

### 3. System Analysis and Environmental Modelling

<b>Module designation</b>	System Analysis and Environmental Modelling
<b>Module level, if applicable</b>	
<b>Code, if applicable</b>	C IL 2 3 813
<b>Subtitle, if applicable</b>	
<b>Courses, if applicable</b>	
<b>Semester(s) in which the module is taught</b>	1 <sup>st</sup> Semester
<b>Person responsible for the module</b>	Prof. Dr. Ir. Purwanto, DEA
<b>Lecturer</b>	1. Prof. Dr. Ir. Purwanto, DEA 2. Prof. Dr. Sutrisno Anggoro, M.S.
<b>Language</b>	<i>Indonesian and English</i>
<b>Relation to curriculum</b>	Compulsory
<b>Type of teaching, contact hours</b>	<ul style="list-style-type: none"> <li>• Regular meeting with Lecturer 16 times (40 hours with total contact hour per teaching is 2.5 hours weekly for 16 weeks). This activity consists of Lecture: 80 minutes; Q&amp;A: 20 minutes; Discussion: 30 minutes; Presentation: 20 minutes).</li> <li>• Independent work on reading materials and literature review (48 hours, 3 hours weekly for 16 weeks).</li> <li>• Preparing paper and final personal assignment (96 hours, 6 hours weekly for 16 weeks).</li> <li>• Peer group discussion (24 hours, 1.5 hour weekly for 16 weeks).</li> <li>• Personal work on reflecting the course's gained knowledge to the student's research topic (17.6 hours, 1.1 hours weekly for 16 weeks).</li> </ul> <p>Total contact hours in 1 semester = 225 hours</p>
<b>Student Workload for One ECTS</b>	<ul style="list-style-type: none"> <li>• Face-to-face lecturers in class (4.44 hours)</li> <li>• Independent work (reading books, materials, papers, literature review, etc : 5.33 hours)</li> <li>• Preparing paper and structured assignments (doing homework or assignments given by lecturers : 10.67 hours)</li> <li>• Peer group discussion (2.67 hours)</li> <li>• Personal work on reflecting the course's gained knowledge to the student's research topic (1.89 hours)</li> </ul> <p>Total workload for one ECTS = 25 hours</p>
<b>Laboratory Work</b>	This course requires no laboratory work

<b>Credit points</b>	3 SKS which equivalent to 9 ECTS
<b>Requirements according to the examination regulations</b>	<i>Minimum attendance of lectures 75%</i>
<b>Recommended prerequisites</b>	-
<b>Module objectives/intended learning outcomes</b>	<ul style="list-style-type: none"> <li>• <i>Able to identify, formulate and analyze complex engineering problems on integrated systems based on analytical, computational or experimental approaches.</i></li> <li>• <i>Mastering the principles and techniques of integrated system design with an environmental systems approach.</i></li> <li>• <i>Able to research and investigate complex engineering problems on integrated systems using basic engineering principles and by carrying out research, analysis, data interpretation and information synthesis to provide solutions.</i></li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>• This course studies systems and system modeling, especially systems in the environment</li> <li>• This course studies the process/steps of mathematical modeling for problems in environmental systems</li> <li>• The process of model verification and validation, to finding solutions or model analysis.</li> </ul>
<b>Study and examination requirements and forms of examination</b>	<ul style="list-style-type: none"> <li>• <i>Open book and close book</i></li> <li>• <i>Multiple choice, case study, interview, practice</i></li> </ul>
<b>Media employed</b>	<i>Power point, YouTube, website</i>
<b>Reading Materials</b>	<p>Lee, G. Y., Hickie, I. B., Occhipinti, J. A., Song, Y. J. C., Skinner, A., Camacho, S., ... &amp; Freebairn, L. (2022). Presenting a Comprehensive Multi-Scale Evaluation Framework for Participatory Modelling Programs: A Scoping Review. <i>PloS one</i>, 17(4), e0266125.</p> <p>Rahmati, O., Kornejady, A., Samadi, M., Deo, R. C., Conoscenti, C., Lombardo, L., ... &amp; Bui, D. T. (2019). PMT: New Analytical Framework for Automated Evaluation of Geo-Environmental Modelling Approaches. <i>Science of the Total Environment</i>, 664, 296-311.</p> <p>Refsgaard, J. C., van der Sluijs, J. P., Højberg, A. L., &amp; Vanrolleghem, P. A. (2007). Uncertainty in the Environmental Modelling Process—a Framework and Guidance. <i>Environmental Modelling &amp; Software</i>, 22(11), 1543-1556.</p> <p>Skidmore, A. (2017). <i>Environmental Modelling with GIS and Remote Sensing</i>. CRC Press.</p>