COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΕΣΔΤΥΚΤΥΠ**	**SEMESTER**	**1st**
COURSE TITLE	Introduction to water and aquatic environment management		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- ·To understand relationships between natural, biological and ecological mechanisms in the management of aquatic ecosystems.
- ·Use integrated control and mathematical modeling techniques for the control and monitoring of aquatic ecosystems.
- ·Understand how aquatic ecosystems respond to natural and man-made impacts.
- ·Gain experience in ecological management and key elements of decision-making authorities.
- ·Be able to formulate objectives and targets in the management of water resources

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,
ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking

Working in an interdisciplinary environment *Promoting free, creative and inductive reasoning* *Production of new research ideas*
• Search, analysis and synthesis of data and information • Production of new research ideas • Project design and management • Respect for the natural environment • Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. General aspects of aquatic ecosystems: global distribution, exploitation, food chains, addressing natural and man-made impacts.
2. Water and sediment quality indicators
3. Framework Directive and water policy
4. Water quality assessment and prediction of ecosystem properties using mathematical modeling techniques.
5. Water quality monitoring and bioconditions.
6. Principles of ecological management and decision-making
7. Physical and biological methods for assessing the quality of freshwater and coastal waters
8. Waste treatment
9. Integrated control of water resources.
10. Presentation of water body monitoring programs

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others*	Written Assignment, 100%

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

Please indicate all relevant information about the course assessment and how students are informed	

5. SUGGESTED BIBLIOGRAPHY

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Akratos C., Kagkalou I., Sylaios G., Latinopoulos D.
Contact details:	cakratos@civil.duth.gr, ikagkalo@civil.duth.gr, gsylaios@env.duth.gr, dlatinop@civil.duth.gr
Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment (100%)
Implementation Instructions: (3)	Written assignment should be submitted via eclass on a specified date.

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**Y-YKA**	**SEMESTER**	**1st**
COURSE TITLE	Hydrometeorology - Hydrology and Climate Change		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- Be able to manage processes carried out in the atmosphere and hydrosphere.
- Understand and quantify the impacts of climate change on the hydrological cycle.
- Be familiar with data from measurements and simulations of the water phases in the hydrological cycle.
- manage meteorological and hydrological data.
- Make forecasts of future stress events and provide counseling.
- Implement the appropriate model for simulation of hydrological processes.
- To evaluate and design various water projects.
- Propose solutions and proposals for water management.
- Be able to shape the flow processes into porous media.
- To understand the processes of underground hydrology.
- Evaluate surface hydrological processes in the rainfall runoff.
- Understand and explain the multi-functionality of river basins as well as their integrated design and management.

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,	*Project design and management*
ICT Use	*Equity and Inclusion*
Adaptation to new situations	*Respect for the natural environment*
Decision making	*Sustainability*
Autonomous work	*Demonstration of social, professional and moral responsibility and*
Teamwork	*sensitivity to gender issues*
Working in an international environment	*Critical thinking*
Working in an interdisciplinary environment	*Promoting free, creative and inductive reasoning*
Production of new research ideas	

- Search, analysis and synthesis of data and information
- Production of new research ideas
- Project design and management
- Respect for the natural environment
- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Basic principles governing the Earth's climate system and air-hydrosphere interactions. Presentation of the radiation and water balance in the climate system.
2. Introduction to the concept of climate variability and climate change. Natural and anthropogenic mechanisms of climate change. Global climate trends and extreme phenomena. Climate change scenarios and predictions for the future.
3. Estimation of maximum possible precipitation.
4. Estimation of evaporation.
5. Hydrometeorological prediction-supply models.
6. Presentation of the hydrological cycle with emphasis on the hydrological aspect.
7. Hydrological prognosis using basin models
8. Hydrologic simulation using rainbow curves.
9. Report the impacts of climate change on hydrology through rainfall in river basins.
10. Introduction to river basin management, water resources, land-use and agriculture runoff, groundwater, electricity generation, drought response.
11. Technical projects for the management of water diet.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

