COURSE DESCRIPTION CARD

<table>
<tr><td colspan="10">Faculty of Civil Engineering and Environmental Sciences</td></tr>
<tr><td>Field of study</td><td colspan="5"></td><td colspan="2">Degree level and programme type</td><td colspan="2"></td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="5"></td><td colspan="2">Study profile</td><td colspan="2">academic profile</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="5" rowspan="2">Spatial processes in hydrology modeling</td><td colspan="2">Course code</td><td colspan="2">IS-FCEE-00206S</td></tr>
<tr><td colspan="2">Course type</td><td colspan="2">Erasmus</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>summer</td></tr>
<tr><td></td><td></td><td></td><td></td><td>30</td><td></td><td></td><td>No. of ECTS credits</td><td>4</td></tr>
<tr><td>Entry requirements</td><td colspan="9">does not concern</td></tr>
<tr><td>Course objectives</td><td colspan="9">Student can use hydrological modeling tool for water resource management.</td></tr>
<tr><td>Course content</td><td colspan="9">Specialization workshop: Applying various hydrologic models in exploring different scenarios, expressing for example, possible effects of changes in population and climate on the water cycle. Defining the tasks for which the model will be applied and tested. Analyzing catchment characteristics and processes which should be included in the modeling framework (reference and potential evapotranspiration, dynamic vegetation processes, snow processes, soil water processes, routing). Creating a new project and setting general options (climate, soil, groundwater, land use, snow, routing , report options). Running the model. Results visualizing. Model calibrating (discharge time-series. water balance, sensitivity analysis, checking streamflow results). Scenario simulations.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">specialization workshop</td></tr>
<tr><td>Assessment method</td><td colspan="9">specialization workshop: final report with calculations</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">Student knows the phenomena and processes simulated in the hydrological model.</td><td colspan="2">IS1_W07</td></tr>
<tr><td>LO2</td><td colspan="7">Student can find the appropriate data needed to build the model.</td><td colspan="2">IS1_U04</td></tr>
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LO3	Student is able to interpret the results of model tests.	IS1_U14
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	final report with calculations	**SW**
LO2	final report with calculations	**SW**
LO3	final report with calculations	**SW**
Student workload (in hours)		**No. of hours**
Calculation	participation in specialization workshop	30
	participation in consultations	5
	preparation of both calculations and final report	45
	TOTAL:	**80**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	35 h	1,5
Student workload – practical activities	75 h	3,0

Basic references	Lutz A.F., Immerzeel W.W., Gobiet A., Pellicciotti F., Bierkens M.F.P., 2013. Comparison of climate change signals in CMIP3 and CMIP5 multi-model ensembles and implications for Central Asian glaciers, Hydrol. Earth Syst. Sci.; 17(9): 3661–3677. Lutz A.F., Immerzeel W.W., Shrestha A.B., Bierkens M.F.P., 2014. Consistent increase in High Asia's runoff due to increasing glacier melt and precipitation. Nature Climate Change, 4. Terink, W., Lutz A.F., Simons G.W.H., Immerzeel W.W., Droogers P., 2015. SPHY v2.0: Spatial Processes in HYdrology. Geoscientific Model Development; 8: 2009-2034.
Supplementary references	Han D., 2010. Concise Hydrology. eBooks at bookboon.com Lükenga W., 2015. Water Resource Management. eBooks at bookboon.com

Organisational unit conducting the course	**Department of Agri-Food Engineering and Environmental Management**	**Date of issuing the programme**
Author of the programme	**dr Piotr Kondratiuk**	**25.02.2020**

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar