

Course unit title:	Mathematics and Modelling for Games Programming
Course unit code:	MAT350
Type of course unit: (Compulsory/optional)	Optional
Level of course unit: (First, second or third cycle)	Bachelor (1st cycle)
Year of study:	3
Semester when the unit is delivered:	5 or 6 or 7 or 8
Number of ECTS credits allocated:	6
Name of lecturer(s):	TBA
Learning outcomes of the course unit:	
<p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> • Demonstrate an overall understanding of the mathematics required in games programming • Describe the basic concepts of vector calculus and analytic geometry. • Describe the algebra of matrices and their operations and the fundamentals on linear transformations • Explain motion in 2 and 3 dimensions • Discuss Newton's Laws of motion • Identify collision detection via matrix operations 	
Mode of delivery:	Face- to- face
Prerequisites and co-requisites:	CSC205, MAT206
Recommended optional program components:	None
Course Contents:	
<p>Objective: This course provides the essential mathematics, modelling and a certain amount of physics required for games programming.</p> <p>Description: Analytic geometry: Vectors, Dot product, Cross product, Vector spaces, Trigonometry Linear Algebra: Matrices and Matrix operations (Addition, subtraction, multiplication, product with scalars, transpose, inversion, adjoint), Linear systems and Cramer's rule</p>	

<p>Transformations using homogeneous coordinates and matrices Applications to Collision Detection The Lagrange Interpolant, Non-linear interpolation, Bezier polynomials and curves Newton's Laws of motion</p>							
<p>Recommended or required reading:</p>	<p>Lengyel, E., MATHEMATICS FOR 3D GAME PROGRAMMING AND COMPUTER GRAPHICS, 3rd edition, Course Technology, Cengage Learning Publishers 2012</p> <p>Van Verth, J., Bishop, L., ESSENTIAL MATHEMATICS FOR GAMES AND INTERACTIVE APPLICATIONS, A PROGRAMMER'S GUIDE, 2nd edition, Morgan Kaufmann Publishers 2008</p>						
<p>Planned learning activities and teaching methods:</p>	<table border="1"> <tr> <td>Class Instruction</td> <td>42 Hours</td> </tr> <tr> <td>Consultations/Computer Lab</td> <td>20 Hours</td> </tr> </table>	Class Instruction	42 Hours	Consultations/Computer Lab	20 Hours		
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<p>Assessment methods and criteria:</p>	<table border="1"> <tr> <td>Examinations</td> <td>75%</td> </tr> <tr> <td>Assignments/Quizzes</td> <td>25%</td> </tr> <tr> <td></td> <td>100%</td> </tr> </table>	Examinations	75%	Assignments/Quizzes	25%		100%
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	100%						
<p>Language of instruction:</p>	<p>English</p>						
<p>Work placement(s):</p>	<p>No</p>						
<p>Place of Teaching:</p>	<p>Computer Laboratory European University Cyprus, Nicosia</p>						