STUDENT EVALUATION *Description of the evaluation process*	Written Assignment, 100%

Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others *Please indicate all relevant information about the course assessment and how students are informed*	

5. SUGGESTED BIBLIOGRAPHY

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Angelides P., Paschalidou A., Papaioannou G., Paparizos S., Varlas G.
Contact details:	pangelid@civil.duth.gr, spipap@gmail.com, gvarlas@hcmr.gr, varlas.giorgos@gmail.com, apascha@fmenr.duth.gr, gpapaio@fmenr.duth.gr
Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment (100%)
Implementation Instructions: (3)	Written assignment should be submitted via eclass on a specified date.

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΜΠΚΔΚΠ**	**SEMESTER**	**1st**
COURSE TITLE	Modeling, Forecasting and Management of Flood Risk		
TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*		**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
	Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.			
COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area		
PREREQUISITES:	NO		
TEACHING & EXAMINATION LANGUAGE:	Greek/ English		
COURSE OFFERED TO ERASMUS STUDENTS:	NO		
COURSE URL:	https://eclass.duth.gr/courses/1021376/		

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- Understand the main problems of flood management as well as the procedures governing the creation and spread of floods.
- Address the dynamics of flood risk in a changing climate
- Evaluate the extent of the risk of a flood and the vulnerability of the area and assess the responsiveness
- Develop comprehensive flood risk management strategies in a changing climate
- Assess and select the appropriate flood river model for the immediate implementation of structural and non-structural flood response measures.
- Simulate floods and predict the likely locations of floods
- Implement structural and non-structural measures to reduce the risk of flooding
- Develop preparedness and response plans for the effective reduction of flood risk
- Integrate flood recovery programs into flood risk management strategies
- Address urgent flood risk management issues.
- manage current real-time flood forecasting and warning practices.
- Propose and plan appropriate flood defenses on a case-by-case basis
- Propose natural solutions to limit the effects of floods (Natural Base Solutions)

General Skills *Name the desirable general skills upon successful completion of the module*	
Search, analysis and synthesis of data and information, *ICT Use* *Adaptation to new situations* *Decision making* *Autonomous work* *Teamwork* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project design and management* *Equity and Inclusion* *Respect for the natural environment* *Sustainability* *Demonstration of social, professional and moral responsibility and sensitivity to gender issues* *Critical thinking* *Promoting free, creative and inductive reasoning*
• Search, analysis and synthesis of data and information • Production of new research ideas • Project design and management • Respect for the natural environment • Promoting free, creative and inductive reasoning	

3. COURSE CONTENT

1. Analysis of vulnerability, risk and risk conditions.
2. Introduction to modeling, model categories, optimization.
3. Introduction to floods, their categories and mechanisms.
4. Analysis of water-based flood processes (estimation of rain losses and the rain-runoff mechanism).
5. Flood water transit.
6. Hydraulic flood simulation with open-source software.
7. Directive 2007/60.
8. Analysis and evaluation of technical flood protection projects.
9. Analysis of natural flood management solutions.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report,*	Written Assignment, 100%

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

Clinical examination of a patient, Artistic interpretation, Other/Others *Please indicate all relevant information about the course assessment and how students are informed*	

5. SUGGESTED BIBLIOGRAPHY

1. Τσακίρης Γ. (Υπεύθυνος Έκδοσης), (1995). «ΥΔΑΤΙΚΟΙ ΠΟΡΟΙ: Ι. Τεχνική Υδρολογία», Εκδόσεις Συμμετρία, Αθήνα, ISBN 960-266-003-1.
2. Σακκάς Ι.Γ. (2004). «ΤΕΧΝΙΚΗ ΥΔΡΟΛΟΓΙΑ, Τόμος 1, Υδρολογία Επιφανειακών Υδάτων», Εκδόσεις Αϊβάζη, Θεσσαλονίκη.
3. Spiliotis M., Iglesias A. and Garrote L., 2020. A multicriteria fuzzy pattern recognition approach for assessing the vulnerability to drought: Mediterranean region. Evolving Systems (in print, https://doi.org/10.1007/s12530-020-09332-7

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Angelides P., Maris F., Spiliotis M., Papaioannou G.
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Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment (100%)
Implementation Instructions: (3)	Written assignment should be submitted via eclass on a specified date.

