COURSE OUTLINE

RECOVERY PROJECTS AND TECHNICAL INTERVENTIONS AFTER NATURAL DISASTERS

1. GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
DEPARTMENT	PREVENTION AND MANAGEMENT OF CRISIS AND DISASTERS: INNOVATIVE TECHNIQUES IN CIVIL PROTECTION		
LEVEL OF STUDIES	ISCED level 7 – Master's or equivalent level		
COURSE CODE	CP08	**SEMESTER**	8th Semester
COURSE TITLE	Recovery Projects and Technical Interventions After Natural Disasters		

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**
	3.0	6.0
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:	YES
COURSE URL:	https://eclass.duth.gr/courses/

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.

At the end of the course the student will be able to:

- Analyze the impacts of different natural disasters on the built and natural environment.
- Select and apply appropriate restoration techniques for a variety of natural disasters.
- Understand the legislative and financial framework of restoration projects.
- Implement sustainable solutions that align with disaster-affected areas' specific characteristics and environmental constraints.
- Propose and integrate technically sound and feasible solutions that enhance the resilience of areas impacted by natural disasters.

General Skills

Name the desirable general skills upon successful completion of the module

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

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*	*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*
Adaptation to new situations Decision making Teamwork Working in an interdisciplinary environment Project design and management Respect for the natural environment Promoting free, creative and inductive reasoning	

3. COURSE CONTENT

The course focuses on the methodologies, techniques, and processes for restoring areas and infrastructure affected by natural disasters. It examines the types of interventions required after a range of widely known natural disasters that traditionally impact Greece, including earthquakes, floods, wildfires, landslides, and failures of soil and rock slopes. The course also covers other natural disasters that have become more prevalent due to climate change, such as drought and desertification, hurricanes and cyclones, storms and extreme weather events, snowstorms and frost, tsunamis, and volcanic eruptions. Finally, the course also presents and analyzes strategies for planning and implementing restoration projects and the legislative and financial framework applied to emergency and recovery processes.

1. Introduction to Natural Disasters and Their Impacts: Definition and classification of natural disasters, effects on the built and natural environment, and the role of local, state, and international organizations in disaster recovery.
2. Restoration Strategies and Crisis Management: Emergency response plans, evacuation strategies, recovery phases (immediate, short-term, long-term), prioritization of restoration projects, resilience, and infrastructure adaptation.
3. Restoration Techniques and Infrastructure Redesign: Reconstruction of buildings, road and rail networks, bridges, hydraulic and port works.
4. Sustainability and Resilience in Restoration and Reconstruction: Use of innovative materials, green solutions, and adaptation to climate change.
5. Legislative and Institutional Framework: Policies and protocols for restoration processes, case studies of post-disaster recovery efforts in Greece and abroad.
6. Earthquakes: Collapses of buildings and critical infrastructure, reinforcement and reconstruction with earthquake-resistant materials, upgrading/modification of seismic design regulations, and strengthening of network density.
7. Floods: Reconstruction of drainage networks and flood protection works with climate-adaptive designs, restoration of residential and agricultural areas, and reinforcement of coastal and riverbank zones with nature-based solutions.

8. Wildfires: Reforestation and management of burned areas, ecosystem restoration, soil protection from erosion and flooding, and enhancement of fire protection.
9. Landslides and Slope Instabilities: Slope stabilization/reinforcement measures, protection of road networks, strengthening buildings and infrastructure in high-risk zones, implementation of monitoring and early warning systems.
10. Drought and Desertification: Due to climate change, Greece faces increasing drought and water scarcity issues, which impact agriculture, livestock farming, beekeeping, water resource availability, and the natural environment. Solutions include designing and constructing dams, reservoirs, and water storage systems and implementing sustainable agricultural practices.
11. Hurricanes, Cyclones, Storms, Frost, and Extreme Weather Events (Meteorological Storms): Restoration of infrastructure using resilient materials and appropriate designs, protection of coastal areas and ports, mitigation measures for storm damage, upgrading drainage systems, and strengthening critical infrastructure (telecommunications, energy networks, road and rail systems).
12. Tsunamis and Volcanic Eruptions: Although rare in Greece, they have occurred. Early warning systems for Tsunamis, resilient coastal infrastructure design, and public education. Issues related to volcanic eruptions: disruptions to air travel, hazardous gases, potential tsunamis (underwater eruptions), destruction of local infrastructure, and public preparedness training.
13. Case Studies of Natural Disasters in Greece and Abroad: Description, management strategies, emergency response plans, mitigation measures, and recovery efforts.

4. LEARNING & TEACHING METHODS - EVALUATION

<table>
<tr><td>TEACHING METHOD
Face to face, Distance learning, etc.</td><td>Face to face
Distance learning</td></tr>
<tr><td>USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT)
Use of ICT in Teaching, in Laboratory Education, in Communication with students</td><td>Use of ICT in Teaching
Use of ICT in Communication with students</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Workload/semester</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Essay</td><td>50</td></tr>
<tr><td>Study</td><td>58</td></tr>
<tr><td>Examination</td><td>3</td></tr>
<tr><td>Total</td><td>150</td></tr>
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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*	Student evaluation languages Greek English Method (Formative or Concluding) Concluding Examination In-class participation: Assessed based on engagement and the ability to apply learned concepts to practical applications.

5. SUGGESTED BIBLIOGRAPHY

1. Principles of Emergency Planning and Management, David Alexander, 1st Edition, Oxford University Press, 2002
2. Vulnerability and Resilience to Natural Hazards, Sven Fuchs and Thomas Thaler, Cambridge University Press, 2018
3. Φυσικές και Τεχνολογικές Καταστροφές, Ευθύμιος Λ. Λέκκας, 2η Έκδοση, Τομέας Δυναμικής, Τεκτονικής & Εφαρμοσμένης Γεωλογίας – Τμήμα Γεωλογίας και Γεωπεριβάλλοντος Ε.Κ.Π.Α., 2000