FACULTY OF CIVIL ENGINEERING

SUBJECT CARD

Name in English:	**Hydrology for building engineers**
Name in Polish:	**Hydrologia dla inżynierów budownictwa**
Main field of study (if applicable):	***Civil Engineering***
Specialization (if applicable):	**Civil Engineering**
Level and form of studies:	**~~1st /~~ 2nd level*, full-time ~~/ part-time~~***
Kind of subject:	**~~obligatory~~ / optional / ~~university-wide~~***
Subject code:	**CEB006363**
Group of courses:	**~~YES~~ / NO***

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**15**		
Number of hours of total student workload (CNPS)	**30**		**60**		
Form of crediting	~~Examination~~ / crediting with grade *	Examination / crediting with grade *	~~Examination~~ / crediting with grade *	Examination / crediting with grade *	Examination / crediting with grade *
For group of courses mark (X) final course					
Number of ECTS points	**1**		**2**		
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	**0,6**		**0,6**		

* delete as appropriate

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. The student possesses knowledge of the areas of mathematics, applied statistics, hydraulics and hydrology, geology and hydrology

SUBJECT OBJECTIVES	
C1.	Gaining a knowledge on the calculation of the water balance and determination of its constituents for river basins.
C2.	Acquiring knowledge and skills for calculating extreme flows for the catchment controlled and uncontrolled.
C3.	The acquisition of knowledge in the field of mathematical modeling of hydrological phenomena.
C4.	Strengthening the ability to work in a project team and the awareness of the need to find new solutions to theoretical and practical hydrologic calculations for sizing of hydraulic structures.

SUBJECT EDUCATIONAL EFFECTS	
Relating to knowledge:	
PEK_W01	The student knows and understands the rules for the calculation of water balance and its components for river basins.
PEK_W02	The student has in-depth expertise in the implementation and development of hydrometric measurements.
PEK_W03	The student knows the rules for calculating extreme flows in the catchment controlled and uncontrolled.
PEK_W04	The student has expertise in modeling the outflow of water from the catchment.
Relating to skills:	
PEK_U01	The student establishes correlations based on hydrometric measurements.
PEK_U02	The student prepares a detailed water balance for the catchment.
PEK_U03	The student can calculate statistical methods extreme water flows.
PEK_U04	The student determines water flow in the basin uncontrolled.
PEK_U05	The student creates a simple model for the catchment uncontrolled.
Relating to social competences:	
PEK_K01	The student can work independently on the performance of a task or project team during the hydrological calculations.
PEK_K02	The student is aware of the need to increase knowledge in the field of modern computational techniques in hydrology for design of hydraulic structures and communication

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec1	Problems and tasks of hydrology for engineers	1
Lec2	Water balance. Determination of the balance equation components.	2
Lec3	Hydrometry. Measurements of water levels, the flow velocity and water discharge.	2
Lec4	Hydrography. Observations gauges. Rating curve. Hydrograph.	2
Lec5	Transfer of a hydrological information.	1
Lec6	Determination of probable maximum and minimum flows.	2
Lec7	Determination of maximum flow for small catchments.	2
Lec8	Basics of mathematical modeling of hydrological phenomena.	2
Lec 9	Test	
	Total hours	**15**

Form of classes - class		**Number of hours**
Cl1		
...		
	Total hours	

Form of classes - laboratory		**Number of hours**
Lab1	Water-economy balance	2
Lab2	The development of hydrologic curves.	4
Lab3	The calculation of the maximum probable flow in the controlled catchment.	4
Lab4	The calculation of the maximum probable flow in a small uncontrolled catchment.	2
Lab5	Construction of the flood hydrograph.	2
Lab6	Crediting of the laboratory.	1
	Total hours	**15**

Form of classes - project		Number of hours
Proj1		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem1		
…		
	Total hours	

TEACHING TOOLS USED
N1. Lecture: multimedia presentations lecture content N2. Laboratory: multimedia presentations, defining and solving problems using the software, N3. Consultation in the form of direct meetings and via e-mail

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
P (lecture)	PEK_W01 PEK_W02 PEK_W03 PEK_W04	Final test
F (computer laboratory)	PEK_W01 PEK_U02 PEK_K01	Attendance and report writing
F (computer laboratory)	PEK_W02 PEK_U01 PEK_K01	Attendance and report writing
F (computer laboratory)	PEK_W03 PEK_U03 PEK_K01 PEK_K02	Attendance and report writing
F (computer laboratory)	PEK_W03 PEK_U04 PEK_K01 PEK_K02	Attendance and report writing
F (computer laboratory)	PEK_W04 PEK_U05 PEK_K01 PEK_K02	Attendance and report writing
P (laboratory etc) = P = (F1+F2+F3+F4+F5)/5		
P (lecture) =		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: 1. Brutsaert W., Hydrology. An Introduction, Cambridge University Press, Cambridge, 2010. 2. Chow V. T., Handbook of Applied Hydrology, McGraw-Hill, New York, 1964. 3. Chow V. T., Mays L. W., Maidment D. R., Applied Hydrology, McGraw-Hill, New York, 1988. 4. Davie T., Fundamentals of hydrology, Routledge, Taylor & Francis Group, London and New York, 2010. 5. Shaw E. M., Beven K. J., Chappell N. A., Lamb R., Hydrology in practice, Spon Press, Taylor & Francis Group, Taylor & Francis Group, 2011. **SECONDARY LITERATURE:** 1. Baban R., Design of diversion weirs. John Wiley & Sons, 1995. 2. Ghosh S. N., Flood control and drainage engineering, A.A. Balkema/Rotterdam/Brookfield, 1999.

SUBJECT SUPERVISOR (NAME AND SURNAME, DIVISION, E-MAIL ADDRESS)
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Hydrology for building engineers
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ***Civil Engineering***
AND SPECIALIZATION **Civil Engineering**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives ***	Programme content ***	Teaching tool number ***
Knowledge				
PEK_W01	K2_W01, K2_W02, K2_W03, K2_W09, K2_CEB_W22	C1, C4	Wy1, Wy2	N1, N3
PEK_W02	K2_W01, K2_W02, K2_W03, K2_W09, K2_CEB_W22	C1, C4	Wy1, Wy3, Wy4	N1, N3
PEK_W03	K2_W01, K2_W02, K2_W03, K2_W09, K2_CEB_W22	C2, C4	Wy1,Wy5, Wy6, Wy7	N1, N3
PEK_W04	K2_W01, K2_W02, K2_W03, K2_W09, K2_CEB_W22	C3, C4	Wy1, Wy8	N1, N3
Skills				
PEK_U01	K2_U07, K2_U08, K2_CEB_U23	C1, C4	La2	N2, N3
PEK_U02	K2_U07, K2_U08, K2_CEB_U23	C1, C4	La1	N2, N3
PEK_U03	K2_U07, K2_U08, K2_CEB_U23	C2, C4	La3	N2, N3
PEK_U04	K2_U07, K2_U08, K2_CEB_U23	C2, C4	La4	N2, N3
PEK_U05	K2_U07, K2_U08, K2_CEB_U23	C3, C4	La5	N2, N3
Social competence				
PEK_K01	K2_K03, K2_K04, K2_K05	C4	La1 do La5	N2, N3
PEK_K02	K2_K01, K2_K02, K2_K06	C4	Wy1 do Wy8	N1, N3

** - enter symbols for main-field-of-study/specialization educational effects
*** - from table above