

Subject Description Form

Subject Code	COMP4122
Subject Title	Game Design and Development
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite: COMP2011
Objectives	<p>The objectives of this subject are to:</p> <ol style="list-style-type: none"> 1. To provide students with a broad view of the nature of computer games and digital entertainment; 2. To equip students with the knowledge and skills in the analysis, design and development of interactive computer games and virtual reality applications; 3. To allow students to explore and use the different algorithms, techniques and tools in rendering and producing animations in 3D computer games; 4. To equip students with knowledge in game AI, multi-user games and networking games; 5. To guide students to study and evaluate the social impact of computer game.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <p><u>Professional/academic knowledge and skills</u></p> <ol style="list-style-type: none"> (a) understand the history, evolution and recent development in computer games; (b) understand the overall hardware and software architecture of a typical 3D computer game; (c) familiarize with the different practical analysis, design and implementation techniques that apply to the development of computer games across different platforms; (d) learn game design, testing, and playability principles; (e) learn the computing game programming aspects, such as event loops, execution threads, rendering, animation, terrain and background representation, polygonal models, texturing, collision detection and physically-based modeling, game AI, and multi-user games and networking; (f) understand the social impact of computer games; <p><u>Attributes for all-roundedness</u></p> <ol style="list-style-type: none"> (g) work in a team to build a 3D computer game; (h) communicate effectively and present, both in terms of an oral presentation and a written report, the result of developing a 3D computer game; (i) appreciate the broader perspectives of digital entertainment, and social

	impact of computer games.																																																				
Subject Synopsis/ Indicative Syllabus	<ol style="list-style-type: none"> 1. Introduction and game history. Early origins of video games and computer game design and programming; arcade games; some popular home game systems; game design methodology and principles; current development in computer game industry. 2. Game software, hardware and platforms. Different game platforms: Web-based, console-based (e.g., play station, X-box, Wii), PC-based, handheld games, mobile and wireless game platforms. 3. Game design principles. Game psychology and game sociology. Human characteristics as information processors and players in gaming environment. Cognitive principles for game design. 4. Programming and implementation techniques in computer games. 3D models, geometry, rotation, and quaternion interpolation; camera control, texturing, terrain, lighting, level of details (LOD), collision detection; shading, non-photorealistic rendering, image-based rendering. 5. Game behavior and game AI. Algorithms in game animations: acceleration, motion analysis, game physics, path finding, chasing and evading, pattern movement, flocking, obstacle avoidance, swarming, learning the opponent behaviors; search and heuristics in games, finite state machines, decision trees. 6. Languages and tools in game programming. Java 3D, Maya, 3D studio max, VRML, XNA, Virtools, and other authoring tools for various components in the game, such as graphics, audios, sound digitizer, and the like. 7. Social impacts of computer games. Gender, race, social and cultural characteristics in computer games; youth violence and digital entertainment software rating; future of computer games. 																																																				
Teaching/Learning Methodology	<p>Lectures During the lectures, students will come across the common concepts, methods, and issues in computer game analysis, design and development, and will be supplemented by exercises in games evaluation, and development.</p> <p>During the labs / tutorials, students will have the opportunity to practice, apply, and present what they have learned, and form in groups to develop a computer game which forms a major output of this subject.</p>																																																				
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1"> <thead> <tr> <th data-bbox="440 1675 703 1854" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="708 1675 868 1854" rowspan="2">% weighting</th> <th colspan="9" data-bbox="873 1675 1473 1778">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="873 1785 935 1854">a</th> <th data-bbox="940 1785 1002 1854">b</th> <th data-bbox="1007 1785 1069 1854">c</th> <th data-bbox="1074 1785 1136 1854">d</th> <th data-bbox="1141 1785 1203 1854">e</th> <th data-bbox="1208 1785 1270 1854">f</th> <th data-bbox="1275 1785 1337 1854">g</th> <th data-bbox="1342 1785 1404 1854">h</th> <th data-bbox="1409 1785 1473 1854">i</th> </tr> </thead> <tbody> <tr> <td data-bbox="440 1861 703 1964">Continuous Assessment</td> <td data-bbox="708 1861 868 1964">55</td> <td data-bbox="873 1861 935 1964">✓</td> <td data-bbox="940 1861 1002 1964">✓</td> <td data-bbox="1007 1861 1069 1964">✓</td> <td data-bbox="1074 1861 1136 1964">✓</td> <td data-bbox="1141 1861 1203 1964">✓</td> <td data-bbox="1208 1861 1270 1964">✓</td> <td data-bbox="1275 1861 1337 1964">✓</td> <td data-bbox="1342 1861 1404 1964">✓</td> <td data-bbox="1409 1861 1473 1964">✓</td> </tr> <tr> <td data-bbox="440 1971 703 2074">Final Examination</td> <td data-bbox="708 1971 868 2074">45</td> <td data-bbox="873 1971 935 2074">✓</td> <td data-bbox="940 1971 1002 2074">✓</td> <td data-bbox="1007 1971 1069 2074">✓</td> <td data-bbox="1074 1971 1136 2074">✓</td> <td data-bbox="1141 1971 1203 2074">✓</td> <td data-bbox="1208 1971 1270 2074">✓</td> <td data-bbox="1275 1971 1337 2074"></td> <td data-bbox="1342 1971 1404 2074"></td> <td data-bbox="1409 1971 1473 2074"></td> </tr> </tbody> </table>											Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)									a	b	c	d	e	f	g	h	i	Continuous Assessment	55	✓	✓	✓	✓	✓	✓	✓	✓	✓	Final Examination	45	✓	✓	✓	✓	✓	✓			
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	Total	100 %	
	<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Students need to complete a major game development project starting from concept development, tools and techniques analysis and final implementation in an appropriate setting and platform. This project is used to develop students' ability in game design and development.</p> <p>Students also need to complete a survey / evaluation of some popular computer games in the market based on the principles, concepts and techniques learnt in class. This will help student to apply all these learning in analyzing real products in the market.</p> <p>Students also need to get familiar with some successful / popular games by playing them using the game lab facilities so as to understand the characteristics and limitations as a game player and game designer of computer games.</p>		
Student Study Effort Expected	Class contact:		
	Lecture		26 Hrs.
	Tutorial/Lab		13 Hrs.
	Other student study effort:		
	Courseworks and project		80 Hrs.
	Total student study effort		119 Hrs.
Reading List and References	<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Rick Rarent, Computer Animation: Algorithms and Techniques, 2nd Edition, 2008. 2. Rob Miles, Microsoft XNA Game Studio 4.0: Learning Programming Now, Microsoft Press, 2011. 3. Daniel Liu and Shaun Le Lacheur Sales, Virtools Fundamentals, Axis 3D Technology Inc., 2007 		