Description: Object-Oriented Programming in C++

Subject: CSC
Cat-nbr: 2402
Class: 66757
Term: 2, 2007
Mode: ONC
Units: 1.00
Campus: Fraser Coast

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

STAFFING
Examiner: Ian Richards
Moderator: Jamie Shield

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

**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. The Cygwin software is available on the Semester 1, Department of Mathematics and Computing DVDROM SET, 2007 (available from the Bookshop) or from http://www.cygwin.com/.


(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>Examinations</td>
<td>2.00</td>
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<tr>
<td>Laboratory or Practical</td>
<td>26.00</td>
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<tr>
<td>Classes</td>
<td></td>
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<tr>
<td>Lectures</td>
<td>26.00</td>
</tr>
<tr>
<td>Private Study</td>
<td>110.00</td>
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</table>

ASSESSMENT DETAILS

<table>
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<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
</tr>
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<tbody>
<tr>
<td>ASSIGNMENT 1</td>
<td>100.00</td>
<td>5.00</td>
<td>12 Aug 2007</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>(see note 1)</td>
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<tr>
<td>ASSIGNMENT 2</td>
<td>100.00</td>
<td>20.00</td>
<td>02 Sep 2007</td>
</tr>
<tr>
<td>ASSIGNMENT 3</td>
<td>100.00</td>
<td>20.00</td>
<td>30 Sep 2007</td>
</tr>
<tr>
<td>ASSIGNMENT 4</td>
<td>100.00</td>
<td>10.00</td>
<td>14 Oct 2007</td>
</tr>
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<td>ASSIGNMENT 5</td>
<td>100.00</td>
<td>5.00</td>
<td>28 Oct 2007</td>
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<td>2 HR CLOSED EXAMINATION</td>
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NOTES
1. Assignments are due 11:59:59 PM Australian Eastern Standard Time on each due date.
2. Examination dates will be available during the semester. Please refer to the examination timetable when published.

IMPORTANT ASSESSMENT INFORMATION

1. Attendance requirements:
   It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and 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 satisfactorily complete an assessment item a student must achieve at least 50% of the
marks. Students do not have to satisfactorily complete each assessment item to be awarded
a passing grade in this course. Refer to Statement 4 below for the requirements to receive
a passing grade in this course.

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 receiving a passing grade a student must achieve at least 50% of the total
   weighted marks available for the course.

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 Closed
   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 All assignments must be submitted electronically through the course website. Assignment
   submission will not be accepted in any other form or by any other means without prior
   approval. The due date for an assignment is the date by which a student's submission must
   be received electronically by USQ.

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 being
    made.

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.