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΥΝΚΣΕ**	**SEMESTER**	**1st**
COURSE TITLE	Computational Intelligence and Control Systems		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- Understand the basic principles of optimization techniques.
- Know how real-time control systems work
- Identify control options for solving hydrological problems.
- To design a general plan for a regional real-time control system.
- To know the basic techniques of data modeling from machine learning (neural networks, model trees, vague systems etc.).
- Be able to correctly classify a modeling problem based on physics, data or hybrid
- Choose appropriate methods and tools for constructing models based on real time data

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information, ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking

Working in an interdisciplinary environment *Promoting free, creative and inductive reasoning* *Production of new research ideas*
• Search, analysis and synthesis of data and information • Production of new research ideas • Project design and management • Respect for the natural environment • Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Development of Machine Learning templates
2. Introduction - Basic Concepts
3. Sorting - Classification
4. Regression - Regression
5. Ambiguous Set Fundamentals
6. Data Preprocessing
7. Decrease Parameters
8. Directed Machine Learning
9. Artificial Neural Networks (Front Feeding Multiplanes)
10. Applications in the development of Classification-Regression Standards in the water sector
11. Rating Indicators
12. Unbalanced data cases
13. Nondirected Machine Learning
14. Fuzzy fc-means cluster analysis
15. Introduction to the internet of things
16. Exercises and laboratories: optimal water distribution, automatic model calibration.
17. Hydroinformatics modeling based on data and physical models. Use of data-based methods in hydrological forecasts..

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

STUDENT EVALUATION *Description of the evaluation process*	Written Assignment, 100%

Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others *Please indicate all relevant information about the course assessment and how students are informed*	

5. SUGGESTED BIBLIOGRAPHY

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Iliadis L., Papaleonidas A.
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Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment (100%)
Implementation Instructions: (3)	Written assignment should be submitted via eclass on a specified date.

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΥΚΣΥΑΓΤΚΠΣΑΠ**	**SEMESTER**	**1st**
COURSE TITLE	Hydroinformatics and Decision Support Systems (DSS) for flood risk in urban areas		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- Understand the potential of available data sources (weather satellites, web resources, data produced by climate and meteorological models) in advanced integrated models and decision support.
- Generate the primary input data of the models using Geographic Information Systems and remote sensing techniques.
- To shape and solve water resource problems as optimization problems.
- Create and optimize water resource models that will act as decision support systems.
- Separate and correctly use different types of decision support methods for water problems.
- Evaluate and optimize existing models
- Create and propose decision-making tools related to water problems.

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,	*Project design and management*
ICT Use	*Equity and Inclusion*
Adaptation to new situations	*Respect for the natural environment*

Decision making	*Sustainability*
Autonomous work	*Demonstration of social, professional and moral responsibility and sensitivity to gender issues*
Teamwork	*Critical thinking*
Working in an international environment	*Promoting free, creative and inductive reasoning*
Working in an interdisciplinary environment	
Production of new research ideas	

- Search, analysis and synthesis of data and information
- Production of new research ideas
- Project design and management
- Respect for the natural environment
- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Introductory concepts of hydroinformatics and optimization of water resources systems.
2. Analysis and processing of satellite data
3. Geographic Information Systems, Group Decision Support Systems, Database and Model Management Systems.
4. Spatial Multi-Criteria Data Analysis using Geographic Information Systems
5. Introduction to Decision Support Systems
6. Introduction to systems analysis.
7. Knowledge mining
8. Analysis of the simulation-optimization combination
9. Analysis of multicriteria optimization
10. Uncertainty Analysis - Monte Carlo Simulation
11. Modeling and simulation of water resource systems.
12. Optimizing resource models

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam,*	Written Assignment, 100%

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others *Please indicate all relevant information about the course assessment and how students are informed*	

5. SUGGESTED BIBLIOGRAPHY

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Maris F., Spiliotis M., Papaioannou G., Iliadis L., Papaleonidas A.
Contact details:	fmaris@civil.duth.gr, mspiliot@civil.duth.gr, gpapaio@fmenr.duth.gr, liliadis@civil.duth.gr, papaleon@civil.duth.gr,
Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment (100%)
Implementation Instructions: (3)	Written assignment should be submitted via eclass on a specified date.

