**Postgraduate Studies Program**

**«ENVIRONMENTAL ENGINEERING»**

<table>
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<tr>
<th>Specialization:</th>
<th>PhD Level</th>
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<tr>
<td>Code:</td>
<td>GEnvE 882</td>
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<tr>
<td>Course:</td>
<td>Smart energy systems and integrated design in the Built Environment</td>
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<td>Required:</td>
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<td>Elective:</td>
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**Instructors:** Assistant Professor D. Kolokotsa

**Bibliography**


**Course objectives**

The course aims to deepen the graduate students’ knowledge in energy management design and operation both in buildings and communities. Additional analysis of computational tools that are available for the comprehensive design of intelligent energy management systems and the evaluation of the calculations through measuring protocols is provided.

**Syllabus**

1st week: Εισαγωγή στην ενεργειακή διαχείριση. Μεθοδολογίες και Πρακτικές.

2nd week: Energy management systems. Components and functionalities.

3rd week: Sensors and actuators in the built environment.

4th week: Communication protocols and interfaces.

5th week: Introduction to control systems in the built environment, applications and control exercises.

6th week: Innovative control systems and optimization of energy systems in the built environment. Part 1: Control of mechanical equipment.
7th week: Innovative control systems and optimization of energy systems in the built environment. Part 2: Smart meters.

8th week: Computational and modelling tools: TRNSYS MATLAB ENERGY PLUS

9th week: Integrated management systems: Examples and applications in buildings. The role of computational tools.

10th week: Integrated management systems: examples and applications in communities and neighborhoods. The role of computational tools.

11th week: Microgrids, smart grids and the built environment.

12th week: Practicing in computational tools. Exercises, applications. TRNSYS MATLAB ENERGY PLUS

13th week: Practicing in computational tools. Exercises, applications. TRNSYS MATLAB ENERGY PLUS

**Student evaluation**

1. Final exam (50%)
2. Exercises Applications (50%)