Description: Simulation

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
<th>Units</th>
<th>Campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC</td>
<td>3409</td>
<td>48093</td>
<td>3, 2005</td>
<td>EXT</td>
<td>1.00</td>
<td>Toowoomba</td>
</tr>
</tbody>
</table>

Academic group: FOSCI
Academic org: FOS003
Student contribution band: 2
ASCED code: 020307

STAFFING
Examiner: David Mason
Moderator: Mike McFarlane

REQUISITES
Pre-requisite: STA2300 or USQIT16

RATIONALE
Simulation is a powerful and widely used tool in the analysis of complex systems. Accordingly, graduates should have an understanding of the basic ideas of simulation, and an appreciation of some of the problems that arise in using simulation. This course uses the simulation language ARENA in the analysis of problems.

SYNOPSIS
This course introduces students to computer based simulation and modelling with applications to all areas of business and industry where management, strategic and operational decision making can be enhanced through the modelling and analysis of complex systems. Particular attention is given to the simulation of discrete event systems using the simulation language ARENA and developing animated displays of complex systems. Through project work students are encouraged to develop information systems of direct relevance to their interests in business and industry.

OBJECTIVES
On completion of this course students will be able to:

1. general: introduce students to simulation modelling using a computer;
2. provide an understanding of the assumptions, strengths and weaknesses of simulation models.
3. Specifically, on completion of this course, students will be able to:
4. differentiate between the major classes of simulation;
5. demonstrate competence in using ARENA to model simple problems;
6. analyse and translate problems into a form suitable for applying simulation strategies;
7. analyse the distributional properties of data;
8. validate a simulation model.

**TOPICS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Simulation models: classification and characteristics</td>
<td>5.00</td>
</tr>
<tr>
<td>2. Discrete event simulation</td>
<td>5.00</td>
</tr>
<tr>
<td>3. Designing computer models</td>
<td>2.00</td>
</tr>
<tr>
<td>4. The ARENA Language</td>
<td>8.00</td>
</tr>
<tr>
<td>5. Construction of simulation programs with ARENA</td>
<td>40.00</td>
</tr>
<tr>
<td>6. Data structures</td>
<td>5.00</td>
</tr>
<tr>
<td>7. Collection and analysis of simulation data</td>
<td>5.00</td>
</tr>
<tr>
<td>8. Parameter estimation and confidence intervals</td>
<td>5.00</td>
</tr>
<tr>
<td>9. Estimating distribution and goodness of fit</td>
<td>5.00</td>
</tr>
<tr>
<td>10. Interpretation, validation and limitations of simulation models</td>
<td>10.00</td>
</tr>
<tr>
<td>11. Using animation techniques to establish construct validity</td>
<td>10.00</td>
</tr>
</tbody>
</table>

**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).

(Arena package supplied with the Text.)

**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.


Law, A M & Larmey, C S 1984, *An Introduction to Simulation using Simscript 11.5*, CACI Products Co, La Jolla, California.


**STUDENT WORKLOAD REQUIREMENTS**

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>20.00</td>
</tr>
<tr>
<td>Private Study</td>
<td>30.00</td>
</tr>
<tr>
<td>Project Work</td>
<td>125.00</td>
</tr>
</tbody>
</table>

**ASSESSMENT DETAILS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORTNIGHTLY ASSESSMENT</td>
<td>10.00</td>
<td>40.00</td>
<td>08 Nov 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(see note 1)</td>
</tr>
<tr>
<td>PROJECT PROPOSAL</td>
<td>10.00</td>
<td>5.00</td>
<td>16 Dec 2005</td>
</tr>
<tr>
<td>PROJECT</td>
<td>100.00</td>
<td>55.00</td>
<td>03 Feb 2006</td>
</tr>
</tbody>
</table>

**NOTES**

1. The Examiner will make fortnightly assessment on this assignment.

**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 the assessment items satisfactorily, students must obtain at least 50% of the marks for the project assessment items, and 50% of the marks allocated for the combined weekly assessment.

3. Penalties for late submission of required work:
   - If students submit the project assignments after the due date without adequate reason, then a penalty of 20% of the total marks available for the assignment will apply for each working date late. For weekly assessments, students must provide the assessment on line by the due date Australian EST or be penalised 20% per day up to a maximum of 50% for the first week overdue. Weekly assessments over one week late get 0 marks.

4. Requirements for student to be awarded a passing grade in the course:
   - To be assured of a passing grade, students must demonstrate, via the summative assessment items, that they have achieved the required minimum standards in relation to the objectives of the course by satisfactorily completing all 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 aggregate of the weighted marks obtained for each of the summative assessment items in the course.
6 Examination information:
   There is no examination in this course.

7 Examination period when Deferred/Supplementary examinations will be held:
   There will be no Deferred or Supplementary examinations in 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
   http://www.usq.edu.au/corporateservices/calendar/part5.htm or in the current USQ
   Handbook.

OTHER REQUIREMENTS

1 The final project report will be retained by USQ. Students are required to ensure that
   they and all members of their work group (if applicable) have a copy of this report.
   (Feedback will be provided on the assignment cover sheet.)

2 Students will require Internet access for this course.