***Course name: Water Management and Protection of River Valleys***

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| ECTS | *6.0* |
| Course status | *facultative* |
| Course final assessment /evaluation of outcomes | *graded credit* |
| Prerequisite | *basic knowledge in flood protection of river valleys* |

***Main field of study: Landscape Architecture***

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| Educational profile | *General academic* |
| Code of studies and education level | *bachelor* |
| Semester of studies | *winter* |
| Language of instruction | *English* |

**Course offered by**:

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| Name of faculty offering the course | *Environment Engineering and Land Surveying* |
| Name of department offering the course | *Hydraulic Engineering and Geotechnics* |
| Course coordinator | *Leszek Książek, Ph.D., Karol Plesiński, Ph.D., Andrzej Strużyński, 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: | | | |
| *WMP_K1* | *possibilities and effects of human activity in the catchment, methods of flood protection and river regulation close to nature* | *AK1_W09* | *T* |
| SKILLS – student is able to: | | | |
| *WMP_S1* | *determine the degree of development of a small river basin, calculate probable flows, calculate the parameters of semi-natural hydraulic rapid structures* | *AK1_U01 AK1_U06* | *T* |
| SOCIAL COMPETENCIES – student is ready to: | | | |
| *WMP_C1* | *understanding the importance of landscape architecture as an engineering discipline affecting the natural environment, landscape quality and human living conditions, cooperating with other specialists involved in the design of a small basin* | *AK1_K01 AK1_K02* | *T* |

**Teaching contents**

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| Lectures: | 15 hours |
| Topics | *1. Development of a small mountain and lowland catchment.*<br>*2. Impact of drainage basin management on the shaping of the outflow (river floods).*<br>*3. Land cover degree.*<br>*4. Protection of the catchment area against extreme phenomena.*<br>*5. Riverbeds close to nature – seminatural rapids.* |
| Accomplished learning outcomes | *WMP_K1; WMP_C1* |

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| Means of verification, rules and criteria of assessment | *Written graded credit, 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%.* |

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| Classes: | | 15 hours |
| Topics | *Land cover forms, their transformation as a result of human activity (land cover and impact on the conditions of water outflow from the catchment area will be discussed). During the classes, students will describe the rate of land cover [%] of the small catchment.* | |
| Accomplished learning outcomes | *WMP_S1* | |
| Means of verification, rules and criteria of assessment | *Project evaluation – 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 practicals: | | 15 hours |
| Topics | *Discovering the land cover degree and transformation of the watershed in the field. Evaluating marks of human activity.* | |
| Accomplished learning outcomes | *WMP_S1* | |
| Means of verification, rules and criteria of assessment | *Attendance list.* | |

**References**:

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| Basic | *1. R.GilPontiusJr.Laura CSchneider, 2001, Land-cover change model validation by an ROC method for the Ipswich watershed, Massachusetts, USA, Agriculture, Ecosystems & Environment, Elsevier, Volume 85, Issues 1–3, June 2001, Pages 239–248.*<br>*2. Swetnam R.D., Fisherb B., Mbilinyid P.B., Willcock S., Ricketts T, Mwakalila S., Balmford A., Burgess N.D., Marshall A.R. Lewis S.L. 2011, Mapping socio-economic scenarios of land cover change: A GIS method to enable ecosystem service modelling. Journal of Environmental Management, Elsevier, Volume 92, Issue 3, March 2011, Pages 563–574.* |
| Supplementary | *1. Suming J., Limin Y., Patrick D., Collin H., Joyce F., George X., 2011. A comprehensive change detection method for updating the National Land Cover Database to circa 2011. Remote Sensing of Environment, Elsevier, Volume 132, 15 May 2013, Pages 159–175.* |

**Structure of learning outcomes**

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|---|---|---|
| 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**

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|---|---|---|---|
| Contact hours | 57 | hrs. | 2.3 ECTS** |
| Including: lectures | 15 | hrs. | |
| classes and seminars | 15 | hrs. | |
| consultations | 10 | hrs. | |
| participation in research | 0 | hrs. | |

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|---|---|---|---|---|
| obligatory field trips | 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