Description: Computer Games Programming

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
<th>Units</th>
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<td>CSC</td>
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<td>45296</td>
<td>2, 2005</td>
<td>EXT</td>
<td>1.00</td>
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Academic group: FOSCI
Academic org: FOS003
Student contribution band: 2
ASCED code: 020115

STAFFING
Examiner: Penny de Byl
Moderator: Mike McFarlane

REQUISITES
Pre-requisite: CSC1401 and CSC2402

OTHER-REQUISITES
Recommended Pre-requisite: CSC3405 or CSC3406

RATIONALE
Computer games have evolved from being developed by individuals and novice programmers to major commercial projects produced by teams of 20 or more people working, in some cases, for years on a particular product. It is a rapidly growing industry, employing large numbers of people. As the complexity of games has increased, development roles have become more defined and games' programmers now need to have clearly marked areas of specialist knowledge and skills. With an increasing interest in games research arising in Universities, it is essential today's games' programmers not only know how to work with the traditional fundamentals of games programming but also have a firm basis of knowledge in theoretical academic techniques in order to implement them in the games of the future.

SYNOPSIS
This course brings the current research and tools for creating computer games and presents them to the student in a tutorial-based approach. It provides an in-depth examination of 3D game environment modelling, player behaviour and believable character development. It will cover areas of particular interest to the International Game Developers Association such as pathfinding, decision trees, finite state machines, rule-based systems and goal-oriented action planning. In particular, the focus will be on the development of higher-level artificial intelligence, such as believable and interesting non player characters that learn and have emotions with complex reasoning and interaction skills. This course follows the creation of a gaming environment from the modelling of character avatars through their animation, placement in a 3D Quake-like
environment to the development of believable character behaviours with techniques for learning, socialising, communicating and navigating.

OBJECTIVES

On completion of this course students will be able to:

1. discuss the theoretical aspects of computer games design and programming;
2. describe the important techniques that facilitate implementation of efficient algorithms in games programming;
3. discuss games genre, player requirements and suspension of disbelief;
4. use traditional and contemporary artificial intelligence techniques in games programming;
5. build a 3D gaming environment;
6. demonstrate the modelling process of a 3D character avatar and discuss body proportions and environmental influences on body posture;
7. immerse and animate a 3D character avatar in a 3D gaming environment;
8. discuss the issues relevant to suspension of disbelief and the creation of believable gaming environments; and
9. claim practical experience with games programming.

TOPICS

<table>
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<th>Description</th>
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<tbody>
<tr>
<td>Introduction</td>
<td>5.00</td>
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<tr>
<td>3D modelling, human proportions, body language and kinematics</td>
<td>15.00</td>
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<tr>
<td>Games theory and competitive human behaviour</td>
<td>15.00</td>
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<tr>
<td>Knowledge representation and reasoning techniques</td>
<td>15.00</td>
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<tr>
<td>Game specific artificial intelligence techniques</td>
<td>20.00</td>
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<tr>
<td>Agent architectures</td>
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<tr>
<td>Suspension of disbelief and elements of believable behaviour</td>
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TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at http://bookshop.usq.edu.au click 'Semester', then enter your 'Course Code' (no spaces).

Microsoft Visual C++ 7.0 or Microsoft Visual Studio or greater.

Department of Mathematics and Computing CDROM Set 1, 2005 (available from the USQ Bookshop). This CD set contains course material, Windows and Linux Software relevant to this course offering. For more information about the CD sets and their use, please refer to http://www.sci.usq.edu.au/cdrom and the course web site.
REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.


STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
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<th>ACTIVITY</th>
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<tr>
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<td>Directed Study</td>
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<td>Examinations</td>
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<td>Private Study</td>
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ASSESSMENT DETAILS

<table>
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<tr>
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<th>Wtg(%)</th>
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<td>ASSIGNMENT 1</td>
<td>100.00</td>
<td>10.00</td>
<td>13 Aug 2005</td>
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<tr>
<td>ASSIGNMENT 2</td>
<td>100.00</td>
<td>15.00</td>
<td>27 Aug 2005</td>
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<td>ASSIGNMENT 3</td>
<td>100.00</td>
<td>20.00</td>
<td>22 Oct 2005</td>
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NOTES

1. Examination dates will become available during the semester. Please refer to the examination timetable when published.

IMPORTANT ASSESSMENT INFORMATION

1. Attendance requirements:
   There are no attendance requirements for this course. However, it is the students’ responsibility to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.

2. Requirements for students to complete each assessment item satisfactorily:
   To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available for each assessment item.

3. Penalties for late submission of required work:
   If students submit assignments after the due date without prior approval then a penalty of 10% of the total marks available for the assignment will apply for each working day late.

4. Requirements for student to be awarded a passing grade in the course:
   To be assured of receiving a passing grade a student must submit all of the summative assessment items, achieve at least 50% in the examination and at least 50% of the available weighted marks for the summative assessment items.

5. Method used to combine assessment results to attain final grade:
   The final grades for students will be assigned on the basis of the weighted aggregate of the marks obtained for each of the summative assessment items in the course.

6. Examination information:
   In a Restricted Examination, candidates are allowed access to specific materials during the examination. The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material which could give the student an unfair advantage in the examination); calculators which cannot hold textual information (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination.

7. Examination period when Deferred/Supplementary examinations will be held:
   Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.

8. University Regulations:
   Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL.
9 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.

10 If requested, students will be required to provide a copy of assignments submitted for assessment purposes. Such copies should be despatched to USQ within 24 hours of receipt of a request being made.

OTHER REQUIREMENTS

1 Students will require access to e-mail and internet access to USQConnect for this course.