Description: Object-Oriented Programming in C++

Subject  Cat-nbr  Class  Term  Mode  Units  Campus
CSC      2402    40340  1, 2005  EXT   1.00   Toowoomba

Academic group: FOSCI
Academic org: FOS003
Student contribution band: 2
ASCED code: 020103

STAFFING
Examiner: Ron House
Moderator: Ian Richards

REQUISITES
Pre-requisite: CSC1401 or USQIT16

RATIONALE
Object oriented software development has become a standard methodology throughout the software engineering discipline. Therefore, a solid grasp of object oriented programming is essential for any information technology specialist. While there are a variety of object oriented programming languages available, C++ is one of the most widely used and is therefore the focus of this course.

SYNOPSIS
This course extends the student's basic procedural design and programming knowledge into the object oriented paradigm. The student will be expected to learn and apply the basic concepts of object oriented design and programming, i.e. abstraction, inheritance and polymorphism, in the context of the C++ language. Key software engineering principles such as decomposition and component re-use shall also be emphasised.

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

1. identify the additional features of C++ compared with C;
2. identify and design suitable classes and class hierarchies and code robust class implementations in C++;
3. design and program C++ programs using classes and class libraries;
4. apply the principles of information hiding using C++ facilities for private and protected class attributes;
5. employ C++ facilities for dynamic storage;
6. employ C++ input/output facilities including sequential and random access files;
7. employ C++ facilities such as operator overloading, templates, inheritance and dynamic binding to promote code re-use;
8. program using the C++ Standard Template Library (STL) at an intermediate level.

**TOPICS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
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</thead>
<tbody>
<tr>
<td>1. C++ differences from C, iostreams, strings, reference parameters</td>
<td>5.00</td>
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<tr>
<td>2. Classes, Constructors, Destructors</td>
<td>15.00</td>
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<tr>
<td>3. Function and Operator Overloading</td>
<td>8.00</td>
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<tr>
<td>4. Programming with multiple source files</td>
<td>5.00</td>
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<tr>
<td>5. Templates</td>
<td>5.00</td>
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<tr>
<td>6. Dynamic Storage</td>
<td>8.00</td>
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<tr>
<td>7. Pointers, Iterators and Functors</td>
<td>5.00</td>
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<tr>
<td>8. File handling</td>
<td>8.00</td>
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<tr>
<td>9. Inheritance</td>
<td>8.00</td>
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<tr>
<td>10. Polymorphism and Dynamic Binding</td>
<td>8.00</td>
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<tr>
<td>11. Using the Standard Template Library</td>
<td>15.00</td>
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<td>12. Exception Handling</td>
<td>5.00</td>
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<tr>
<td>13. Casts and Run-Time Type Identification</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).

The student must have access to a standard C++ compiler. The only supported compilers are the Linux g++ compiler and its equivalent running under Cygwin on Windows.

Department of Mathematics and Computing CDROM SET 1, 2005 (available from the Bookshop). This CD set contains course materials, Windows and Linux Software relevant to this course offering only. 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.


(Special 3rd edition: Do NOT purchase old copies of the second edition - the new edition is completely rewritten.)
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.


(An excellent book about object-oriented software design, but it uses Meyer's own language, Effel, not C++.)

STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>Directed Study</td>
<td>52.00</td>
</tr>
<tr>
<td>Examinations</td>
<td>3.00</td>
</tr>
<tr>
<td>Private Study</td>
<td>107.00</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>TUTORIAL &amp; PRACTICAL EXERCISE</td>
<td>10.00</td>
<td>10.00</td>
<td>01 Mar 2005</td>
</tr>
<tr>
<td>(see note 1)</td>
<td></td>
<td></td>
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<tr>
<td>ASSIGNMENT 1</td>
<td>100.00</td>
<td>15.00</td>
<td>29 Apr 2005</td>
</tr>
<tr>
<td>ASSIGNMENT 2</td>
<td>100.00</td>
<td>15.00</td>
<td>03 Jun 2005</td>
</tr>
<tr>
<td>3 HOUR CLOSED EXAMINATION</td>
<td>100.00</td>
<td>60.00</td>
<td>END S1</td>
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<td>(see note 2)</td>
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NOTES

1. Refer to the Study Materials for the correct assessment date for this item.
2. Examination dates will be 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:
   Not applicable. See Item 4.

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 gained by the student for the assignment will apply for each day late.

4. Requirements for student to be awarded a passing grade in the course:
To be assured of a passing grade, students must gain at least 50% for the examination and at least an overall mark of 50% for the total of the non-exam assessment items. There is no requirement that students must get a mark of 50% for every non-exam assessment.

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 marks obtained for each of the assessment items in the course weighted as in the Assessment Details.

6 Examination information:
   Candidates are allowed to bring only writing and drawing instruments into 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 http://www.usq.edu.au/corporateservices/calendar/part5.htm or in the current USQ Handbook.

ASSESSMENT NOTES

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 Students must retain a copy of each item submitted for assessment. 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 to do so.

11 In accordance with University Policy, the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.

12 The Faculty will NOT accept submission of assignments by facsimile.

13 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time, may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination); IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).

OTHER REQUIREMENTS

1 Students will require access to an appropriate computer either via the student's own arrangements or a USQ study centre. Ideally, students should have access to email and the Internet.