

**Course name: Engineering Hydrology**

ECTS	6.0
Course status	facultative
Course final assessment /evaluation of outcomes	written examination
Prerequisite	basics of meteorology, mathematics and statistics

**Main field of study: Environmental Engineering**

Educational profile	General academic
Code of studies and education level	master of thesis
Semester of studies	winter
Language of instruction	English

**Course offered by:**

Name of faculty offering the course	Environmental Engineering and Land Surveying
Name of department offering the course	Sanitary Engineering and Water Management
Course coordinator	Agnieszka Cupak, Ph.D., Andrzej Wałęga, Ph.D.

**Learning outcomes:**

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands:			
ENH_K1	hydrologic cycle, water balance and method of hydrologic analysis in small and midsize catchments.	IS2_W04 IS2_W05	T
SKILLS – student is able to:			
ENH_S1	calculate of precipitation and catchments characteristics, analysis of flood frequency and modeling of flood waves.	IS2_U02	T
SOCIAL COMPETENCIES – student is ready to:			
ENH_C1	cooperate in groups. Is responsible for his tasks and duties.	IS2_K04	T

**Teaching contents**

Lectures:	15 hours
Topics	<ol style="list-style-type: none"> <li>1. Definition of hydrology and engineering hydrology. The catchment and its hydrologic budget. Uses of engineering hydrology.</li> <li>2. Basic hydrologic principles: precipitation, hydrologic abstractions, catchment properties.</li> <li>3. Hydrology of small catchments: rational method, overland flow.</li> <li>4. Hydrology of midsize catchment: runoff curve number method, unit hydrograph techniques.</li> <li>5. Frequency analysis: concept of statistics and probability, flood frequency analysis, low-flow frequency analysis. Regional analysis.</li> <li>6. Catchment routing: time-area method, Clark unit hydrograph method, cascade of linear reservoirs method, catchment routing with kinematics wave.</li> <li>7. Catchment modeling: classification of models, model component and model construction, model calibration and verification, catchment models.</li> </ol>

Accomplished learning outcomes	ENH_K1; ENH_C1
Means of verification, rules and criteria of assessment	Single-choice test, positive assessment should be given at least 50% of correct answers to given questions: <50% – insufficient (2.0); 50–60% – sufficient (3.0); 61–70% – satisfactory plus (3,5); 71–80% – good (4.0); 81–90% – good plus (4,5); 91–100% – very good (5.0). The share of the lecture grade in the final grade is 50%.

Classes: 15 hours

Topics	<ol style="list-style-type: none"> <li>1. Flood frequency analysis in gauge station: Pearson III type distribution.</li> <li>2. Rainfall-runoff catchment model with HEC-HMS program.</li> <li>3. Qualification of connection between two cross-sections.</li> </ol>
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Accomplished learning outcomes	ENH_S1
Means of verification, rules and criteria of assessment	Passing reports on exercises – a grade from exercises is an arithmetic average of formative grades. The share of the grade for the project exercises in the final grade of the subject is 50%.

Field work: 15 hours

Topics	Evaluation of flow with use different measurement methods.
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Accomplished learning outcomes	ENH_S1
Means of verification, rules and criteria of assessment	Attendance list

### References:

Basic	<ol style="list-style-type: none"> <li>1. Maidment D. V. 1993. <i>Handbook of Hydrology</i>. McGraw-Hill.</li> <li>2. Shaw E.M., Beven K.L., Chappel N.A., Lamb R. 2011. <i>Hydrology in practice. Fourth Edition</i>. Spon Press.</li> <li>3. Ven Te Chow, Maidment D.R., Mays L.W. 1988. <i>Applied hydrology</i>. McGraw-Hill International Editions.</li> </ol>
Supplementary	<ol style="list-style-type: none"> <li>1. Ponce V. M., 1989. <i>Engineering Hydrology: Principles and Practices</i>. Prentice Hall, Upper Saddle River, New Jersey.</li> <li>2. <i>National Engineering Handbook. Part 630 Hydrology</i>. National Resources Conservation Service. US Department of Agriculture. 1997.</li> </ol>

### Structure of learning outcomes

Area of academic study: R – Agricultural, forestry and veterinary sciences	0.0 ECTS **
Area of academic study: T – technical sciences	6.0 ECTS**

### Structure of student activity

Contact hours	57	hrs.	2.3	ECTS**
Including: lectures	15	hrs.		
classes and seminars	15	hrs.		
consultations	10	hrs.		
participation in research	0	hrs.		
obligatory traineeships	15	hrs.		
participation in examination	2	hrs.		
e-learning	0	hrs.	0.0	ECTS**
student own work	93	hrs.	3.7	ECTS**

\*Areas of academic study in the fields of: A – the arts; H – humanities; M – medical, sport and health sciences; N – natural sciences; P – biological sciences; R – agricultural, forestry and veterinary sciences; S – social studies; T – engineering and technology

\*\* stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25–30 hours of classes