CP234754 – Land Use Modelling

Module Name	Land Use Modelling
Module level, if applicable	Advance BoURP
Code, if applicable	CP234754
Subtitle, if applicable	-
Course, if applicable	Land Use Modelling
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Nursakti Adhi Pratomoatmojo
Lecturer	Nursakti Adhi Pratomoatmojo Rivan Aji Wahyu Dyan Syafitri, S.PWK., M.Ars
Language	Indonesian, English
Relation to curriculum	Electives Courses for undergraduate program in Urban and Regional Planning
Type of teaching*, contact hours*	M1: Group Discussion M2: Simulation M4: Collaborative learning M6: Project-based learning Lecture (Face to face lecture): 2.5 hours x 14 weeks 35 hours per semester
Workload	Elective (3 SKS) Class: 2.5 hours x 14 weeks = 35 hours Structured activities: 4 hours x 14 weeks = 56 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 1.5 hours x 4 time = 6 hours Total = 133 hours
Credit points	3 SKS ~ 4.8 ECTS
Requirements according to the examination regulations	Registered in this course Minimum 80% attendance in this course
Recommended prerequisites	Planning Information System Planning Communication and Computation
Module objectives/intended learning outcomes	***General knowledge:*** 1. Able to understand the spatial and non-spatial planning methods in decision-making within the field of urban and regional planning. 2. Able to comprehend qualitative, quantitative, and spatial modeling (geographic information system)

<table>
<tr><td></td><td>techniques and processes in urban and regional planning, as well as presentation skills.

Specific skills:
1. Students are able to master data analysis approach techniques in regional/city planning problems
2. Students are able to understand the concept of using Planning Information Systems and understand the methods of application in the Spatial Planning process.
3. Students are able to provide information and display planning results into information systems for publication purposes.
4. Students are able to draw up recommendations for spatial pattern recommendations using techniques in decision making using the GIS process.

General skills:
1. Students are able to communicate small research visually, verbally, and in writing based on ICT</td></tr>
<tr><td>Content</td><td>1. Basic concepts/theories and principles in Land Use Modeling
2. Cellular Automata Technique
3. Development and implementation of Cellular Automata
4. LanduseSim features, framework and output
5. LanduseSim GUI introduction
6. Introduction to data types
7. Explanation of making input data
8. Process simulation in LanduseSim
9. Explanation of the Neighborhood Filter, its characteristics, and explanation of Time-Step
10. Transition with Zoning feature (LanduseSim)
11. Implementation of Land Elasticity in LanduseSim
12. Implementation of the landuse hierarchy in the simulation process with LanduseSim
13. Comprehension of Validation and Accuracy
14. Explanation of the Spatial Footprint, with the example of UrbanFootprint
15. Mechanism for developing planning scenarios
16. Development of needs/impact assumptions based on existing references to land use types (Standart RDTR or RTRW)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>4 asssessments:

<table>
<tr><th>Evaluation</th><th>Method</th><th>Weight</th></tr>
<tr><td>1</td><td>Literature Review</td><td>35%</td></tr>
<tr><td>2</td><td>Critical Review</td><td>15%</td></tr>
<tr><td>3</td><td>Simulation Practice</td><td>20%</td></tr>
<tr><td>4</td><td>Simulation Practice</td><td>30%</td></tr>
</table>
</td></tr>
</table>

	1. ***Literature Review - week 3, 6, 7, 12, 13, 14, 15*** 2. ***Critical Review - week 4*** 3. ***Simulation Practice - week 10*** 4. ***Simulation Practice - week 16***
Media employed	Classical teaching tools with white board and power point presentation, audiovisual, zoom meeting, ITS online classroom.
Readng list	Main References: 1. Pratomoatmojo, NA. (2020). Landusesim Modul Praktikum – Pemodelan Spasial Perkembangan Permukiman dan Industri berbasis Sistem Informasi Geografis dan Cellular Automata : http://www.landusesim.com/wp-content/uploads/2014/08/Tutorial-LanduseSim-Indonesian-0.3-LE-VERSION.pdf 2. Koomen E. Et al (2007). Modelling Land-Use Change: Progress and Applications, GeoJournal Library, Springer 3. Wang J, et al (2022) Machine learning in modelling land-use and land cover-change (LULCC): Current status, challenges and prospects, Science of The Total Environment, 822 4. Long, H. et al (2021) Land Use Transitions: Progress, Challenges and Prospects. Land, 10, 903. 5. Alvarez DG, et al (2022) Land Use Cover Datasets and Validation Tools, Validation Practices with QGIS, Springers 6. Angel S. et al (2020) The shape compactness of urban footprints, Volume 139. Main References: 1. Verburg P. (2010) The Clue Modelling Framework, the conversion of LandUse and its Effect 2. Pratomoatmojo, N. A. (2014) LanduseSim sebagai aplikasi pemodelan dan simulasi spasial perubahan penggunaan lahan berbasis Sistem Informasi Geografis dalam konteks perencanaan wilayah dan kota. Seminar Nasional Cities, 69–80. 3. Pratomoatmojo, N. A. (2018) LanduseSim Algorithm: Land use change modelling by means of Cellular Automata and Geographic Information System. IOP Conf. Series: Earth and Environmental Science 202 012020. DOI:10.1088/1755-1315/202/1/012020 4. Pratomoatmojo, N. A. (2018) LanduseSim Methods: Land use class hierarchy for simulations of multiple land use growth. IOP Conf. Series: Earth and Environmental Science 202 012023. DOI:10.1088/1755-1315/202/1/012023