

Program: Hydraulic, Water Resources and Environmental Engineering	
Level: Master studies	
<b>Course title: RIVER HYDRAULICS AND MORPHOLOGY – 1D MODELS</b>	
<b>Teacher: Miodrag P. Spasojevic</b>	
Course status: Elective	Credits: 6
<p><b>Course objective</b></p> <p>To gain theoretical background in river flow, sediment transport and bed evolution modeling. To gain practical experience in application of 1D mathematical models in this area.</p>	
<p><b>Course outline</b></p> <p><i>Lectures (2 hours/week)</i></p> <p>Mass conservation equation for suspended sediment  Mass conservation equation for bed and near-bed sediment  Mass conservation equation for sediment below bed surface  Sediment exchange between suspension and bed and near-bed sediment  Bed evolution – bed-surface morphological changes  1D mobile-bed models – uniform sediment  Sediment mixtures – hydraulic sorting and bed armoring  1D mobile-bed models – sediment mixtures  Numerical methods for suspended-sediment equations  Numerical methods for bed and near-bed sediment equations  Numerical solution of flow and sediment equations system  Application and test cases</p> <ul style="list-style-type: none"> <li>    Prevailing suspended-sediment transport</li> <li>    Prevailing bedload transport</li> <li>    Prevailing bed degradation (erosion)</li> <li>    Prevailing bed aggradation (deposition)</li> </ul> <p><i>Assignments and term projects (2 hours/week)</i></p> <p>Lectures are accompanied by assignments and term projects, requiring individual work under teacher's guidance and supervision.</p>	
<p><b>Recommended texts:</b></p> <ol style="list-style-type: none"> <li>1. M. Jovanovic: <i>River Hydraulics and Morphology</i>, Civil Engineering Faculty Belgrade, 2002, in Serbian.</li> <li>2. M. S. Yalin: <i>Mechanics of Sediment Transport</i>, Pergamon Press Ltd, 1977.</li> <li>3. W. H. Graf: <i>Hydraulics of Sediment Transport</i>, McGraw-Hill, Inc., 1971.</li> <li>4. Manual 54: <i>Sedimentation Engineering</i>, Vanoni, V.A., Editor, ASCE, 1975.</li> <li>5. F. M. Henderson: <i>Open Channel Flow</i>, Macmillan Publishing Co., Inc., 1966.</li> <li>6. S. C. Jain: <i>Open-Channel Flow</i>, John Wiley &amp; Sons, Inc., 2001.</li> <li>7. M. Spasojevic: <i>Computational Hydraulics – Open-Channel Flow</i>, Civil Engineering Faculty Subotica, 1996, in Serbian.</li> </ol>	