COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**AY402**	**SEMESTER**	**4th**
COURSE TITLE	**HYDROLOGY**		
INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**		**CREDITS**
Teaching Hours	4		5
COURSE TYPE	General background		
PREREQUISITE COURSES	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_119/		

(2) LEARNING OUTCOMES

Learning outcomes

The course introduces students to the phenomena and natural processes of surface hydrology and the hydrologic cycle so that they understand the phenomena and analysis of precipitation and discharge data, aiming at the development of design storm and flood for the study of water resources works. The course strengthens students' technical and intellectual competency, preparing them for engineering employment or advanced study. The course exposes students to computational techniques of Engineering Hydrology used in contemporary professional civil engineering practice.

Upon successful completion of the course, students will be able to:

- Understand the hydrological cycle and the natural hydrological processes.
- Define a watershed and its basic geomorphological characteristics.
- Compute and estimate the spatial and temporal distribution of precipitation in a watershed.
- Compute the IDF and DDF curves and a design storm over a watershed.
- Compute and measure the flow in a river cross section and estimate the flow components.
- Compute the unit hydrograph of a watershed using flow data, and estimate, based on geomorphological characteristics, the synthetic unit hydrograph of a watershed.
- Estimate the design flood of a watershed with statistical analysis of flow data or application of unit hydrograph or application of empirical methods.
- Estimate the flood routing, using hydrological methods, through a river section and a reservoir or lake.

General Competences

- Search for, analysis and synthesis of data and information by the use of appropriate technologies,
- Decision-making
- Working independently
- Team work
- Criticism and self-criticism
- Production of free, creative and inductive thinking
- Environmental awareness

(3) SYLLABUS

- Introduction to hydrological processes.
- Water Balance.
- Statistics – Probabilistic analysis of hydrological information.
- Study of atmospheric processes and precipitation.

- Methods of precipitation measurement, precipitation networks.
- Analysis of precipitation data, spatial distribution of precipitation, calculation of mean areal precipitation.
- Temporal distribution of precipitation, synthetic methods of temporal distribution of precipitation.
- Calculation of precipitation curves (Intensity-Duration-Frequency, IDF curves and Depth-Duration-Frequency, DDF curves).
- Estimation of design storm.
- Hydrological abstractions.
- Methods of measurement and estimation of evaporation and evapotranspiration, interception and infiltration.
- Net rainfall. Estimation methods of rainfall abstractions. Estimation of net rainfall with the SCS method.
- Analysis of hydrometric data.
- Flow duration curves, cumulative flow curves, flood flows.
- Unit hydrograph, development of unit hydrograph, instant unit hydrograph.
- Estimation of concentration and lag time of runoff.
- Empirical methods for the estimation of design flood.
- Rational Formula.
- Synthetic unit hydrograph.
- Hydrological methods of flood routing, flood routing through a reservoir.
- Theory Review – Theoretical Exercises.

(4) TEACHING and LEARNING METHODS – EVALUATION

<table>
<tr><td>DELIVERY</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>• Use of PowerPoint slides
• View material in video
• Visiting and using material from websites
• Communication with students via e-mail
• Use of asynchronous distance learning (e-class)</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Laboratory practice</td><td>13</td></tr>
<tr><td>Study and analysis of bibliography</td><td>53</td></tr>
<tr><td>Essay writing and presentation preparing</td><td>20</td></tr>
<tr><td>Course total
(25 hours workload per credit)</td><td>125</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION</td><td>Students' performance is evaluated in the Greek language. The final grade is determined by:
• A written exam (at the end of the semester) that contributes 70% to the final grade, applying one or more of the following evaluation methods: Multiple choice questions, short-answer questions, problem solving.
• Students' participation in laboratory practice activities and the preparation and delivery of related assignments (during the semester) that contribute 30% to the final grade.
Final Grade = 70% Exam Grade + 30% Assignments Grade</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Mimikou, M., Baltas, E. (2012) *Engineering Hydrology, (5th ed).* Athens: Papasotiriou Publications. (in Greek)
- Papamichail, D.M. (2001) *Engineering Hydrology of Surface Waters.* Thessaloniki: Giachoudi – Giapouli Publications. (in Greek)
- Tsakiris, G. (2013) *Water Resources I, Engineering Hydrology*. Athens: Simmetria Publications. (in Greek)