The Hong Kong University of Science and Technology

UG Course Syllabus

[Course Title] Advanced Construction with AI and Robotics

[Course Code] CIVL4210

[No. of Credits] 3

[Any pre-/co-requisites] COMP2011 OR COMP2012 OR COMP2012H

Name: [Instructor(s) Name] YU, Yantao

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Course Description

[Briefly describe the course content, key topics or themes, objectives, methods of instruction, e.g., lectures, discussions, projects].

This multi-faceted course encompasses advanced technologies in infrastructure and building construction, maintenance and operations. The course provides deep learning methods in computer vision and robot sensing with hands-on coding training on solving construction management problems with these methods. Combined with tools from AI and robotics, the course equips students with leading-edge knowledge and practices to bring about successful construction reform in the context of the smart city.

The course is a mixture of lectures, tutorials, and student projects. The concept, theory and applications of AI and robotics in construction are delivered through lectures. The tutorials provide hands-on exercises on AI and robotics software development toolkits to learn how to apply these tools with given data. Through mini-projects, students explore the use of the toolkits for practical problem-solving in construction.

Assessments:

[List specific assessed tasks, exams, quizzes, their weightage]

Assessment Task	Contribution to Overall Course grade (%)
In-class quizzes	30%
Participation	10%
Individual Project	60%

Required Texts and Materials

[List required textbooks, readings, and any other materials]

Rafael Sacks, Chuck Eastman, Ghang Lee, Paul Teicholz (2018) BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers, 3rd Edition. Wiley.

Zacharias Voulgaris and Yunus Emrah Bulut (2018) AI for Data Science: Artificial Intelligence Frameworks and Functionality for Deep Learning, Optimization, and Beyond First Edition, Technics Publications

Bock, T., & Linner, T. (2016). Construction Robots Elementary Technologies and Single-Task Construction Robots. In Construction Robots: Elementary Technologies and Single-Task Construction Robots (p. I). Cambridge: Cambridge University Press.

[Optional] Additional Resources

[List any additional resources, such as online platforms, library resources, etc.]