# ECTS

## EUROPEAN CREDIT TRANSFER SYSTEM

## Course information in english

**General course information:**

| | | | |
|---|---|---|---|
| **Course title:** | Environmental Fluid Mechanics | **Course code:** | ΥΔ0601 |
| **Credits:** | 6 | **Work load (hours):** | 116 |
| **Course level:** | Undergraduate ☑ | Graduate ☐ | |
| **Course type:** | Mandatory ☐ | Selective ☑ | |
| **Course category:** | Basic ☐ | Orientation ☑ | |
| **Semester:** | $9^{o}$ | **Hours per week:** | 4 hours |
| **Course objectives (capabilities pursued and learning results):** | | | |
| The course objective is to familiarize the students with the application of the principles and methods of Fluid Mechanics to the analysis of the environmental flows and the design of typical hydraulic works for the protection of the environment, especially those related to the protection of coastal waters and the atmosphere. | | | |
| **Prerequisites:** | | | |
| Fluid mechanics<br>Hydraulics<br>Mathematical models of pollution | | | |

**Instructor's data:**

| | |
|---|---|
| **Name:** | Evangelos Keramaris |
| **Level:** | Assistant Professor |
| **Office:** | Civil Engineering Faculty<br>University of Thessaly<br>Pedion Areos, 38334 Volos, Greece<br>Tel. 24210-74140 |
| **Tel. – email:** | ekeramaris@civ.uth.gr |
| **Other tutors:** | - |

**Specific course information:**

| Week No. | Course contents | Hours | |
|---|---|---|---|
| | | Course attendance | Preparation |
| 1 | Introduction. | 4 | 2 |
| 2 | Homogeneous fluids. Mixtures. Salinity. Pollutants. | 4 | 2 |
| 3 | Molecular diffusion. Fick's law. Diffusion equation. | 4 | 2 |
| 4 | Turbulent diffusion and dispersion. | 4 | 2 |
| 5 | Taylor's analysis. | 4 | 2 |
| 6 | Mixing in lakes and reservoirs. | 4 | 2 |
| 7 | Mixing in rivers. | 4 | 2 |
| 8 | Discharge dynamics. | 4 | 2 |
| 9 | Jets and plumes. | 4 | 2 |
| 10 | Turbulent jets and plumes. | 4 | 2 |
| 11 | Buoyant jets. | 4 | 2 |
| 12 | Boundary effects – Buoyancy effects. | 4 | 2 |
| 13 | Applications. | 4 | 2 |
| 14 | Special topics. | 4 | 2 |

| Additional hours for: | | | |
|---|---|---|---|
| **Class project** | **Examinations** | **Preparation for examinations** | **Educational visit** |
| 20 | 2 | 10 | |

**Suggested literature:**


1. Antonopoulos, ¨Environmental Hydraulics & Quality of Free Surface Flows ¨, Giahoudis-Giapoulis, 2003.
2. Dimitriou , I. D., ¨Environmental Hydraulics ¨, Part A and B, Athens, 1994.
3. Fischer, H.B., List E.J., Koh, R.C.Y., Imberger J., Brooks, N.H., ¨Mixing in inland and coastal waters¨, Academic Press, 1979.
4. Gilbert M. Masters, ¨Introduction to Environmental Engineering and Science¨, Pearson Higher Education, 1997.
5. Simpkins P.G. and A. Liakopoulos, ¨ Stability of Convective Flows¨, ASME Press, 1992.

| **Teaching method** *(select and describe if necessary* - **weight***):* | | |
|---|---|---|
| Teaching | ☑ | .....40% |
| Seminars | ☐ | …….% |
| Demonstrations | ☐ | …….% |
| Laboratory | ☑ | .....20% |
| Exercises | ☑ | .....40% |
| Visits at facilities | ☐ | …….% |
| Other *(describe):* ……. | ☐ | …….% |
| Total | | 100% |

| **Evaluation method** *(select)*- **weight:** | | | | |
|---|---|---|---|---|
| | *written* | *%* | *Oral* | *%* |
| Homework | ☐ | | ☐ | |
| Class project | ☑ | 30 | ☐ | |
| Interim examination | ☑ | 20 | ☐ | |
| Final examinations | ☑ | 50 | ☐ | |
| Other *(describe):* …… | ☐ | | ☐ | |