

MODUL COMPUTER APPLICATIONS AND ENVIRONMENTAL MODELING




MASTER PROGRAM OF ENVIRONMENTAL SCIENCE
SCHOOL OF POSTGRADUATE
DIPONEGORO UNIVERSITY

Modul Description:

Module Name	Computer Applications and Environmental Modeling
Module level, if applicable	
Code, if applicable	P-CIL-8-105
Subtitles, if any	
Course, if applicable	
Semester(s) in which the module is taught	Semester 1
Module responsible	Prof. Dr. Ir. Purwanto, DEA
Teaching Lecturer	1. Prof. Dr. Ir. Purwanto, DEA 2. Dwi P Sasongko, M.Sc 3. Dr. Istadi, ST, MT
Language	<i>Indonesian and English</i>
Relationship with curriculum	
Type of teaching, hours of contact	<i>Lectures: 1 x 180 minutes x 16 meetings = 48 hours/week Q&A: 1 x 30 minutes x 16 meetings = 8 hours/week Discussion: 1 x 30 minutes x 16 meetings = 8 hours/week Presentation: 1 x 30 minutes x 16 meetings = 8 hours/week Individual assignment: 60 minutes/day = 5 hours/week Total work for 1 semester = 150 hours = 6 ECTS</i>
Workload	<i>(Estimated) workload, divided into contact hours (lectures, exercises, laboratory sessions, etc.) and personal study, including test preparation, specified in hours,¹and overall.</i>
credit points	3 Credits / 6 ECTS
Requirements according to the exam regulations	<i>Lecture attendance of at least 75%</i>
Recommended prerequisites	<i>For example, competence in...</i>

<p>Modulethe desired learning objectives/outcomes</p>	<p>Students understand modeling techniques to understand the behavior of engineering and natural systems and find solutions to problems resulting from interactions between elements in engineered and natural systems. And also students are able to use Excel, Visual Basic, Access, SPSS, Word and Power Point application programs to process and analyze data</p>
<p>Fill</p>	<p>This course discusses the history of systems and models in environmental management. Concepts and approaches, definitions and clarifications, various systems and models and their applications in environmental management, model construction, input-output models, system-model relationships, simulations and case studies. And also study information retrieval, environmental information systems, classification of environmental information, theoretical data and its relationship with environmental information, data processing using computers. Spreadsheet application (Excel), visual basic (Programming), Access (Database), SPSS (Statistics),word processing (Word), Presentation (Power Point).</p>
<p>Study and exam requirements and forms</p>	<ul style="list-style-type: none"> • <i>Open the book and close the book</i> • <i>Multiple choice, case studies, interviews, practicals</i>
<p>Media used</p>	<p><i>Powerpoint, youtube, website</i></p>
<p>Read reference</p>	<ol style="list-style-type: none"> 1. Thomann, RV & Mueller, JA 1987. Principles of Surface Water Quality Modeling and Control, Harper & Row Publishers: New York. 2. Software books related to Excel, Word, Access, Visual Basic, Power Point. 3. Singgih, Santoso. 1999. SPSS Processes Statistical Data Professionally. Elex Media Komputindo. 4. Sarwono, Jonathan. Research Data Analysis using SPSS. PublisherAndi. 5. The Complete Guide to Microsoft Word XP for Windows. 2004. Publisher Andi. 6. Sianipar, Pandapotan Ir. 2003. Using Microsoft Office PowerPoint. Elexmedia Komputindo. 7. Maximizing Data Processing Automation Facilities and Functions with Microsoft Office Excel. PublisherAndi. 8. Visual basic programming 6.0. publisher Andi.

	<p>9. Abdel-Magid, IM 2019. Computer Modeling Applications for Environmental Engineers. CRC Press.</p> <p>10. Holzbecher, E. 2012. Environment Modeling: Using MATLAB. Jumper</p>
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SEMESTER STUDY PLAN							
		Study program: Master of Environmental Science			Faculty: School of Postgraduate		
		Subject: Computer Applications and Environmental Modeling		Code: CIL-8-105	Credit:3 (6 ECTS)	smt:1	
Supporting lecturer:		<ol style="list-style-type: none"> 1. Prof. Dr. Ir. Purwanto, DEA 2. Dr. Dwi P Sasongko, M.Sc. 3. Dr. Istadi, ST, MT 					
Learning Outcomes Subject:		Students understand modeling techniques to understand the behavior of engineered and natural systems and find solutions to problems resulting from the interaction between elements in engineering systems and nature. And also students are able to use Excel, Visual Basic, Access, SPSS, Word and Power Point application programs to process and analyze data.					
Short Description of Courses:		This course studies the history of systems and models in environmental management. Concepts and approaches, definitions and clarifications, various systems and models and their applications in environmental management, model construction, input-output models, system relations with models, simulations and case studies. And also study information search, environmental information systems, classification of environmental information, theoretical data and its relationship to environmental information, data processing using computers. Spreadsheet application (Excel), visual basic (Programming), Access (Database), SPSS (Statistics), word processing (Word), Presentation (Power Point).					
1	2	3	4	5	6	7	
Week	Final Ability of each learning stage	Study Materials/ Subjects	Learning methods	Workload	Student Learning Experience	Evaluation	
						Criteria & Indicators	Weight (%)
1.	Students are able to explain the history of systems and models in environmental management	History of systems and models in environmental management	Lectures and discussions	330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • Lecture:180 minutes • Q&A: 30 minutes • Discussion : 30 minutes • Presentation : 30 minutes • Individual tasks: 60 	Listening, summarizing and asking questions, giving opinions, answering questions	Ability to explain the history of systems and models in environmental management	5

