

Course Title	Ship Operations Management and Data Analytics				
Course Code	SOM 004				
Course Type	Lecture				
Level	Postgraduate				
Year / Semester	1 <sup>st</sup> / 1 <sup>st</sup>				
Teacher's Name	Dr. Stelios Alexandrou / Dr Nicholas Anastasiou				
ECTS	10	Lecture hours (total)	10 hours	Laboratory hours (total)	6 hours
Course Purpose and Objectives	<p>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:</p> <ul style="list-style-type: none"> <li>• Provide in-depth understanding of the ship management market and ship management functions and operations</li> <li>• Describe and analyze the costs in ship operation</li> <li>• Explain the functions of ship operations, crewing operations, technical operations and superintendence</li> <li>• Introduce the concepts of ship registration</li> <li>• Facilitate in-depth understanding of issues pertaining to the management of safety and pollution prevention in shipping</li> <li>• Introduce aspects of measuring, managing and improving ship operation performance.</li> <li>• Use performance monitoring and condition-based maintenance tools to cut costs, head off breakdowns and find efficiencies</li> <li>• Apply predictive data analytics methods to vessel data to predict optimal maintenance times to achieve longer equipment life cycles, lower maintenance and replacement costs.</li> <li>• 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.</li> </ul>				
Learning Outcomes	<p>This course enables students to demonstrate the fundamental principles of ship operations management including the organization of ship management companies, criteria for ship management selection, ship 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.</p> <p>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</p>				

	capability of performance monitoring, remove human error and increase interdependencies of components.		
Prerequisites	None	Required	Maritime Economics
Course Content	<p><b>1. Management of Ships: Costs and Operations</b>  Ship's costs, Capital costs, Operating costs, Voyage costs</p> <p><b>2. Ship management</b>  Ship management defined, reasons for outsourcing  Growth of ship managers, ship management functions  Ship operations  Crew management, STCW  Technical management, ISM Code and quality assurance  SHIPMAN, CREWMAN  Organizational structures  Ship management market analysis  Criteria for selection and evaluation of ship managers  Ship managers' competitiveness</p> <p><b>3. Ship registration</b>  Ship registration Where to register?  Types of ship registers Open registers and international registers  Flags of convenience Factors influencing choice of ship registry  Comparison of international ship registers Trends in ship registration and ownership  Types of ship registry Criteria for ship registration; factors influencing choice  Flag choice and implications  Parallel registration  Open registries and second international ship registries</p> <p><b>4. Safety management</b>  Safety in maritime transportation Risk analysis in maritime transportation  Safety of Life at Sea (SOLAS) International Safety management (ISM) Code  Role of classification societies Flag state control and ship safety  Port state control and ship safety</p> <p><b>5. Data Analytics in Ship Management</b>  Applying data analytics methods to vessel &amp; weather data bases to optimize vessel performance  Applying predictive data analytics methods to vessel data to predict optimal maintenance times to achieve longer equipment life cycles, lower maintenance and replacement costs.  Use performance monitoring and condition-based maintenance tools to cut costs, head off breakdowns and find efficiencies  Analyze real-time data streams looking for patterns and early hints of problems, identify patterns, and unearth valuable insights to improve decision-making  Providing ship managers with "actionable" information by automatically analysing a broad swath of real-time data using a variety of reporting and comparison tools and dashboards</p> <p><b>6. Ship operations management</b></p>		

	<p>Tanker Management and Self-Assessment (TMSA)  Shipping regulation, regulatory role of flag, coastal and port states  International Conventions  Ship shore communications  Classification societies and their role  Port state control  Accidents in international shipping</p>
<p>Teaching Methodology</p>	<ul style="list-style-type: none"> <li>• Audiovisual lectures</li> <li>• Class exercises</li> <li>• Assignment guidance</li> <li>• Continuous criticism and evaluation of marine insurance</li> <li>• Extensive reference to international literature</li> <li>• Live sessions</li> </ul>
<p>Bibliography</p>	<p>Akam, V. (2016) <i>Big Data Analytics</i>, Packt Publishing, UK</p> <p>Anastasiou, J. (2017) “Crew Operations Management”, in Visvikis, I.D. and Panayides, Ph.M. (eds), <i>Shipping Operations Management</i>, Springer; Switzerland (pp. 47-72).</p> <p>Assimenos, N. (2017) “Commercial Operations Management”, in Visvikis, I.D. and Panayides, Ph.M. (eds), <i>Shipping Operations Management</i>, Springer: Switzerland (pp. 73-98).</p> <p>Branch, A. E. (1996), <i>Elements of Shipping</i>, 7<sup>th</sup> ed., London: Chapman &amp; Hall.</p> <p>Farthing, B. (2001), <i>International Shipping</i>, London: LLP Ltd.</p> <p>Furnival, D. and Crispe, J. (2017) “Technical Operations Management”, in Visvikis, I.D. and Panayides, Ph.M. (eds), <i>Shipping Operations Management</i>, Springer; Switzerland (pp. 99-128).</p> <p>Gorton, L., Ihre, R., Sandevan, A. (1990), <i>Shipbroking and Chartering Practice</i>, 3<sup>rd</sup> ed., London: Lloyd’ of London Press.</p> <p>Grammenos, C. Th. (2002), <i>The Handbook of Maritime Economics and Business</i>, London: LLP Ltd.</p> <p>Kendall, L. C. and Buckley, J. J. (1994), <i>The Business of Shipping</i>, 6<sup>th</sup> ed., Maryland: Cornell Maritime Press.</p> <p>Panayides, Ph. M. (2001), <i>Professional Ship Management: Marketing and Strategy</i>, Aldershot: Ashgate.</p> <p>Panayides, Ph. M. (2017) “Fundamentals of Ship Management”, in Visvikis, I.D. and Panayides, Ph.M. (eds), <i>Shipping Operations Management</i>, Springer; Switzerland (pp. 1-24).</p> <p>Pastra, A., Gkliatis, I. and Koufopoulos, D.N. (2017) “Organisational behaviour in Shipping” in Visvikis, I.D. and Panayides, Ph.M. (eds), <i>Shipping Operations Management</i>, Springer; Switzerland (pp. 25-47).</p> <p>Visvikis, I. and Panayides, Ph.M. (2017), <i>Shipping Operations Management</i>, Netherlands: Springer. (ISBN: 9783319623658)</p>

	<p>Vouros, G.A., Doulkeridis, C., Santipantakis, G. and Vlachou, A. (2018) Taming Big Maritime Data to Support Analytics, in Popovich et al (eds.), <i>Information Fusion and Intelligent Geographic Information Systems</i>, Netherlands: Springer</p> <p>Willingale, M. (1998), <i>Ship Management</i>, 3<sup>rd</sup> ed., London: LLP Ltd</p>
Assessment	<ul style="list-style-type: none"> <li>• 2 Assignments            30%</li> <li>• Final Examination       70%</li> </ul>
Language	Greek & English