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΠΠΔΚ-ΚΣΑΕΑ**	**SEMESTER**	**2nd**
COURSE TITLE	Civil Protection, Crisis Management - and Contingency Plans		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- To recognize the action and objectives of the Civil Protection
- Familiarize themselves with risk management structures.
- Evaluate risk management plans.
- Assess and analyze simple and complex natural and man-made disasters

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,
ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking
Promoting free, creative and inductive reasoning

- Search, analysis and synthesis of data and information
- Production of new research ideas
- Project design and management
- Respect for the natural environment
- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Longitudinal analysis of disasters.
2. Identification of crises and disasters.
3. Crisis development, timing and incident management plans.
4. Creation and evaluation of incident management plans
5. Information role in crisis management. The role of the Operational Coordination Centers.
6. Crisis management systems. Citizen education and readiness.
7. Perception and risk assessment.
8. Development of crisis management capabilities. Public policy in crisis management. Crisis management.
9. Administrative risk. Risk management concepts. Risk management functions. Concepts and stochastic models of risk management. Concepts and stochastic models of crisis management.
10. Crisis management organizations/agencies/bodies. Crisis communication. Image-forming agents.
11. Operational disaster response. Social dimension of disasters. Concepts and stochastic models of disaster management. Security culture.
12. Emergency, rehabilitation and reconstruction planning. Design failures. Valuation of losses. Civil Protection and Self-Government.
13. National Protection Plans.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others*	Multiple Choice Test, 100%

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

Please indicate all relevant information about the course assessment and how students are informed	

5. SUGGESTED BIBLIOGRAPHY

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Dokas I.
Contact details:	idokas@civil.duth.gr
Supervisors: (1)	YES
Evaluation methods: (2)	Multiple Choice Test (100%)
Implementation Instructions: (3)	The examination is conducted using the relevant tool available on the class platform. The trainees are informed in the final courses about the examination procedure and how the grade is calculated. They are also informed that there might be questions that are not required by multiple choice but in some other way (e.g. free text)

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΣΠΚΕΠΒΚΔΤΠ**	**SEMESTER**	**2nd**
COURSE TITLE	Prediction and Early Warning Systems of Precipitation and Internet of Things (IoT)		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- To use data from weather stations.
- Analyze rainfall data from weather stations and numerical weather models.
- Use the QPF (Quantitative Precipitation Forecast) method.
- Assess and implement the forecasts of operational early warning systems in the European field (e.g. EFAS, European Flood Awareness System).
- To produce time series of hydrological parameters by the method of Synthetic Unit Hydrography.
- To be able to use the internet of things for the purpose of forecasting weather conditions and phenomena.
- Propose appropriate early warning systems.
- Evaluate and improve existing early warning systems.
- Propose integrated solutions to address water problems

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information, ICT Use
Adaptation to new situations
Decision making
Autonomous work
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and

Teamwork *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*sensitivity to gender issues* *Critical thinking* *Promoting free, creative and inductive reasoning*

- Search, analysis and synthesis of data and information
- Production of new research ideas
- Project design and management
- Respect for the natural environment
- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Introduction to the prediction and early warning systems.
2. Processing of meteorological stations' data.
3. Geostatistical analysis of rainfall data.
4. Introduction to numerical weather forecasting models with emphasis on rainfall.
5. Synthetic production of hydrological time series.
6. Responding to threats with early warning systems.
7. Communication protocols of early warning systems.
8. Planning early warning systems based on cost-benefit analysis.
9. Introduction to the internet of things.
10. Optimizing Early Warning Systems Using IoT.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others* *Please indicate all relevant information about the course assessment and how students are informed*	Written Assignment, 70% Final Examination 30%

