MULTIMEDIA UNIVERSITY®

COURSE INFORMATION

1 .	**Name of Course**	Game Physics
2 .	**Course Code**	TGD2251
3 .	**Type of Course** (e.g. : Core, major, elective etc.)	Specialization Elective (BCS - Game Development)
4 .	**Synopsis**	To equip the students with necessary physics concepts and apply them in game development.
5 .	**Version** (State the date of theSenate's approval - previous and the current approval date)	Current: January 2018 Previous: June 2016
6 .	**Name(s) of Academic Staff**	Wong Ya Ping Junaidi bin Abdullah
7 .	**Semester and Year Offered**	Trimester 2 (Delta)
8 .	**Credit Value**	4 credit hours
9 .	**Pre-Requisite**	TMA1101 Calculus and TCP1101 Programming Fundamentals
10 .	**Objective of the course in the programme:** • To expose students to the importance of mathematics and physics in game design and development. • To introduce students to frequently used physics concepts and formulas to improve game-play. • To develop the skills to analyse problems and implement appropriate algorithms when creating games	
11 .	**Justification for including the course in the programme:** To provide students sufficient knowledge and skills to implement physics in game development.	

12 .	**Course Learning Outcomes (CLO)**	**Domain**	**Level**
	CLO1: recognize the role of physics and mathematics in game development	Cognitive	2
	CLO2: apply physics concepts in the design and development of games to enhance game-play	Cognitive	3
	CLO3: analyze specific game situations and apply appropriate game physics to them	Cognitive	4
	CLO4:		

13 . **Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment:**

Course Learning Outcomes (CLO) (Must tally with CLOs in item 12)	Programme Learning Outcomes (PLO)												Teaching Methods	Assessment Method
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
CLO1							✔						Lecture / Practical	Quizzes / Tests
CLO2								✔					Lecture / Practical	Assignments
CLO3									✔				Lecture / Practical	Assignments
Total							1	1	1				*Indicate the relevancy between the CLO and PLO by ticking "✔" the appropriate relevant box (This description must be read together with standards 2.1.2, 2.2.1, and 2.2.2 in Area 2 – pages 16 & 18 of COPPA 2.0)*	

14 .	**Transferable Skills:** Transferable Skill: Critical thinking How it is developed: Through discussion on given case study and report writing Assessment: Presentation and written report Transferable Skill: Teamwork, Communication and Listening How it is developed: Through group project and discussion Assessment: Project

15 . **Distribution of Student Learning Time (SLT)**

	Course Content Outline	**CLO	Teaching and Learning Activities Guided Learning (F2F)*				Guided Learning (NF2F)*	Independent Learning (NF2F)*	Total SLT
			*L	*T	*P	*O			
1	**Introduction to Game Physics** The importance of physics to games, and a brief history. Overview of the current state of the art, software and hardware.	1	1		0			1	2
2	**Mathematical Concepts** Units and measurements. Scientific notation. Coordinate systems. Scalars and vectors. Matrices. Derivatives. Differential equations.	1, 2	2		2		2	4	10
3	**Newtonian Mechanics** Inertia (1st Law). Force. Mass and acceleration (2nd Law). Equal and opposite forces (3rd Law). Types of forces. Work. Energy. Power.	1, 2	3		4		2	7	16
4	**Basic Kinematics** Translational motion. Spring motion. Rotational motion. Torque. Angular acceleration. Rigid body motion. Rolling motion.	1, 2	3		4		2	7	16
5	**Projectiles** Modeling projectile motion. Gravity only model of projectiles. Aerodynamic drag on motion. Wind effect on motion. Spin effects on motion.	1, 2, 3	5		5		4	10	24
6	**Collisions** Conservation of linear momentum. Elastic and inelastic collision. 2D and 3D collision. Frictional effects. Collision detection.	1, 2, 3	3		4		2	7	16
7	**Basic Quaternions** Introduction to quaternions. Quaternion representations. Quaternion operations.	1, 2, 3	2		1		2	3	8

No	Topic	L	T	P	O	CLO	F2F	Total SLT
8	**Case Studies of Games Applications** Ball games. Car racing simulations. Airplane flight simulations. Weaponry. Explosions.	3	3	3		4	6	16
							Total SLT	108

SUMMATIVE ASSESSMENT

1. Continuous Assessment	Percentage %	Total SLT
Quizzes	10%	6
Assignments	70%	36
Tests	20%	10
Total SLT for Continuous Assessment		**52**

2. Final Assessment	Percentage %	Total SLT F2F	Total SLT ILT
Final Exam			
Total SLT for Final Assessment (F2F + NF2F)		**0**	

Grand Total	**100%**	**160**

**Indicate the CLO based on the CLO's numbering in Item 12.
*L= Lecture, *T= Tutorial, *P= Practical, *O= Others, F2F*= Face to Face, NF2F*= Non Face to Face

16 .	**Identify Special Requirement to Deliver the Course (e.g., software, nursery, computer lab, simulation room):** Computer Lab
17 .	**Main References:** Palmer, G. Physics for Game Programmers, Apress, 2005.
18 .	**Additional References:** Bourg, D. Physics for Game Developers, O'Reilly Media, Inc., 2001. Eberly, D.H. Game Physics, Morgan Kaufmann, 2003.

Note:

Cells shaded light grey contain formulas / fixed values. Edit these formulas only if needed.