

Course Title	Mathematics I					
Course Code	MANS-101					
Course Type	Required					
Level	1 <sup>st</sup> Cycle					
Year / Semester	1 <sup>st</sup> Year, Fall Semester					
Teacher's Name	Mrs. Panayiota Argyrou					
ECTS	5	Theory	Laboratory	Simulation	Tutorial	Seminar
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Course Purpose and Objectives	<p>The main objectives of the course are</p> <ul style="list-style-type: none"> <li>• basic arithmetical operations;</li> <li>• arithmetical expressions;</li> <li>• basic algebra</li> <li>• linear and quadratics equations and methods of solution</li> <li>• basic statistical methods</li> </ul>					
Learning Outcomes	<p>After completion of the course students are expected to be able to:</p> <ul style="list-style-type: none"> <li>• be proficient in calculations involving the basic arithmetical operations and algebra essentials;</li> <li>• deal with arithmetical expressions involving the use of brackets;</li> <li>• construct graphs of linear and polynomial expressions</li> <li>• solve problems in algebra.</li> <li>• perform basic interpolation of functions</li> </ul>					
Prerequisites	None	Required		MANS -102,		
Course Content	<p><b>1. ALGEBRA</b></p> <ul style="list-style-type: none"> <li>• sums, differences, products and quotients of simple algebraic expressions, including simple fractions</li> <li>• expansion of the square and the cube, the difference of squares and cubes, the summation of cubes</li> <li>• extraction of common factors, simplification of expressions and collection of common terms</li> </ul>					

- solution of problems leading to linear equations, solution of systems of two equations in two unknowns
- quadratic equations
- 'absolute error' and 'relative error'
- percentage errors in areas and volumes

## **2. GRAPHS**

- draws and labels axes
- defines 'origin', 'abscissa', 'ordinate', and describes how a point is identified by its Cartesian co-ordinates
- determines suitable scales from given data
- plots points, given their Cartesian co-ordinates
- draws a smooth curve through plotted points
- given the abscissa, reads the value of the ordinate and vice versa
- extracts values from graphs of ship's data
- draws graphs of given functions
- solves simultaneous equations graphically

## **3. PROPORTION , VARIATION AND INTERPOLATION**

- defines the ratio of two quantities, and uses the notation  $a : b = a/b$
- uses the notation  $a:b :: c:d$  and states that it is equivalent to  $a/b = c/d$
- given any three quantities of a proportional equation, calculates the fourth
- explains that map and drawing scales are expressed as ratios
- solves problems involving scales
- states that two quantities which vary so as to maintain a constant ratio are said to vary directly
- states that a quantity is said to vary inversely as another when it varies directly as the reciprocal of the other
- states that a quantity is said to vary jointly as a number of others when it varies directly as their product

	<ul style="list-style-type: none"> <li>• solves problems on direct, inverse and joint variation explains what is meant by linear interpolation</li> <li>• shows how linear interpolation is an application of proportion</li> <li>• uses linear interpolation to find intermediate values in tables such as ullage tables and deadweight scales</li> <li>• given intermediate values, performs inverse interpolation to find the value of the argument</li> <li>• uses differences in inverse interpolation</li> <li>• describes the arrangement and use of critical tables</li> <li>• interpolates in tables with two arguments</li> <li>• given the value of one argument, uses inverse interpolation to find the value of the other argument</li> <li>• performs linear extrapolation</li> <li>• explains, with the aid of a diagram, how the linear assumption may lead to error in the interpolated value</li> <li>• states that the intervals of arguments used in navigational tables are sufficiently small that linear interpolation produces negligible errors</li> </ul>																				
Teaching Methodology	Lectures and Assignments																				
Bibliography	<p><b>Required Textbooks/Reading:</b></p> <table border="1"> <thead> <tr> <th>Authors</th> <th>Title</th> <th>Publisher</th> <th>Year</th> <th>Library Access</th> </tr> </thead> <tbody> <tr> <td>M. Sullivan and M. Sullivan III</td> <td>Precalculus</td> <td>Pearson</td> <td>2017 7<sup>th</sup> Edition</td> <td>Print copy at library</td> </tr> </tbody> </table> <p><b>Recommended Textbooks/Reading:</b></p> <table border="1"> <thead> <tr> <th>Authors</th> <th>Title</th> <th>Publisher</th> <th>Year</th> <th>Library Access</th> </tr> </thead> <tbody> <tr> <td>M. Bittinger, J. Beecher, D. Ellenbogen, J. Penna</td> <td>Precalculus: Graphs and Models</td> <td>Pearson</td> <td>2017 6<sup>th</sup> Edition</td> <td>Print copy at library</td> </tr> </tbody> </table>	Authors	Title	Publisher	Year	Library Access	M. Sullivan and M. Sullivan III	Precalculus	Pearson	2017 7 <sup>th</sup> Edition	Print copy at library	Authors	Title	Publisher	Year	Library Access	M. Bittinger, J. Beecher, D. Ellenbogen, J. Penna	Precalculus: Graphs and Models	Pearson	2017 6 <sup>th</sup> Edition	Print copy at library
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Assessment	Midterm Exam, Final Exam, Assignments																				
Language	English																				