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

5. SUGGESTED BIBLIOGRAPHY

1. Μπαλτάς Ευάγγελος, Μιμίκου Μαρία (2018). Τεχνική Υδρολογία. Εκδόσεις Α. ΠΑΠΑΣΩΤΗΡΙΟΥ & ΣΙΑ Ι.Κ.Ε..ISBN 978-960-491-125-7.
2. Τσακίρης Γ. (Υπεύθυνος Έκδοσης), (1995). «ΥΔΑΤΙΚΟΙ ΠΟΡΟΙ: Ι. Τεχνική Υδρολογία», Εκδόσεις Συμμετρία, Αθήνα, ISBN 960-266-003-1.
3.Τσακίρης Γεώργιος, Βαγγέλης Χ. (2009). Υδατικοί Πόροι ΙΙ: Εφαρμογές Τεχνικής Υδρολογίας. Εκδόσεις Σ.ΑΘΑΝΑΣΟΠΟΥΛΟΣ & ΣΙΑ Ο.Ε. ISBN 978-960-266-266-3.
4. Σακκάς Ι.Γ. (2004). «ΤΕΧΝΙΚΗ ΥΔΡΟΛΟΓΙΑ, Τόμος 1, Υδρολογία Επιφανειακών Υδάτων», Εκδόσεις Αϊβάζη, Θεσσαλονίκη.

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Angelides P., Spiliotis M., Varlas G., Iliadis L., Papaleonidas A.
Contact details:	pangelid@civil.duth.gr, mspiliot@civil.duth.gr, gvarlas@hcmr.gr, liliadis@civil.duth.gr, papaleon@civil.duth.gr,
Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment, 70%, Final Examination 30%
Implementation Instructions: (3)	Written assignment should be submitted via eclass on a specified date.

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΕΥΑΠΚΠ**	**SEMESTER**	**2nd**
COURSE TITLE	Urban infrastructure works and floods (sewage network, floods and waste)		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- Describe the procedures necessary for the analysis and design of urban water supply systems, water distribution systems, drainage and drainage systems, as well as waste water treatment facilities.
- Evaluate the impact of urban water systems on the receiving environment.
- Analyze an integrated model of urban water systems and judge between different multifunctional measures that can be implemented.
-

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,
ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking
Promoting free, creative and inductive reasoning

- Search, analysis and synthesis of data and information
- Production of new research ideas

- Project design and management
- Respect for the natural environment
- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Water Systems: In General, Water Networks.
2. Water abstractions: General, Rainwater, Surface water, Underground water.
3. Legislation & Water Management: Legislation, River Basin Management Plans (RBMPs), Flood Risk Management Plans (RBMPs)
4. Constructed Wetlands
5. 5. Artificial wetlands for urban runoff treatment
6. Process of modeling and modeling tools available and currently used for urban water systems.
7. Applications of modeling systems are made in practical problems such as improving the performance of systems, controlling leakage in water distribution networks, rehabilitating sewage systems, analyzing treatment operations and minimizing the impact of overflowing drains in receiving waters. Use of a range of supportive tools, illustrated with practical cases.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others* *Please indicate all relevant information about the course assessment and how students are informed*	Written Assignment, 50% Final Examination 50%

5. SUGGESTED BIBLIOGRAPHY

1. Δ. Κουτσογιάννης, Σχεδιασμός Αστικών Δικτύων Αποχέτευσης, ΕΜΠ, Αθήνα, 2011.
2. Χ. Τσόγκας, Δίκτυα αποχέτευσης και επεξεργασία λυμάτων, Ιων, 1998.
3. Α. Λαγκούσης, Ν. Φουρνιώτης, Στοιχεία Σχεδιασμού Έργων Ύδρευσης και Αποχέτευσης, GOTSIS,
2020.
4. Παντοκράτορας, Α. (2014). Υδρεύσεις Πόλεων. Εκδόσεις Επίκεντρο Α.Ε.
5. Κωτσόπουλος, Σ. (2013). Υδρεύσεις. Εκδόσεις Μαρία Μάρκου & ΣΙΑ
6. Τσακίρης Γ., Υδραυλικά Έργα, Σχεδιασμός και Διαχείριση, 2010. εκδόσεις «Συμμετρία», Αθήνα.

