Μέμος Κωνσταντίνος

Βιβλίο [11264]: Εισαγωγή στην παράκτια τεχνική και τα λιμενικά έργα, Κουτίτας Χριστόφορος Γ.

FOUNDATIONS – RETAINING STRUCTURES

1. GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40803	**SEMESTER**	8th
COURSE TITLE	FOUNDATIONS – RETAINING STRUCTURES		

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)**
Lectures	4 hours/week	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*	**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, especially Mechanics, SoilMechanins I and Soil Mechanins II.
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 e Learning platform).

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 comprehend and calculate:

- Bearing capacity of shallow foundations for various soil types.
- The expected settlement of a foundation and the comparison with the allowable values of the regulations.
- The design of a shallow foundation for ultimate and operational load failure.
- Design, dimensioning and calculation of support structures after excavation (gravity and cantilever walls) and before excavation (sheet piles, piles, diaphragm walls)

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.
- Team work.
- Project planning and management
- Respect for the natural environment
- Production of free, creative and inductive thinking.

3. SYLLABUS

1. Types of foundations. Deep and shallow foundations.
2. Bearing capacity of shallow foundations. Allowable values based on regulations.
1. Methods of calculating and estimating settlements of shallow foundations. In - situ testing methods. Allowable settlement values based on regulations.
2. Design of shallow foundations (spread footings, strap foundations, mat foundations)
3. Retaining structures before and after excavation. Calculation of stability and dimensioning of various retaining and sheet – pile walls.

4. TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face.
Lectures in the class in Power Point with the use of videoprojector.
The Laboratory education takes place at the Soil Mechanics Laboratory.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Use of the Information and Communication Technologies (ICT) in Teaching.Support of the learning process through the electronic e-class 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>Attendance of Lectures (3 hours x 13 weeks)</td><td>26</td></tr>
<tr><td>Participation in optional practice exercises that are given in the classroom and focus on Civil Engineering applications</td><td>54</td></tr>
<tr><td>IndependentStudy</td><td>70</td></tr>
<tr><td>Coursetotal</td><td>150</td></tr>
<tr><td>(25 hours workload per credit)</td><td>(6 ECTS x25) = 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 evaluation is done:
• With practice exercises. The participation in the final grade is 20%.
• With the final written exam that participates by 80% in the final grade.</td></tr>
</table>

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Θεμελιώσεις Αντιστηρίξεις, Αιμίλιος Κωμοδρόμος, , ΚΛΕΙΔΑΡΙΘΜΟΣ, 2019.
2. Σχεδιασμός των Θεμελιώσεων, Αναγνωστόπουλος Α. και Παπαδόπουλος Β., Εκδόσεις ΚΑΛΑΜΑΡΑ ΕΛΛΗ, 2016
3. MURTHY V.N.S. , “Soil Mechanics &Foundation Engineering” (1993)
4. Foundation Analysis and Design, Joseph Bowles, Mc Graw Hill, 1997
5. ΕΔΑΦΟΜΗΧΑΝΙΚΗ Αρχές και Εφαρμογές, G.E.Barnes, ΚΛΕΙΔΑΡΙΘΜΟΣ, 2005
6. Braja M. Das, Fundamentals of Geotechnical Engineering, Brooks/Cole
7. Στοιχεία Εδαφομηχανικής , Μ.Καββαδά, http://users.ntua.gr/kavvadas/Books/books.htm

ARCHITECTURAL RESTORATION OF CONSTRUCTIONS

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	BACHELOR		
COURSE CODE	40804	**SEMESTER**	8th
COURSE TITLE	ARCHITECTURAL RESTORATION OF CONSTRUCTIONS		

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**
	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*	Specialised general knowledge
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*

Students should acquire the necessary knowledge to be able to prepare the restoration study of a historic building, as well as the architectural study of its reuse.

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

- *Follow the process of preparing the restoration study of a historic building and the inclusion of a new use in it.*
- *Carry out studies and interventions for the restoration, reuse and enhancement of historic buildings.*
- *To worry about the correct way of intervening in historic buildings in terms of maintenance, restoration and revitalization with the choice of the best uses.*

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…*
	…….

Autonomous work

Group work

3. SYLLABUS

Reuse and modern operational performance in the composition of the interior of the listed buildings. Issues that arise in case of a change of use or addition to a listed building and how to deal with them. The rehabilitation study technique: A) Analytical procedure: Historical architecture, photographic and design documentation, Building research, Recognition of the building phases of the monument, research work, recording of damages-pathology.

