

Syllabus form

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	LGT6501
Subject Title	Advanced Control Methods and Practice in Smart Port
Credit Value	3
Level	6
Normal Duration	1-semester
Pre-requisite Co-requisite/ Exclusion	/ Nil
Objectives	<p>This subject contributes to the following Intended Learning Outcomes for the doctoral programme: Doctor of International Shipping and Port (D.ISP):</p> <p>#2 Understand and tackle International Shipping and Port Management issues by using relevant principles and emerging technologies</p> <ul style="list-style-type: none">● To enable students to understand the cutting-edge theory of smart port control;● To enable students to grasp basic research methodology of optimisation in order to solve some logistical problems;● To understand the existing management strategies and actual operation of smart port;● To enable students to explore and apply new technologies in the shipping industry;● To deepen students' theoretical understanding and practical management ability through the interaction of theory and practice.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none">A. understand the importance of port intelligent construction for national economic and trade security and social security.B. master the basic theory and research methods: smart port control and modeling research methods.C. get equipped with the ability to analyse the developing trend of ports.

	<p>D. have an international perspective and master the characteristics related to the methods involved and advance their experience in smart port control, dispatch and operations, and its maintenance at home and abroad.</p> <p>E. gain knowledge and understanding of emerging technologies such as blockchain, artificial intelligence, and big data, and their applications in smart port operations and logistics networks.</p> <p>F. acquire the basic ability to solve the optimisation problem of multimodal transport logistics networks with smart ports as the core, in China.</p>
<p>Subject Synopsis/ Indicative Syllabus</p>	<p><u>Part 1: Theoretical introduction</u></p> <ul style="list-style-type: none"> ● Introduce the main concepts of smart ports, smart ports evaluation index, and the development process of smart ports; ● Introduce the key technologies of smart ports, the organisational mode of smart ports and other fields of theoretical knowledge; ● Introduce advanced control technologies of smart ports; ● Introduce the methodology of logistics network optimisation. <p><u>Part 2: Port practice</u></p> <ul style="list-style-type: none"> ● Organise students to visit and investigate well-known ports, learn the frontier practice and the utilization of new technologies of international port operation on the spot; ● Understand the advanced management concepts and characteristic management methods in other countries.
<p>Teaching/Learning Methodology</p>	<p>Teaching and Learning Methods:</p> <p>The course combines classroom learning with actual visits to provide students with a comprehensive understanding of smart port logistics control. In-class sessions will introduce theoretical knowledge and practical applications of smart port technology. Additionally, students will visit well-known ports, such as Ningbo Zhoushan port, to gain first-hand experience and understanding of the practice of smart port control.</p> <p>To support their learning, students will engage in various in-class and website activities, including case studies and literature reviews of selected journal papers. They will also have the opportunity to hear from industry experts, with operators from ports that are invited to introduce the technology applications in smart ports.</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
	1. Course Work	60 %	✓	✓	✓	✓	✓	✓
	2. Examination	40 %	✓	✓	✓	✓	✓	✓
	Total	100 %						
<p>To reflect the significant technology content in this subject, 10% (or more) of the overall weighting of this subject is based on individual assessments concerning technology-related knowledge.</p> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Assessment: The assessment will be based on two components:</p> <p>a) A three-hour examination will contribute to a weight of 40% in the course. The objective of the examination is for students to review all concepts covered in the course one last time.</p> <p>b) Class discussions and individual assessments will each contribute to 10% of the final grade. A technology-focused group project will constitute 20% of the overall grade, testing students' application and communication of technological knowledge. The remaining 20% will be based on overall class participation.</p>								
Student Study Effort Expected	Class contact:							
	▪ Lectures / Tutorials	30 Hrs.						
	Other student study effort:							
	▪ Revision, doing exercises and cases	96 Hrs.						
	▪	Hrs.						
	Total student study effort		126 Hrs.					
Reading List and References	<p>1. 《港口论》，真虹，人民交通出版社，2022.</p>							

	<ol style="list-style-type: none"> <li data-bbox="635 210 1469 367">2. Douaioui, K., Fri, M., & Mabrouki, C. (2018, April). Smart port: Design and perspectives. In 2018 4th International Conference on Logistics Operations Management (GOL) (pp. 1-6). IEEE. <li data-bbox="635 398 1497 613">3. Yang, Y., Zhong, M., Yao, H., Yu, F., Fu, X., & Postolache, O. (2018). Internet of things for smart ports: Technologies and challenges. <i>IEEE Instrumentation & Measurement Magazine</i>, 21(1), 34-43. <li data-bbox="635 645 1465 801">4. Hsu, C. T., Chou, M. T., & Ding, J. F. (2023). Key factors for the success of smart ports during the post-pandemic era. <i>Ocean & Coastal Management</i>, 233, 106455. <li data-bbox="635 833 1506 990">5. Molavi, A., Lim, G. J., & Race, B. (2020). A framework for building a smart port and smart port index. <i>International Journal of Sustainable Transportation</i>, 14(9), 686-700. <li data-bbox="635 1021 1490 1236">6. Hirata, E., Watanabe, D., Lambrou, M., Banyai, T., Banyai, A., & Kaczmar, I. (2022). Shipping digitalization and automation for the smart port. In <i>Supply chain—recent advances and new perspectives in the industry 4.0 era</i>. IntechOpen.
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