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Akratos C., Angelides P., Spiliotis M., Samaras A.
Contact details:	cakratos@civil.duth.gr, pangelid@civil.duth.gr, mspiliot@civil.duth.gr, achsamar@civil.duth.gr
Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment, 50%, Final Examination 50%
Implementation Instructions: (3)	Oral remote examination will take place on the day and time indicated in the Department's examination program. The oral test will be conducted by MS TEAMS. Students will enter a joint conference scheduled day and time. The examination link will be sent via teachers.duth.gr to the institutional accounts of the enrolled students who have declared their intention to participate in the examination, having received knowledge and accepted the terms of the remote examination, and will be announced on eClass. Students will have to connect to the videoconference via their institutional account, otherwise they will not be able to participate in the process. In addition, they will participate in the camera examination which will be open throughout. Prior to the start of the examination, the students will show their identity on the camera in order to be identified by the supervisors. The students will be examined in the Semester Work entrusted to them, according to the instructions for its preparation. In the week before the examination, by the specified date and time, students should have submitted through eClass all of the deliverables of the Semester Work as described in its opinion. The deliverables of each student should be submitted through a single file. Students should therefore, prior to submitting their work, arrange to consolidate all of their deliverables into a single file of *.zip format or other format allowed by the system. In the event of serious failure or destruction of the computer system, the test will be repeated when conditions permit

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΦΞΣΦΠΚΤΓ**	**SEMESTER**	**2nd**
COURSE TITLE	Drought effects in the natural environment and agriculture		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- Implement appropriate techniques and models to assess the aquatic potential of an area.
- Provide for periods of drought
- To propose appropriate solutions for both technical and craft activities
- Understand climate change and explore possible solutions that they can implement.
- Understand and manage water resources.
- Be aware of the impact that climate change will have on the human, natural and built environment, covering key aspects such as water resources, floods, sea level rise and coasts, health, transport, infrastructure and cities.
- Be able to evaluate, propose and implement sustainable adaptation strategies to key infrastructure and environmental arrangements.
- Know precision farming methods.
- Be able to propose management measures in both the environment and agriculture for more efficient yields by protecting water resources.

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information, Project design and management

ICT Use	*Equity and Inclusion*
Adaptation to new situations	*Respect for the natural environment*
Decision making	*Sustainability*
Autonomous work	*Demonstration of social, professional and moral responsibility and sensitivity to gender issues*
Teamwork	*Critical thinking*
Working in an international environment	*Promoting free, creative and inductive reasoning*
Working in an interdisciplinary environment	
Production of new research ideas	

- Search, analysis and synthesis of data and information
- Production of new research ideas
- Project design and management
- Respect for the natural environment
- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Introduction to drought
2. Drought categories
3. Potential evaporation, plant coefficient, active rainfall, crop needs in water.
4. Effect of drought on ecosystems
5. Drought Indicators (SPI-RDI-PDSI-AI-RDIe)
6. Drought-water balance assessment models
7. Drought and Water Resource Management
8. Climate change and drought
9. Industrial and technical drought response projects
10. Vegetation management in water scarcity environments
11. Water productivity and precision irrigation
12. Plant Growth Monitoring and Simulation
13. Restoration of vegetation in water scarcity environments.
14. Selection and production of plants resistant to lack of water

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development*	Written Assignment, 50% Final Examination 50%

Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others *Please indicate all relevant information about the course assessment and how students are informed*	

