

Subject Description Form

Subject Code	LSGI4503
Subject Title	Integrated Capstone Project
Credit Value	6
Level	4
Pre-requisite/ Co-requisite/ Exclusion	Pre-requisite: COMP1011 Programming Fundamentals/ COMP1012 Programming Fundamentals and Applications, LSGI3803 Spatial Data Analytics and Mining Exclusion: Any other equivalent capstone project
Objectives	The objectives of this subject are to: <ul style="list-style-type: none"> • Promote students' knowledge of artificial intelligence and data analytics (AIDA) to prepare for the increasing presence of AI and Big Data in land surveying and geo-informatics; • Provide a student with the opportunity to apply and integrate AIDA into land surveying and geo-informatics; • Develop the capabilities of a student in analyzing and solving complex and possibly real-life problems using AIDA; • Train students with skills on integrate AIDA and land surveying and geo-informatics to achieve a higher order learning process and to apply this to solve professional problems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: <p><u>Professional/academic knowledge and skills</u></p> <p>(a) get familiar with the latest approaches of AIDA in land surveying and geo-informatics, including machine learning (ML) and deep learning (DL);</p> <p>(b) conduct literature surveys to locate and collect materials and sources relevant to the selected problem area in a land surveying and geo-informatics;</p> <p>(c) understand the materials obtained and connect the materials with the problem to be solved using AIDA knowledge and skills, including data pre-processing and visualization;</p> <p>(d) define and specify the problem precisely (e.g., model selection or creation);</p> <p>(e) assimilate and apply the learned knowledge to generate good solutions to the problem (e.g., model optimization);</p> <p>(f) think critically about the formulation of alternative models and solutions to the problem, in the analysis of approaches to the solution and their implementation; and</p> <p>(g) evaluate the final outcome in an objective manner;</p> <p><u>Attributes for all-roundedness</u></p> <p>(h) improve presentation and communication skills via oral presentation;</p> <p>(i) enhance technical report writing skills with proper organization of materials;</p>

	<p>(j) develop the ability to learn independently and to find/integrate information from different sources required in solving real-life problems;</p> <p>(k) manage the project efficiently and effectively through the supervision of supervisor(s); and</p> <p>(l) work collaboratively with related parties (e.g., vendors, sponsor company, technical support staff, team-partners, research students, etc.).</p>
<p>Subject Synopsis/ Indicative Syllabus</p>	<p>1. In-depth Study of a Topic Typically Proposed by the Supervisor Students are expected to identify a project topic with a supervisor in their chosen discipline, and a co-supervisor with artificial intelligence and data analytics expertise. Students need to demonstrate their knowledge in both their chosen discipline and AIDA in the project, receiving advice from both supervisors. For a specific topic, an in-depth study in the targeted domain is required.</p> <p>2. Project Meeting and Planning The project should represent the requisite effort in analysing and interpreting the data/information obtained, using the principles and techniques learned from various related subjects. Students are also expected to demonstrate significant analytical and, preferably, research ability in the chosen application domain. Regular meetings with supervisors are proceed to make a plan for their topics.</p> <p>3. Proposal Writing A project proposal will be submitted in the first semester. This proposal will contain a comprehensive literature review, an outline of the problem, objectives, project design, proposed methodology (AIDA), and solution evaluation. The preliminary results are also provided as well as the next plan with a timetable for project completion.</p> <p>4. Regular Progress Checking and Reporting Regular progress will be reported to supervisors, and supervisors will provide timely comments and suggestions to students in project execution, including guidance in data pre-processing, model selection, and result evaluation.</p> <p>5. Project Documentation The materials including data sets, coding, output data, and technical documentation, should be documented and archived, and students must submit a bound copy of their dissertation along with relevant documents.</p> <p>6. Presentation and Demonstration In the second semester, students will present a summary of their dissertation topic and defend the results and conclusions during a Q & A session.</p>
<p>Teaching/Learning Methodology</p>	<p>The Integrated Capstone Project spans across the academic year for two consecutive semesters. The teaching/learning activities include regular project meetings with the supervisor and the co-supervisor, guided study of project materials, independent project development work, and other project management tasks.</p>

