

**Course name: *Integrated Watershed Management***

ECTS	3.0
Course status	<i>facultative</i>
Course final assessment /evaluation of outcomes	<i>Graded credit</i>
Prerequisite	<i>basics of hydraulics, hydrology, river engineering</i>

**Main field of study: *Environmental Engineering***

Educational profile	<i>General academic</i>
Code of studies and education level	<i>bachelor</i>
Semester of studies	<i>winter</i>
Language of instruction	<i>English</i>

**Course offered by:**

Name of faculty offering the course	<i>Environmental Engineering and Land Surveying</i>
Name of department offering the course	<i>Hydraulic Engineering and Geotechnics</i>
Course coordinator	<i>Jacek Florek, Ph.D.</i>

**Learning outcomes:**

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
<b>KNOWLEDGE – student knows and understands:</b>			
<i>IWM_K1</i>	<i>methods, techniques and tools for catchment management and problems related to catchment hydrology together with measuring techniques; knows the hydrological, hydrogeomorphological, hydromorphological and hydraulic aspects that affect the processes taking place in the catchment.</i>	<i>IS1_W04</i>	<i>T</i>
<i>IWM_K2</i>	<i>division of river channels, types of technical development of the catchment, life of aquatic organisms and their importance in the aspect of management of the catchment; understands the role of government institutions in the management of the catchment and the problems of land use in the catchment.</i>	<i>IS1_W07</i>	<i>T</i>
<b>SKILLS – student is able to:</b>			
<i>IWM_S1</i>	<i>use the results of measuring the basic parameters of the catchment for management purposes; develop physiographic and hydromorphological characteristics and interpret the results obtained, indicate the weaknesses and strengths of the methodology.</i>	<i>IS1_U06</i>	<i>T</i>
<b>SOCIAL COMPETENCIES – student is ready to:</b>			
<i>IWM_C1</i>	<i>creative solutions to specific problems in the field of river basin management.</i>	<i>IS1_K02</i>	<i>T</i>

**Teaching contents**

Lectures	15 hours
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Topics	<ol style="list-style-type: none"> <li>1. <i>Introduction and basic concepts regarding the management of catchments in English.</i></li> <li>2. <i>Methodology, techniques and tools for catchment management.</i></li> <li>3. <i>Problems related to the catchment hydrology and hydromorphology and hydrogeomorflgy of river beds in the context of its management options.</i></li> <li>4. <i>Problems of water quality in the catchment and related to the life of aquatic organisms.</i></li> <li>5. <i>The role of government and other institutions in managing the catchment.</i></li> <li>6. <i>The problem of land use in the catchment area and surface runoff in the catchment area.</i></li> </ol>
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Accomplished learning outcomes	<i>IWM_K1; IWM_K2; IWM_C1</i>
Means of verification, rules and criteria of assessment	<i>Choice test, positive assessment should be given at least 50% of correct answers to given questions: &lt;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%.</i>

Classes:	15 hours
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Topics	<ol style="list-style-type: none"> <li>1. <i>Data analysis in English for the task of understanding the behaviour of the catchment in conditions of intense precipitation. Analysis of professional vocabulary in a foreign language. Analysis of the phenomenon and its description in the form of an essay based on the data received.</i></li> <li>2. <i>Data analysis in English for the task of understanding the catchment behaviour in which there are frequent water shortages and droughts. Analysis of professional vocabulary in a foreign language. Analysis of the phenomenon and its description in the form of an essay based on the data received.</i></li> <li>3. <i>Analysis of data related to the edge flow. Analysis of the method of calculating the edge flow by morphometric and biological methods. Calculation of the value of coastal and channelling flow by various methods including riverbed hydraulics. Vocabulary analysis related to riverbed hydraulics, edge flows and a creative riverbed in a foreign language. Description of the phenomenon in the form of an essay along with computational analysis.</i></li> </ol>
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Accomplished learning outcomes	<i>IWM_S1</i>
Means of verification, rules and criteria of assessment	<i>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%.</i>

**References:**

Basic	<ol style="list-style-type: none"> <li>1. <i>Radecki-Pawlik A., Hernik J. 2010. Cultural Landscapes of River Valleys. Uniwersytet Rolniczy w Krakowie, Eds., monografia, pp. 260.</i></li> <li>2. <i>Colin R. Thorne, Richard David Hey, Malcolm David Newson. 1997. Applied fluvial geomorphology for river engineering and management. John Wiley, pp. 376.</i></li> </ol>
Supplementary	<ol style="list-style-type: none"> <li>1. <i>Radecki-Pawlik A. 2014. Hydromorfologia rzek i potoków górskich – działy wybrane. Academic Handbook, Uniwersytet Rolniczy w Krakowie, pp. 280 (In Polish).</i></li> <li>2. <i>Klimaszewski M. 1973. Geomorfologia. Wa-wa (In Polish).</i></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	3.0	ECTS**

**Structure of student activity**

Contact hours	34	hrs.	1.4	ECTS**
Including: lectures	15	hrs.		
classes and seminars	15	hrs.		
consultations	2	hrs.		
participation in research	0	hrs.		
obligatory traineeships	0	hrs.		
participation in examination	2	hrs.		
e-learning	0	hrs.	0.0	ECTS**
student own work	41	hrs.	1.6	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