5. SUGGESTED BIBLIOGRAPHY

1. Τσακίρης Γ. (Υπεύθυνος Έκδοσης), (2013). «ΥΔΑΤΙΚΟΙ ΠΟΡΟΙ: Ι. Τεχνική Υδρολογία και Εισαγωγή στη Διαχείριση υδατικών πόρων», Εκδόσεις Συμμετρία, Αθήνα, ISBN 960-266-003-1
2. Spiliotis M., Iglesias A. and Garrote L., 2020. A multicriteria fuzzy pattern recognition approach for assessing the vulnerability to drought: Mediterranean region. Evolving Systems (in print, https://doi.org/10.1007/s12530-020-09332-7
3. Τσακίρης Γ. (2006). Υδραυλικά έργα: Σχεδιασμός και διαχείριση, Εγγειοβελτιωτικά έργα. Εκδόσεις Συμμετρία.

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Spiliotis M., Tsakmakis I.
Contact details:	mspiliot@civil.duth.gr, iotsakmak@gmail.com
Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment, 50%, Final Examination 50%
Implementation Instructions: (3)	Oral remote examination will take place on the day and time indicated in the Department's examination program. The oral test will be conducted by MS TEAMS. Students will enter a joint conference scheduled day and time. The examination link will be sent via teachers.duth.gr to the institutional accounts of the enrolled students who have declared their intention to participate in the examination, having received knowledge and accepted the terms of the remote examination, and will be announced on eClass. Students will have to connect to the videoconference via their institutional account, otherwise they will not be able to participate in the process. In addition, they will participate in the camera examination which will be open throughout. Prior to the start of the examination, the students will show their identity on the camera in order to be identified by the supervisors. The students will be examined in the Semester Work entrusted to them, according to the instructions for its preparation. In the week before the examination, by the specified date and time, students should have submitted through eClass all of the deliverables of the Semester Work as described in its opinion. The deliverables of each student should be submitted through a single file. Students should therefore, prior to submitting their work, arrange to consolidate all of their deliverables into a single file of *.zip format or other format allowed by the system. In the event of serious failure or destruction of the computer system, the test will be repeated when conditions permit

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE	**ΡΥΚΠΠ**	**SEMESTER**	**2nd**
COURSE TITLE	Residual flows and coastal flooding: Notions of risk of vulnerability and elasticity		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	6
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes
Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Once the course is completed, participants will be able to:

- Evaluate variables of hydraulic models, drought models and model of streams with debris leading to danger.
- Follow methodologies to assess vulnerability as quantitative values.
- Apply uncertainty theory to risk assessment.
- Assess the environmental impact on the marine environment.
- Identify the erosion rate and flood risks in coastal areas.
- Manage business models and services
- Use methodologies to assess uncertainty as quantitative values.
- Gain ability to construct hazard maps, using GIS and different models (Hydraulic and debris types).
- Evaluate the risks posed by residues.
- Optimally plan structural measures to deal with floods.

General Skills
Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,
ICT Use
Adaptation to new situations
Decision making
Autonomous work
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and

Teamwork	*sensitivity to gender issues*
Working in an international environment	*Critical thinking*
Working in an interdisciplinary environment	*Promoting free, creative and inductive reasoning*
Production of new research ideas	

- Search, analysis and synthesis of data and information
- Production of new research ideas
- Project design and management
- Respect for the natural environment
- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Processes in Catchment Basins: General, Surface Erosion of Soils, Transfer of Fertile Matter in Watercourses, Computational Simulation M.L.
2. Residue Streams: General, Description - Characteristics, Risk - Risk Assessment, Mitigation - Protection Measures.
3. Petrological Cycle, Landslides, Types of Landslides, Factors that contribute to the creation of landslides, Debris flows, Elements of River Plumbing, Precipitation, Measurement Modes, Databases.
4. Wave Mechanics, Formation Of Ripples, Wind Elements, Wind Ripples, Maritime Traffic - Level Variations
5. Introduction to the R programming language, Analysis of Bronchometric Data with R programming language, The hydroTSM package, Waves, Wave Measurements, Extreme Value Analysis and Wave Spectra.
6. Solidification & Coastal Morphodynamics: General, Coastal sediment physical characteristics, Coastal stereosupply, Morphodynamic coastal variation, Coastal erosion & sediment balance, Coastal parts - Balance profile, Stereotransfer transversely to the coastline & along the coastline, Computational simulation.
7. Copernicus system databases, SMHI hydrological database, erddap satellite database, EMODnet marine data system, Marinomica platform.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, and Communication with students • Digital slides • videos • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	

