

<b>Subject name</b>	<b>Hydraulic structures – design and exploitation</b>	
<b>Subject code</b>	IS-HSE-11	
<b>Department</b>	Hydraulic Engineering and Geotechnics	
<b>Faculty</b>	Environmental Engineering and Land Surveying	
<b>Subject supervisor/Lecturer</b>	Professor Artur Radecki-Pawlik, Karol Plesiński PhD	
<b>General information</b>	Teaching period	winter or summer semester
	ECTS credit	6
	Lectures total	15
	Lab practical	30
<b>Objective and general description</b>	<p>To acquaint the student with the principle of work of innovative hydraulic structures, they are block ramps. Students will also be familiarized with the hydrodynamics and hydraulics of these objects. They will also be taught to design the block ramp, which will be assisted methods of computing (CCHE2D, HEC-RAS numerical model) and calculation programs (VCMaster). In addition, it will be determined impact of the proposed structures in the bed of a mountain stream (flow regime change, changes in hydrodynamic parameters, changes in the morphology of the bed of the stream and sediment transport).</p> <p>Subject also introduces issues with knowledge from construction of hydraulic structures close to nature and fluvial geomorphology (oversized grain structure, cross-ribbed).</p>	
<b>Lectures</b> <b>7 x 2 +1 hours</b>	<ol style="list-style-type: none"> <li>1. Hydraulic structures introduction</li> <li>2. The classical hydraulic structures</li> <li>3. The block ramps and other hydraulic structures close to nature</li> <li>4. Numerical modeling and calculation of hydraulic structures</li> <li>5. Methods of river training close to nature</li> <li>6. Exploitation problems of block ramps</li> <li>7. Hydraulic parameters of water flowing in river channels.</li> <li>8. Bed-load transport in river channels</li> </ol>	
<b>Lab practicals</b> <b>15 x 2 hours</b>	<ol style="list-style-type: none"> <li>1. Design of block ramp - Problem 1</li> <li>2. Exploitation problem of block ramp - Problem 2</li> <li>3. Numerical modeling of hydraulic parameters in the block ramp - Problem 3</li> </ol>	
<b>References</b>	<ol style="list-style-type: none"> <li>1. Radecki-Pawlik A., 1993. Stopień - bystrze w Brennej na rzece Brennicy jako przykład wariantu remontu istniejącego stopnia klasycznego. I Krajowa Konferencja Naukowa z Udziałem Gości Zagranicznych nt. „Bezpieczeństwo i trwałość budowli wodnych”, Wrocław - Rydzyna, edytor: W.Parzonka, 101-109</li> <li>2. Radecki-Pawlik A., 1999. Badania rozkładu prędkości oraz naprężeń stycznych w strefie oddziaływania bystrza, Zeszyty Naukowe AR w Krakowie 341, Inżynieria Środowiska 19, 71-79.</li> <li>3. Radecki-Pawlik A., 2009. Bystrza jako bliskie naturze rozwiązania utrzymania koryt rzek i potoków górskich. Nauka Przyr. Technol. 3, 3</li> <li>4. Radecki-Pawlik A., Plesiński K., Wyżga B. 2013 “Analysis of chosen hydraulic parameters of a rapid hydraulic structure (RHS) in the Porębianka River in the Gorce Mountains, Polish Carpathians [w:] Bung D.B., Pagliara S. IWLHS - The International Workshop on Hydraulic Design of Low-Head Structures” Bundesanstalt für Wasserbau, 121-128</li> <li>5. Plesiński K., Janas M., Radecki-Pawlik A. 2013 „Analiza parametrów hydraulicznych w rejonie bystrza o zwiększonej szorstkości na rzece Porębiance w Gorcach” Acta Scientiarum Polonorum: Formatio Circumiectus, 12(1), 101-114</li> </ol>	