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)											
			a	b	c	d	e	f	g	h	i	j	k	l
	Continuous Assessment	100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Total	100 %												
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>The Integrated Capstone Project will be assessed by the supervisor/co-supervisor and other assessors. Attributes to be assessed include, but not limited to, Problem Identification, Problem Solving, Communication and Presentation, Project Management, and Self-Discipline.</p> <p>Integrated Capstone Projects should be problem-oriented and there are no restrictions on the nature of the problem except that it should be relevant to the student's chosen discipline and AIDA. The project could be practical, academic, or a hybrid in which the student is encouraged but not constrained to have some original contributions. Each student has to submit a proposal, a mid-term checkpoint progress report, and a final report. The proposal must be approved by the supervisor/co-supervisor before the student can proceed with the Integrated Capstone Project. An oral presentation and demonstration are essential at the end of the project. A mid-term presentation and demonstration may also be required for proper continuous assessment.</p> <p>Generative AI can only serve as a tool for assisting initial idea development and proofreading for project presentation and report, and any involvement of generative AI tools must be clearly acknowledged and referenced. Students are required to make close link between the subject contents and the proposed case-specific scenario to encourage critical thinking.</p>														
Student Study Effort Expected	Class contact:													
	▪ Lecture	0 Hrs.												
	Other student study effort:													
	▪ Searching and reading materials, meeting with supervisor/co-supervisor/others, design and system development, testing, documentation, presentation, etc.	210 Hrs.												
	Total student study effort		210 Hrs.											
Reading List and References	<ol style="list-style-type: none"> 1. Kumar, Ranjit, <i>Research Methodology: A Step-by-step Guide for Beginners</i>, 3rd Edition, SAGE Publications, 2011. 2. Burns, Robert B., <i>Introduction to Research Methods</i>, 4th Edition, SAGE Publications, 2000. 3. Roberts, Carol M., <i>The Dissertation Journey: A Practical and</i> 													

	<p><i>Comprehensive Guide to Planning, Writing, and Defending Your Dissertation</i>, 3rd Edition, Corwin Press, 2007.</p> <p>4. Mauch, James E. and Park, Namgi, <i>Guide to the Successful Thesis and Dissertation: A Handbook for Students and Faculty</i>, 5th Edition, Marcel Dekker, 2003.</p> <p>5. Rudestam, Kjell Erik and Newton, Rae R., <i>Surviving Your Dissertation: A Comprehensive Guide to Content and Process</i>, 2nd Edition, Sage Publications, 2001.</p> <p>6. Garson, G. David, <i>Guide to Writing Empirical Papers, Theses and Dissertations</i>, Marcel Dekker, 2002.</p> <p>7. Reinhart, Susan M., <i>Giving Academic Presentations</i>, 2nd Edition, University of Michigan Press, 2013.</p> <p>8. Oshima, Alice and Hogue, Ann, <i>Writing Academic English</i>, 4th Edition, Pearson Longman, 2006.</p> <p>9. American Psychological Association. <i>Publication Manual of the American Psychological Association</i>, 6th Edition, American Psychological Association, 2010.</p> <p>10. Szuchman, Lenore T., <i>Writing with Style: APA Style Made Easy</i>, 5th Edition, Wadsworth/Cengage Learning, 2011.</p> <p>11. Statistics, simulation, programming, and relevant books.</p> <p>12. ACM and IEEE magazines, Transactions and Journals.</p> <p>13. Other International Journals.</p> <p>14. Relevant conference proceedings and magazines (including ACM and IEEE conferences).</p> <p>15. Technical reports from universities and major companies.</p> <p>16. Ian Goodfellow, Yoshua Bengio, and A. Courville, <i>Deep Learning</i>. MIT Press, 2016.</p> <p>17. F. Chollet, <i>Deep learning with python</i>. New York, NY: Manning Publications, 2017.</p> <p>18. Fatimazahra Barramou, El Hassan El Brirchi, Khalifa Mansouri, Youness Dehbi, <i>Geospatial Intelligence</i>. Springer, Cham, 2021</p> <p>19. Cresson R. <i>Deep Learning for Remote Sensing Images with Open Source Software</i>. CRC Press, 2022.</p>
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