B) Synthetic process: Study of repair and fixation, Architectural-morphological rehabilitation proposals, Study of adaptation of the monument to new use, Study of facilities, budget and schedule of execution of the project. The proposed methodology of the course includes three stages: Stage 1: Documentation of the monument. Historical research, architectural and photographic surveying, design imaging, recording of material and damages, recording of additions, changes and modifications.
Stage 2: Data processing, pathology, diagnosis and restoration proposal. Structural analysis, causes of damages, building phases, evaluation and method of intervention, restoration of the building. Stage 3: Proposal for reuse. Study of the relations of the building with the wider area, exploration of the possibilities of incorporating certain architectural types and forms into new uses. Suggestions for reuse and modern functional performance in the composition of the interior. Issues arising from the change of use. Application in special buildings.

Architectural, static, mechanical engineering. A selection of forms that will be preserved, possibilities of expression of forms with new materials, synchronous operation adjustment study in the old form of the building, introduction of modern technology and new provisions which give the monument the opportunity to meet the modern needs of the time, proposals for construction design methods and spaces, preserving and restoring the historic shell and integrating new uses in the historic building, a proposal for the use of materials, combining traditional (those who survived to our days and can be reused if they are economical and available) and modern materials.
List of examples of completed studies following the proposed methodology.

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	25
Course total	75

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

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

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.

- Related academic journals:

URBAN AND ENVIRONMENTAL PLANNING

1. GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40805	**SEMESTER**	8th
COURSE TITLE	URBAN AND ENVIRONMENTAL PLANNING		

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 Exercises	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*	Scientific Area 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 aim of the course is to understand the content, objectives and importance of urban space design as a fusion of political and scientific process.

Specifically , the student:

- Gains knowledge on the methods and tools required for the design of the city in the Greek environment .
- Understands space design, the various levels of the design, the processes and stages of development planning projects, the involved bodies and their powers.
- Familiarized with the institutional framework that covers design in Greece
- Equipped with the knowledge of the principles of environmental planning and international terms .

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…*
	…….

- Application of knowledge in practice
- Search, analyze and compose data and information, using the necessary technologies
- Decision making
- Autonomous work
- Group work
- Work in an international environment
- Work in an interdisciplinary environment
- Respect for the natural environment
- Promoting free, creative and inductive thinking

3. SYLLABUS

The urban environment. The deeper causes of urban degradation. Objectives to improve the urban environment.
Inhibitory factors for effective environmental management. Guidelines for improving the urban environment and areas of action.
Urban planning. Public transport. Protection and promotion of historical heritage. Protection and promotion of natural environment in cities, towns and settlements. Water management. Urban Industry. Energy management in urban areas. Urban problems.
Composition - Urban planning. Urban Planning Rules .

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face • In the lecture hall • In supervising the exercises
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Use of ICT in Teaching • Use of ICT in 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*	

Activity	***Semester workload***
Lectures	50
Individual exercises (solving)	25
Group Exercise (preparation)	30
Supervision and oral presentation Group exercise	5
Independent study	15
Course Total (25 hours of workload per credit unit)	***125***

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.*	I. Written final exam (6 0%) which includes: - Multiple choice questions - Short answer questions - Test development II . Individual exercises: 15% III . Group Exercise : Writing and Presentation (25 %)

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- A. Aravantinos (2007), Urban Planning for the Sustainable Development of Urban Space. Symmetria Publishing, Athens - Code in Eudoxus: 45243
- Michalis Modinos, Elias Efthymiopoulos (2000), The Sustainable City, Daphne Chr. Papaspiliopoulou - Code in Eudoxus: 40461
- Tim Hall (2005), Urban Geography, KRITIKI Publishing S.A. - Code in Eudoxus: 11473
- Aldo Rossi (1991), The Architecture of the City, University Studio Press - Code in Eudoxus: 17280

ENVIRONMENTAL IMPACT ASSESSMENT STUDIES OF TECHNICAL WORKS

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40806	**SEMESTER**	8th
COURSE TITLE	ENVIRONMENTAL IMPACT ASSESSMENT STUDIES OF TECHNICAL WORKS		

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**
	3	3
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*	Scientific Area 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 Environmental Impact Assessment Studies (EIA). Initially the student should be familiar with the basic environmental legislation. Afterwards, through case studies the student will be able to prepare and carry out an EIA study.

