22. Module Handbook of Spatial Modeling

<table>
<tr><td>Module designation</td><td colspan="9">The Spatial Modeling course is an elective course of interest offered in semester 2 in the Master of Geography study program. This course explains the concept of GIS and its utilization, the concept of spatial modeling, analyzing the classification of spatial data models, the process and benefits of GIS in spatial modeling.</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td colspan="9">Even</td></tr>
<tr><td>Person responsible for the module</td><td colspan="9">Dr. Taufik Hery Purwanto, S.Si., M.Si.
Muhammad Kamal, S.Si., M.GIS., Ph.D.</td></tr>
<tr><td>Language</td><td colspan="9">Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td colspan="9">Elective</td></tr>
<tr><td>Teaching methods</td><td colspan="9">SCL: Team-based Project/Case-based Learning/PBL</td></tr>
<tr><td rowspan="5">Workload (incl. contact hours, self-study hours)</td><td>CLO1</td><td>Interactive discussions in class</td><td colspan="7">3 meetings
6 x 50 minutes of classroom lectures and discussions</td></tr>
<tr><td>CLO2</td><td>Interactive discussions in class and assignments</td><td colspan="7">2 meetings
4 x 50 minutes of classroom lectures and discussions
2 x 60 minutes of self-paced tasks</td></tr>
<tr><td>CLO3</td><td>Interaction discussions in class and assignments</td><td colspan="7">2 meetings
4 x 50 minutes of classroom lectures and discussions
2 x 60 minutes of self-paced tasks</td></tr>
<tr><td>CLO4</td><td>Interaction discussions in class and assignments</td><td colspan="7">3 meetings
6 x 50 minutes of classroom lectures and discussions
2 x 60 minutes of independent assignment (literature study and evaluation of literature study results in writing)</td></tr>
<tr><td>CLO5</td><td>Interaction discussions in class and assignments</td><td colspan="7">4 meetings
8 x 50 minutes of classroom lectures and discussions
3 x 60 minutes of self-assignment (case study and evaluation of results in writing and presentation)</td></tr>
<tr><td rowspan="4">Credit points</td><td rowspan="2">Assessment Techniques</td><td rowspan="2">Percentage of Assessment (%)</td><td rowspan="2">Criteria/ Indicators</td><td colspan="5">CLO (%)</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Participatory Activities</td><td>10</td><td>Contribution of class discussion activities in each subject matter of the lecture</td><td></td><td>10</td><td></td><td></td><td>10</td></tr>
<tr><td>Project Results/ Case Study Results/ PBL Results</td><td>50</td><td>Natural Resource Problem Analysis
Economic review
Case study and PBL assessment rubric</td><td></td><td>10</td><td></td><td>40</td><td>50</td></tr>
<tr><td colspan="9">Cognitive</td></tr>
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	Assignment	20	Task command conformance and task results Task rubric		10		10	20
	Final Exam	20	Answer key Final Exam assessment rubric		10		10	20
	Total	100						

Required and recommended prerequisites for joining the module	Taken after taking compulsory courses and adapted to the theme of the thesis	
Module objectives/intended learning outcomes	**ELO B2**	Capable of advancing geographical knowledge, technology, or art through research to produce credible scientific works.
	ELO C1	Able to use and utilise mapping technology and geographic information systems in presenting geographical material object data to support spatial and regional analysis as a foundation for preparing regional development plans.
	ELO C2	Capable of utilising science and technology to generate new ideas based on scientific geography development research findings.
	CLO1	Students understand the concepts, types, and scope of spatial analysis and modeling. [CPL B2]
	CLO2	Students are able to identify components and build conceptual models to solve spatial problems. [CPL C1]
	CLO3	Students are skilled in applying spatial modeling in various geographical themes/cases. [CPL C2]
Content	**CLO1**	1. Introduction to the course, significance of spatial modeling in the field of geography, context of spatial modeling in the UK IG field of GIS. 2. Spatial analysis 3. 3-dimensional analysis 4. Network analysis
	CLO2	1. Spatial modeling 2. Advanced Spatial Analysis and Modeling 3. Spatial Modeling Applications
	CLO3	1. Process Analysis in Spatial Modeling 2. Case study 1: Site selection lokasi perumahan 3. Implementasi pemodelan spasial 4. Case study 2: The use of land suitability model to find the best site for a waste disposal area 5. Cost surface spatial modeling 6. Case study 3: Least-cost path analysis 7. Case study 1: Disaster shelter planning
Examination forms	Final Exam	
Study and Examination Requirements	The examination is carried out offline and the questions are made in the form of a case study and covers CLO1, CLO2 and CLO3; The assessment based on results Participatory Activities 10%, Project result 50%, Assignment 20%, Summative Test (Mid-term and Final Exam) 20%.	

