



Course title: HYDROLOGY AND EARTH SCIENCES

ECTS credit allocation (and other scores): 3.0

Semester: autumn

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 15/15

Course coordinator/ Department and e-mail: Jolanta Grochowska Professor/Department of Water Protection Engineering and Environmental Microbiology; jgroch@uwm.edu.pl

Type of classes: classes and lectures

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#### Substantive content

**CLASSES:** Calculation of the flow rate in the river bed on the basis of water gauge observations and determination of the consumption curve using the graphical and analytical method. Calculation of flows characteristic of the first degree: NQ, SQ and WQ. Determining the boundary of the surface catchment and making its detailed hydrographic division, determining the size of the total catchment area and partial catchments using the planimetry method and determining the physico-geographical parameters: average decrease in the main watercourse, the length and density of the river network, the average liquidity of the catchment area. Calculation of indices characterizing the morphometry of lakes.

**LECTURES:** History of the Earth. The geological structure of the Earth. Factors shaping the land surface: weathering, activity of rivers, wind and glaciers. Hydrology as a scientific discipline and its division into specialized departments. The occurrence of water in nature and the hydrological cycle. Hydrographic facilities and units, basin, catchment area, catchment area, river and lake catchments, partial catchments, differential catchment, watershed and its determination. Natural and artificial lakes, definitions, genesis, types of power, thermals, circulation types. River outflow and its components. River systems and their characteristics, flowing water networks, hierarchical division of the river network, water levels, outflow measures, characteristic flows, intact flows, low flows and floods. Classification and usefulness of waters in human economy. Genesis, typology and environmental conditions of the formation of groundwater resources. Occurrence, supply, hydrological regime and classification of sources. Learning purpose: Acquainting with the principles of assessing the operational reliability of devices used in environmental engineering and risk assessment related to the operation of environmental engineering facilities.

Learning purpose: Getting to know the basics of hydrology, methods of observation, measurements and hydrological calculations, including processes and phenomena occurring in the hydrosphere.

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On completion of the study programme the graduate will gain:

**Knowledge:** He knows the basic phenomena and processes taking place in the hydrosphere and the principles of drawing up various water-economic balances. Has knowledge of the functioning of surface and underground water ecosystems, knows the causes of the water cycle in nature. Can explain the causes of the phenomena occurring in the hydrosphere with the use of hydrological data.

**Skills:** The student alone or in a team is able to measure and calculate basic hydrological parameters (min. Water flow rate, morphometric indicators of lakes and rivers, hydrological system of rivers), which can be used in environmental engineering. He understands the principle of operation, design and use of control in devices and technologies that protect the atmospheric air, surface water and soil, including the principle of water management.



Social Competencies: Student recognizes the need to use environmental engineering technologies to conserve natural resources and improve the quality of human life.

Basic literature: Bajkiewicz-Grabowska E., Magnuszewski A., Mikulski Z., 2001. A guide to exercises in general hydrology. PWN Warsaw.

Bajkiewicz-Grabowska E., Mikulski Z., 2005. General hydrology. PWN Warsaw.

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The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 2.49

Student's independent work: 0.51