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

- Recognise the interdisciplinary nature of the specific field
- Appreciate the importance of Environmental Impact Assessment for Environmental Policy and Management
- Realise the aims and objectives of Environmental Production and Consumption.

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

- Introduction (Technical Terminology)
- Environmental impact in time and space
- The Greek legislation for EIS
- The use of Environmental Impact Assessment (EIA) in Greece
- Methods for the evaluation of the environmental impact of an activity (distiction of categories)
- Step-by-step analysis of an EIS preparation
- Monitoring, critical evaluation of the EIA system in Greece
- EIA case studies.
- EIA case study category A1
- EIA case study category A2
- EIA case study category B
- Stretegic Environmental Impact Assessment
- Final Project

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>45</td></tr><tr><td>Project</td><td>15</td></tr><tr><td>Essay Writting</td><td>15</td></tr><tr><td>Course total</td><td>75</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</td><td>Final Written Exam 80%

Essay/Report 20%</td></tr>
</table>

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.*	

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography (in Greek):

Vagiona, D. (2018) Environmental Impact Assessment Studies, Disigma Publications, Thessaloniki.[Βαγιωνά Δ. (2018), Μελέτες Περιβαλλοντικών Επιπτώσεων, Εκδόσεις ΔΙΣΙΓΜΑ ΙΚΕ. – Κωδικόςτον Εύδοξο: 77118264]

Vavizos, G &Mertzanis, A. (2003), Environment - Environmental Impact Assessment Studies, Papasotiriou Publications, Athens.[Βαβίζος Γ. &Μερτζάνης Α. (2003), Περιβάλλον – Μελέτες Περιβαλλοντικών Επιπτώσεων,Εκδόσεις Παπασωτηρίου, – Κωδικόςτον Εύδοξο: 68406906]

SPECIAL TOPICS IN PAVEMENT ENGINEERING

1. GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	40807	**SEMESTER**	8th
COURSE TITLE	SPECIAL TOPICS IN PAVEMENT ENGINEERING		

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	3
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*	Scientific area course
PREREQUISITE COURSES:	Road Construction II-Road Construction Works
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 has the goal of driving the student to specialize in pavements. It aims at increasing the student knowledge on the types of asphalt-mixtures and their production, in pavement strengthening techniques, pavement conservation and rehabilitation and quality control. The course has also the goal of familiarizing the student with environmental impact studies and sustainability in road construction works. Finally, it introduces the student to the aspects of constructional and conservational cost of pavements.

After the successful completion of the course, the student is expected to:

- Know the basic types of asphalt-mixtures
- Conduct a composition study of asphalt-mixtures
- Know the basic teckniques of strengthening pavements
- Know the basic principles of quality control
- Know the main ways of pavement conservation
- Estimate the constructional and conservational cost of pavements
- Appreciate the importance of enviromental impact and sustainable materials

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…

…….

- Decision-making
- Working independently

3. SYLLABUS

Types of asphalt concrete and their composition.
Design of asphalt concrete mixtures.
Production of asphalt and asphalt concrete.
Anti-skid surfaces of asphalt concrete.
Pavement strengthening technologies. Pouring and compaction.
Quality control.
Computational methods in pavements. Accuracy of measurements.
In situ measurements and technical visits.
Conservation of pavements. Operations for improvement and rehabilitation of damages in pavements. Methods for rehabilitation.
Cost of rehabilitation works.
Environmental impact studies. Anti-noisy pavements.
Methods of recycling in pavements.
Sustainable materials. Anti-polution measures in pavements.
New developments in design and construction of pavements.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face in the classroom
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	**Support of learning process through the electronic platform e-class**
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*	Final exam 100%

Activity	*Semester workload*
Lectures	39
Individual study	36
Course total	**75**

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.*	

4. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

A.F.Nikolaides, Highway Engineering: Pavements, Materials and Control of Quality, CRC Press, 2015 (Greek version by M.Triantafyllou Press, Thessaloniki, 2011).

A.K.Mouratidis, Road Construction: Road Construction Works, University Studio Press, Thessaloniki, 2007 (in Greek).

A.K.Mouratidis, Road Construction: Management of Road Works, University Studio Press, Thessaloniki, 2008 (in Greek).

- Related academic journals:

Journal of Transportation Engineering of ASCE

Road Materials and Pavement Design