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

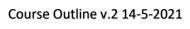*Name the desirable general skills upon successful completion of the module*

Search, analysis and synthesis of data and information,	*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. 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.*		
	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, 70% Final Examination 30%

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.

Alternative ways of examining a course in emergency situations

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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.