

**PL5162 Computational Thinking and Data Science**

Module designation	Computational Thinking and Data Science
Semester(s) in which the module is taught	1 <sup>st</sup> Semester (first year of master program)
Person responsible for the module	Ibnu Syabri, B.Sc., M.Sc., Ph.D.
Language	Indonesian
Relation to curriculum	Specialisation Compulsory Course
Teaching methods	Lectures and discussions, empirical studies / case studies, class debates, brainstorming, talk shows / panels, roundtables, guest lectures
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: around 9 hours per week x 16 weeks = 144 hours <ul style="list-style-type: none"><li>• Face to face teaching: 2 hours per week = 2 x 16 = 32 hours</li><li>• Self-study hours: 7 hours per week: 7 x 16 = 112 hours</li></ul>
Credit points	3 CU/5 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are able to master the theory and practice of urban and regional planning and its application in plan preparation. Competencies acquired include urban informatics management, data modeling for urban efficiency, and formulating and evaluating policies and plans using spatial and/or dynamic modeling theories, methods, and tools.
Content	<ol style="list-style-type: none"><li>1. Introduction to Programming Languages and Data Types</li><li>2. Algorithm Basics</li><li>3. Searching and Sorting, Web Crawling</li><li>4. Inferential statistics</li><li>5. Mathematical foundations</li><li>6. Machine Learning and AI</li><li>7. Cluster analysis</li><li>8. Nonparametric Test</li></ol>
Examination forms	Take home test/ Midterm, critical review and in-class discussions, Final Paper/ Final Exam
Study and examination requirements	Take home test/ Midterm Exam (30%), critical review and in-class discussions (40%), Final Paper/ Final Exam (30%)
Reading list	<ol style="list-style-type: none"><li>1. G. Beekman and B. Beekman, Digital Planet: Tomorrow's Technology and You, Complete Tenth Edition, Prentice Hall, 2012</li><li>2. D. D. Riley and K. A. Hunt, Computational Thinking for The Modern Problem Solver, , CRC Press, 2014</li><li>3. Schutt &amp; O'Neil, Doing Data Science, , O'Reilly, 2014</li></ol>