

# ECTS

## EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM IN THE EUROPEAN UNION

### (B) Course information in english

#### General course information:

|  |   |                           |                                     |
|--|---|---------------------------|-------------------------------------|
| <b>Course title:</b>   | Flows in natural and artificial open channels     | <b>Course code:</b>       | <b>CE08-H10</b>                     |
| <b>Credits:</b>  | 5   | <b>Work load (hours):</b> | 120                                 |
| <b>Course level:</b>   | Undergraduate <input checked="" type="checkbox"/> | Graduate                  | <input type="checkbox"/>            |
| <b>Course type:</b>  | Mandatory <input type="checkbox"/>                | Selective                 | <input checked="" type="checkbox"/> |
| <b>Course category:</b>  | Basic <input type="checkbox"/>                    | Orientation               | <input checked="" type="checkbox"/> |
| <b>Semester:</b>   | 8 <sup>th</sup>                                   | <b>Hours per week:</b>    | 4 hours                             |
| <b>Course objectives (capabilities pursued and learning results):</b>  |   |                           |                                     |
| The course objective is to familiarise the students with the hydraulic laws which concern the natural and artificial open channels. Also the course objective is to familiarize the students with the hydraulic computation, the design and the construction of hydraulic works in rivers. |   |                           |                                     |
| <b>Prerequisites:</b>  |   |                           |                                     |
| Fluid Mechanics<br>Hydraulics  |   |                           |                                     |

#### Instructor's data:

|                      |  |
|----------------------|--|
| <b>Name:</b>         | <b>Vasilis Kanakoudis</b>  |
| <b>Level:</b>        | Associate Professor  |
| <b>Office:</b>       | Civil Engineering Faculty<br>University of Thessaly<br>Pedion Areos, 38334 Volos, Greece |
| <b>Tel. – email:</b> | 0030 24210 74156,<br>bkanakoud@civ.uth.gr  |
| <b>Other tutors:</b> |  |
| <b>Level:</b>        |  |
| <b>Tel. – email:</b> |  |

#### Specific course information:

| Week No. | Course contents  | Hours             |             |
|----------|--|-------------------|-------------|
|          |  | Course attendance | Preparation |
| 1        | Artificial Open Channels. Short introduction.  | 4                 | 4           |
| 2-3      | Hydraulic Jump. Energy loss. Calculation of its size. Applications                   | 8                 | 8           |
| 4-5      | Gradient varied non uniform flow. Free surface profiles. Hydraulic Jump.Applications | 8                 | 8           |
| 6        | Free water fall. Inflow-outflow in lakes/water basins. Special issues                | 4                 |             |

| Week No. | Course contents   | Hours             |             |
|----------|---|-------------------|-------------|
|          |   | Course attendance | Preparation |
| 7        | Discharge measurement (methods, instruments, examples)  | 4                 | 4           |
| 8        | Laboratory exercise at the 5m. long lab channel.( Discharge Measurement, Calculation of the flow depth) | 4                 |             |
| 9        | Natural open channels. Characteristics-Types of flow in open channels. River mechanics                  | 4                 | 4           |
| 10       | Watersheds  | 4                 | 4           |
| 11       | Sediment transport in rivers.   | 4                 | 4           |
| 12       | Study of control structures and sediment transport management works.                                    | 4                 | 4           |
| 13       | Design of hydraulic works in rivers.  | 4                 | 4           |
| 14       | Measurements of different river parameters.   | 4                 |             |

| Additional hours for: |              |                              |                   |
|-----------------------|--------------|------------------------------|-------------------|
| Class project         | Examinations | Preparation for examinations | Educational visit |
| 20                    | 3            | 20                           |                   |

**Suggested literature:**

1. K.L. Katsifarakis, "Steady flow with free surface", Christodoulidis Eds., 2009
2. Vassilios D. Dermisis, "Introduction to river mechanics", Aristotle University of Thessaloniki, Thessaloniki 2000.
3. C. R. Thorne, Sediment transport in gravel-bed rivers, John Wiley and Sons Ltd, 1987.
4. Andre Robert, River Processes, Hodder Education, 2003.
5. Pierre Y. Julien. River Mechanics, Cambridge University Press, 2002.

| Teaching method (select and describe if necessary - weight): |                                     |        |
|--|-------------------------------------|--------|
| Teaching   | <input checked="" type="checkbox"/> | 40%    |
| Seminars   | <input type="checkbox"/>            | .....% |
| Demonstrations   | <input type="checkbox"/>            | .....% |
| Laboratory   | <input checked="" type="checkbox"/> | 20%    |
| Exercises  | <input checked="" type="checkbox"/> | 40%    |
| Visits at facilities   | <input type="checkbox"/>            | .....% |
| Other (describe):<br>.....                                   | <input type="checkbox"/>            | .....% |
| Total  |                                     | 100%   |

| Evaluation method (select)- weight: |                                     |          |                          |          |
|-------------------------------------|-------------------------------------|----------|--------------------------|----------|
|                                     | <u>written</u>                      | <u>%</u> | <u>Oral</u>              | <u>%</u> |
| Homework                            | <input checked="" type="checkbox"/> | 10       | <input type="checkbox"/> |          |
| Class project                       | <input checked="" type="checkbox"/> | 40       | <input type="checkbox"/> |          |
| Interim examination                 | <input type="checkbox"/>            |          | <input type="checkbox"/> |          |
| Final examinations                  | <input checked="" type="checkbox"/> | 50       | <input type="checkbox"/> |          |

|                                     |                          |  |                          |  |
|-------------------------------------|--------------------------|--|--------------------------|--|
| Other ( <i>describe</i> ):<br>..... | <input type="checkbox"/> |  | <input type="checkbox"/> |  |
|-------------------------------------|--------------------------|--|--------------------------|--|