Activity	*Workload/semester*
Lectures	39
Final project	60
Bibliographic research & analysis	78
Final examination	3
TOTAL	**180**

STUDENT EVALUATION *Description of the evaluation process*	Written Assignment, 65%

Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others *Please indicate all relevant information about the course assessment and how students are informed*	Final Examination 35%

5. SUGGESTED BIBLIOGRAPHY

1. Καραμπάς, Θ., Δήμας, Α. και Λουκογεωργάκη Ε. (2020). Ακτομηχανική και Λιμενικά Έργα. Εκδόσεις Δίσιγμα.
2. Καραμπάς, Θ., Κρεστενίτης, Γ. και Κουτίτας Χ. (2016). Ακτομηχανική – Έργα Προστασίας Ακτών. Αποθετήριο «Κάλλιπος».
3. Jakob, M. and Hungr, O. (2005). Debris-flow Hazards and Related Phenomena. Springer Berlin, Heidelberg.

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Samaras A., Sylaios G.
Contact details:	achsamar@civil.duth.gr, gsylaios@env.duth.gr
Supervisors: (1)	YES
Evaluation methods: (2)	Written Assignment, 65%, Final Examination 35%
Implementation Instructions: (3)	Oral remote examination will take place on the day and time indicated in the Department's examination program. The oral test will be conducted by MS TEAMS. Students will enter a joint conference scheduled day and time. The examination link will be sent via teachers.duth.gr to the institutional accounts of the enrolled students who have declared their intention to participate in the examination, having received knowledge and accepted the terms of the remote examination, and will be announced on eClass. Students will have to connect to the videoconference via their institutional account, otherwise they will not be able to participate in the process. In addition, they will participate in the camera examination which will be open throughout. Prior to the start of the examination, the students will show their identity on the camera in order to be identified by the supervisors. The students will be examined in the Semester Work entrusted to them, according to the instructions for its preparation. In the week before the examination, by the specified date and time, students should have submitted through eClass all of the deliverables of the Semester Work as described in its opinion. The deliverables of each student should be submitted through a single file. Students should therefore, prior to submitting their work, arrange to consolidate all of their deliverables into a single file of *.zip format or other format allowed by the system. In the event of serious failure or destruction of the computer system, the test will be repeated when conditions permit

COURSE OUTLINE

1. GENERAL

SCHOOL	School of Engineering		
DEPARTMENT	Department of Civil Engineering/ Master Program 'Hydrometeorological Disasters Program		
LEVEL OF STUDIES	7		
COURSE CODE		**SEMESTER**	**Summer period**
COURSE TITLE	Thesis		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	0	15
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	Greek/ English
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	https://eclass.duth.gr/courses/1021376/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

After the completion of the postgraduate thesis, the students must be able to:

- To know in depth the issues dealt with in their thesis
- Have a holistic view of the objects of the Master program
- To search for and evaluate international literature
- Analyze data
- Plan projects to protect against hydrometeorological disasters

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,
ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking
Promoting free, creative and inductive reasoning

- Search, analysis and synthesis of data and information
- Production of new research ideas
- Project design and management
- Respect for the natural environment

- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Post-graduate thesis

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Distance learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Communication with students • MsTeams/ e-class, webmail
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	

Activity	*Workload/semester*
Study / creation and writing of the thesis	200
Examination	50
Bibliographic research & analysis	200
TOTAL	**450**

STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others* *Please indicate all relevant information about the course assessment and how students are informed*	Final Oral Examination from the examination committee 100%

5. SUGGESTED BIBLIOGRAPHY