

Course title	Ship Operations, Optimizing Performance and Analytics				
Course code	SOM1704				
Course type	Special Background/Skills Development/Core course				
Level	Master (Level 7)				
Year / Semester	1/2				
Teacher's name	Yiannis Filippopoulos				
ECTS	10	Lectures / week	6 in total (distance learning)	Laboratories / week	-
Course purpose and objectives	<p>After taking this course student will be able to understand the players and processes involved in ship operations and management practice. Students will know the different types of charter, the conditions and respective obligations, responsibilities and accountabilities in charter party contracts. Moreover, students will know the different types of shipping costs and how they are classified. Students will also appreciate the concepts of laytime and off-hire in voyage and time chartering. Furthermore, students will know who regulates shipping and how maritime regulations affect maritime competitiveness and economics. Also, they will get familiar with the various international conventions and also, they will be able to understand the importance of safety management in ship operations and to develop knowledge on the necessary practices that shipping firms need to adopt in order to improve their performance and competitiveness. After taking the course students will be able to understand how data analytics increases the owners and charterers value, by influencing decisions across the various business functions of the marine business, such as voyage management, vessel operations and manning, as well as chartering and third-party risk assessment.</p> <p>Operations management is central to ship management services and involves the implementation of operations for the fulfilment of the agreed fixture. The aim of this course is to provide in-depth and holistic understanding of charter markets, chartering practice and charter party analysis in the dry cargo and tanker shipping markets.</p> <p>The management of shipping operations requires integrative knowledge that spans across disciplines and needs varied experiences. It requires shipping operations personnel to have the specific knowledge and experience and excellence with aspects of management, economics, engineering, technology and law, including information and communication systems.</p> <p>More specifically, this course enables students to understand the fundamental principles of ship operations management including the organization of ship management companies, criteria for ship management selection, ship</p>				

costs including capital, operating and voyage costs, ship operations, crew and technical management functions, ship registration, management of safety and environmental protection and prevention of pollution including relevant international conventions and regulations.

The course will help students develop and apply knowledge and skills in ship intelligence and data analytics. Ships generate a large volume of data from different sources and in different formats. Big data analysis discovers correlations between different parameters to determine hidden patterns and trends. This analysis will have a significant impact on vessel performance monitoring and provide performance prediction, real-time transparency, and decision-making support to the ship operator. Big data will also increase the capability of performance monitoring, remove human error and increase interdependencies of components.

The aim of this course is to provide in-depth and holistic understanding of ship operations and management, safety management, ship registration, and management of big data for analytics in ship management.

The aim of this course is to familiarize students with the concepts and techniques for effective ship operations management and the use of data analytics for improving shipping operations. The course aims to fulfil the following objectives:

- Provide in-depth understanding of the ship management market and ship management functions and operations
- Describe and analyze the costs in ship operation
- Explain the functions of ship operations, crewing operations, technical operations and superintendence
- Introduce the concepts of ship registration
- Facilitate in-depth understanding of issues pertaining to the management of safety and pollution prevention in shipping
- Introduce aspects of measuring, managing and improving ship operation performance.
- Use performance monitoring and condition-based maintenance tools to cut costs, head off breakdowns and find efficiencies
- Apply predictive data analytics methods to vessel data to predict optimal maintenance times to achieve longer equipment life cycles, lower maintenance and replacement costs.
- Analyze real-time data streams looking for patterns and early hints of problems, identify patterns, and unearth valuable insights to improve decision-making and minimize risks.