Reading list	**Main:** 1. Longley P.A., et al., 2005, Geographic Information System and Science, 2nd Edition, John Wiley & Sons, Ltd., England 2. Yuji Murayama Editor, 2012, Progress in Geospatial Analysis, © Springer Japan 3. Yuji Murayama Editor, 2012, Spatial Analysis and Modeling in Geographical Transformation Process, © Springer Japan 4. Zeiler M, 1999, Modeling Our World, Environmental Systems Research Institute, Inc. 5. Smith MJ., Goodchild MF., Longley PA., 2018, Geospatial Analysis (A Comprehensive Guide to Principles Techniques and Software Tools) 6th edition, www.spatialanalysisonline.com 6. Berry, J. K. (1991). GIS in Island Resource Planning: A Case Study in Map Analysis. In D. J. Maguire, M. F. Goodchild, & D. W. Rhind (Eds.), Geographical Information Systems: Principles and Applications (pp. 285-295). Harlow, England, UK: Longman Scientific and Technical. 7. Berry, J. K. (1999). GIS Technology in Environmental Management: a Brief History, Trends and Probable Future. In D. Soden & B. R. Steel (Eds.), Handbook of Global Environmental Policy and Administration. Oxfordshire, England, UK: Routledge. 8. Krivoruchko, K., & Crawford, C. (2003). Assessing the Uncertainty Resulting from Geoprocessing Operations. Paper presented at the GIS and Modeling Workshop, Redlands, CA. 9. Tomlin, C. D. (1991). Cartographic Modelling. In D. J. Maguire, M. F. Goodchild, & D. W. Rhind (Eds.), Geographical Information Systems: Principles and Applications (pp. 361-374). Harlow, England, UK: Longman Scientific and Technical. 10. Stucky, J. L. D. (1998). On applying viewshed analysis for determining least-cost paths on Digital Elevation Models. International Journal of Geographical Information Science, 12(8), 891-905. doi:10.1080/136588198241554 11. Lu, M., Zhang, J. F., Lv, P., & Fan, Z. H. (2008). Least visible path analysis in raster terrain. International Journal of Geographical Information Science, 22(6), 645-656. doi:10.1080/13658810701602062 12. Choi, Y. R., Kim, E. J., & Kim, M. K. (2019). A planning guide for temporary disaster shelters focusing on habitability. Indoor and Built Environment, 29(10), 1412-1424. doi:10.1177/1420326X19886051 13. Zhao, L., Li, H., Sun, Y., Huang, R., Hu, Q., Wang, J., & Gao, F. (2017). Planning Emergency Shelters for Urban Disaster Resilience: An Integrated Location-Allocation Modeling Approach. Sustainability, 9(11). doi:10.3390/su9112098 14. Wei, Y., Jin, L., Xu, M., Pan, S., Xu, Y., & Zhang, Y. (2020). Instructions for planning emergency shelters and open spaces in China: Lessons from global experiences and expertise. International Journal of Disaster Risk Reduction, 51, 101813. doi:https://doi.org/10.1016/j.ijdrr.2020.101813
	Additional: **-**