The Hong Kong Polytechnic University

Subject Description Form

Subject Code	LGT5165
Subject Title	AI and Digitalisation in the Global Shipping Industry
Credit Value	3
Level	5
Normal Duration	1-semester
Pre-requisite / Co-requisite / Exclusion	Nil
Objectives	1. Critically analyse the principles and technologies of AI and digitalisation in the global shipping industry 2. Apply AI-driven tools and data analytics to optimise maritime operations, supply chains, and port management 3. Evaluate the impact of digitalisation on sustainability, efficiency, and regulatory compliance in shipping 4. Anticipate and innovate in response to emerging trends and technologies in the maritime sector
Subject Learning Outcomes	Upon completion of the subject, students will be able to: a. Analyse the foundational principles of AI and digitalisation and their relevance to the global shipping industry b. Evaluate the practical applications of AI and digitalisation in maritime operations, supply chain management, and port logistics c. Apply data management techniques and big data analytics to optimise shipping industry processes d. Assess the role of AI and digitalisation in enhancing port and terminal management efficiency and sustainability e. Predict and critique future trends and innovations in AI and digitalisation for the shipping industry f. Integrate quantitative AI-driven tools and methodologies to support decision-making in maritime contexts This subject contributes to the following Intended Learning Outcomes for the following programme(s): MSc/PgD in International Shipping and Transport Logistics (Mixed-mode/Full time Stream) #1 Demonstrate how international shipping functions (Learning Objective b)
Subject Synopsis/ Indicative Syllabus	Foundations of AI and Digitalisation • Introduction to AI, machine learning, and digitalisation in the shipping industry • Digital transformation of maritime supply chains Data-Driven Maritime Operations • Data management principles and big data analytics in shipping

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AI for route optimisation, fuel efficiency, and predictive maintenance
Emerging Technologies in Shipping
Blockchain, smart contracts, and their applications in trade and logistics
Autonomous shipping, robotics, and IoT in maritime operations
AI in Port and Terminal Management
AI-driven port logistics, cargo handling, and terminal automation
Digital twins and real-time monitoring in port operations
Sustainability and Regulatory Frameworks
AI for carbon monitoring, emissions accounting, and sustainability compliance
Regulatory and ethical considerations in AI and digitalisation
Cybersecurity in Digital Shipping
Cybersecurity risks and mitigation strategies in digital maritime systems
Future Trends and Innovations
Emerging AI trends, such as newer Gen AI tools and advanced robotics
Strategic capability of digitalisation in global shipping
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<tr><td>Teaching/Learning Methodology</td><td>
The subject employs a blended teaching and learning approach to encourage critical thinking, practical skills, and industry readiness:
Lectures: Introduce AI and digitalisation concepts, supplemented by real-world examples from the shipping industry
Case-studies and group discussions: Analyse real and hypothetical maritime scenarios to apply AI and digitalisation concepts, encouraging peer learning and problem-solving
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<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr>
<tr><td>1. Coursework</td><td>50%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Examination</td><td>50%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
A group assignment will be designed for an AI-driven solution for a shipping industry challenge (e.g., route optimisation, port automation)

To reflect the significant technology content in this subject, 10% (or more) of the overall weighting of this subject is based on individual assessment concerning technology-related knowledge.
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<tr><td>Student Study Effort Expected</td><td>
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<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>39 Hrs.</td></tr>
<tr><td>▪ Assignments</td><td>42 Hrs.</td></tr>
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<tr><td>Other Student study effort</td><td></td></tr>
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	Self-study / Research for self-learning tasks	39 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Recommended reading** Lind, M., Michaelides, M., Ward, R., Watson, R.T., (2020): *Maritime Informatics: Additional Perspectives and Applications*. Springer Findlay, S. (2021). *Artificial Intelligence and Machine Learning for Business: A No-Nonsense Guide to Data Driven Technologies*. 4th Ed., Preston. Clarkson SEA (2024). *Why Digitise Your Contract Management*. Blog, Clarkson SEA platform **Periodicals** ▪ Tradewinds ▪ Clarkson SEA ▪ Clarkson Shipping Intelligence Network	