Learning outcomes

After completing this module, the student should be able to:

- Understand the shipping management, structure and operations. Be familiar with Maritime Terms and Abbreviation
- Describe the departments of shipping companies, evaluate daily costs and understand the different markets (dry cargoes, tanker etc.)
- Describe the processes and thinking of Shipping Industry
- Recognize and analyse inputs, outputs and automated data from/to ship and shipping management company.
- Understand the needed data analytics in Shipping Management
- Luxuriate in-depth and holistic understanding of charter markets, chartering practice and charter party analysis in the dry cargo and tanker shipping markets

	<ul style="list-style-type: none"> • Apply predictive data analytics methods to vessel data to predict optimal maintenance times to achieve longer equipment life cycles, lower maintenance and replacement cost 		
Prerequisites	None	Required	-
Course content	<p>The content of the course is as follows:</p> <ul style="list-style-type: none"> • Management of Ships Costs and Operations, Departmentalisation • Ship Management: Process Design • Shipping Company Introduction and Environment • Ship Registration, Maritime Documentation & Organizations • Human Resources Management, The Ship-Vessel • Technology and Automation in Shipping Management • Internet of Vessels • Shipping Industry's Digital Transformation Intelligence Maritime Systems • Data Analytics in Ship Management & Safety Management of shipping companies • Mini Intranet InfoNet • Cyber Security & Vessels • Performance Monitoring and Optimization 		
Teaching methodology	<p>The integration of Microsoft Teams and Moodle in our distance learning programs ensures a robust and interactive learning environment that meets the needs of modern learners. Microsoft Teams facilitates real-time communication through live sessions, screen sharing, and collaborative tools such as whiteboards and breakout rooms, enhancing student engagement and fostering dynamic discussions. Meanwhile, Moodle serves as a comprehensive Learning Management System, offering structured access to course materials, assessments, and discussion forums. This combination of synchronous and asynchronous tools supports effective teaching and learning, enabling flexibility, accessibility, and high-quality education delivery. Our approach aligns with global standards for online learning, emphasizing both technological innovation and pedagogical excellence.</p>		
Bibliography	<ul style="list-style-type: none"> • Panayides Ph. (2017), Shipping Operations Management, Springer; Switzerland. • Branch, A. E. (1996), Elements of Shipping, 7th ed., London: Chapman & Hall. • Panayides, Ph. M. (2001), Professional Ship Management: Marketing and Strategy, Aldershot: Ashgate. • Panayides, Ph.M. (2018), Routledge Handbook of Maritime Management, London: Routledge. • Willingale, M. (1998), Ship Management, 3rd ed., London: LLP Ltd 		

	<ul style="list-style-type: none"> • Visvikis, I. and Panayides, Ph.M. (2017), <i>Shipping Operations Management</i>, Netherlands: Springer. • Grammenos, C. Th. (2002), <i>The Handbook of Maritime Economics and Business</i>, London: LLP Ltd. • Alessandrini, A. et al., 2016, "Mining Vessel Tracking Data for Maritime Domain Applications", 2016 IEEE 16th International Conference on Data Mining Workshops (ICDMW), pp. 361-367. • Ben Ayed, A., Ben Halima, M., Alimi, A. M., 2015, "Big Data Analytics for Logistics and Transportation", 4th IEEE International Conference on Advanced logistics and Transport. • Brandsæter, A., Manno, G., Vanem, E., Glad, I. K., 2016, "An application of sensor-based anomaly detection in the maritime industry", IEEE International Conference on Prognostics and Health Management (ICPHM) • Akam, V. (2016) <i>Big Data Analytics</i>, Packt Publishing, UK. • Perera, L. P. (2017). Handling big data in ship performance and navigation monitoring. <i>Smart Ship Technology</i>, 89-97. • Brouer, B. D., Karsten, C. V., Pisinger, D., 2016, Big Data Optimization in Maritime Logistics, Big Data Optimization: Recent Developments and Challenges. • O.J. Rodseth, L.P. Perera, and B. Mo, "Big data in shipping - Challenges and opportunities," the 15th International Conference on Computer Applications and Information Technology in the Maritime Industries (COMPIT 2016), Lecce, Italy, 2016.
Assessment	<ul style="list-style-type: none"> • Weekly Self-Assessment Activities (10%) • Final Project (30%) • Final assignment (60%)
Language	English