				<i>minutes/day (16 weeks)</i>			
2.	Students are able to analyze concepts and approaches and environmental modeling	Environmental Modeling Concepts and Approaches	Lectures and discussions	330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, summarizing and asking questions, giving opinions, answering questions	Ability to analyze environmental concepts and approaches and modeling	5
3.	Students are able to understand the definition and identify environmental models	Definition and Classification of Environmental Modeling	Lectures and discussions	330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, summarizing and asking questions, giving opinions, answering questions	Ability to understand definitions and identify environmental models	5
4.	Students are able to formulate models in research	Modeling type formulation	Discussions, assignments and presentations	330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, summarizing and asking questions, giving opinions, answering questions	Ability to formulate a model of an environmental problem	5
5.	Students are able to develop alternatives from	Analyze and integrate	Task	330 min (0.375 ECTS) Consist of:	Answering questions and	Ability to understand and	5

	the chosen model in completing a case study	alternatives in a case study		<ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> <i>Individual tasks: 60 minutes/day (16 weeks)</i>	developing alternatives in a case study	identify the appropriate model for a case study	
6.	Students are able to use the excel application program	Excel App	Lectures, discussions and practice	330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, asking, answering questions and operating the software	Ability to use excel application program	5
7.	Students are able to use visual basic application programs	Visual Basic Application	Lectures and discussions	330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, asking, answering questions and operating the software	Ability to use visual basic application programs	5
8	Mid Term Examination	Meeting Material 1-7	Independent Written Test	330 minutes of processing time or the equivalent of 0.25 ECTS	Students working on UTS questions	Quality of answers and timeliness of collection	10

9.	Students are able to use the access application program	Access App	Lectures and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, asking, answering questions and operating the software	Ability to use access . application programs	5
10.	Students are able to use the SPSS application program	SPSS App	Lectures and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, asking, answering questions and operating the software	Ability to use SPSS application programs	5
11.	Students are able to use Microsoft Word application programs	Microsoft Word Application	Lectures and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, asking, answering questions and operating the software	Ability to use Microsoft Word application programs	5
12.	Students are able to use the Microsoft Power Point application program	Microsoft Power Point App	Lectures and discussions	330 min (0.375 ECTS) <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30</i> 	Listening, asking, answering questions and	Ability to use Microsoft Power Point application program	5

				minutes <ul style="list-style-type: none"> • Presentation : 30 minutes • Individual tasks: 60 minutes/day (16 weeks) 	operating the software		
13.	Students are able to use the Origin Pro application program	Origin Pro App	Lectures and discussions	330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, asking, answering questions and operating the software	Ability to use the Origin Pro application program	5
14.	Students are able to use the Mendeley application program	Mendeley App		330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Listening, asking, answering questions and operating the software	Ability to use the Origin Pro application program	5
15.	Students are able to apply software as a means of supporting presenting a scientific article or journal	Using and integrating the use of software in presenting scientific articles or journals	Task	330 min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60</i> 	Using and integrating the use of software in presenting scientific articles or journals	Ability to analyze suitable software and integrate multiple software	5

				<i>minutes/day (16 weeks)</i>			
16	Final Examination	Meeting Materials 1-15 (resume material)	Written test	330 minutes of processing time or the equivalent of 0.25 ECTS	Students working on UAS questions	Quality of answers and timeliness of collection	20
8. Reference List:		<ol style="list-style-type: none"> 1. Douglas, H. Environmental System Optimization. John Wiley 2. Thomann, RV & Mueller, JA 1987. Principles of Surface Water Quality Modeling and Control, Harper & Row Publishers: New York. 3. Odum EP Ecology Systems. Translated by Supriyonodkk, Erlangga Publisher: Jakarta 4. Software books related to Excel, Word, Access, Visual Basic, Power Point. 5. Software book related to Applied Statistics. 6. Singgih, Santoso. 1999. SPSS Processing Statistical Data Professionally. Elex Media Komputindo. 7. Sarwono, Jonathan. Research Data Analysis using SPSS. Publisher Andi. 8. Full Guide Microsoft Word XP for Windows. 2004. Andi Publisher. 9. Sianipar, Pandapotan Ir. 2003. Using Microsoft Office Powerpoint. Elexmedia Komputindo. 10. Maximizing Data Processing Automation Facilities and Functions with Microsoft Office Excel. Publisher Andi. 11. Visual basic 6.0 programming. Publisher Andi. 					

