



The University of Southern Queensland

## Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.  
Please consult the web for updates that may occur during the year.

### Description: Object-Oriented Programming in C++

| Subject | Cat-nbr | Class | Term    | Mode | Units | Campus    |
|---------|---------|-------|---------|------|-------|-----------|
| CSC     | 2402    | 86217 | 1, 2009 | EXT  | 1.00  | Toowoomba |

|                                   |        |
|-----------------------------------|--------|
| <b>Academic group:</b>            | FOSCI  |
| <b>Academic org:</b>              | FOS003 |
| <b>Student contribution band:</b> | 2      |
| <b>ASCED code:</b>                | 020103 |

## STAFFING

Examiner: David Lai  
Moderator: Michael de Raadt

## REQUISITES

Pre-requisite: CSC1401 or USQIT16 or Students must be enrolled in one of the following Programs: MPIT or GDGS or GCEN or GDET or METC

## 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 will also be emphasised.

## OBJECTIVES

On completion of this course students will be able to:

1. employ 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 develop 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);
9. justify design decisions and explain the operation of C++ programs developed by the student (all assessments).

## TOPICS

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

## 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 from <http://www.cygwin.com/>, and is also available on the Semester 3 Transmodal CD-ROM (supplied in study package).

Stroustrup, Bjarne 2000, *The C++ programming language*, 3rd edn, Addison Wesley, Reading, Mass.

(The student must have access to a textbook or manual that provides full details of the C++ programming language. Several are available for free download from the Internet. Because the course materials reference the following text, it is strongly recommended that students access this:

(Special edition is also acceptable. Do NOT purchase old copies of the second edition - the third 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.

Eckel, B 2000, *Thinking in C++ Volume 1 - Introduction to Standard C++*, 2nd edn, Prentice Hall, Upper Saddle River, New Jersey.

Johnsonbaugh, R & Kalin, M 2000, *Object-oriented programming in C++*, 2nd edn, Prentice-Hall, Upper Saddle River, New Jersey.

Meyer, B 1997, *Object-oriented software construction*, 2nd edn, Prentice Hall, Upper Saddle River, New Jersey.

## STUDENT WORKLOAD REQUIREMENTS

| ACTIVITY       | HOURS |
|----------------|-------|
| Assessments    | 75.00 |
| Directed Study | 30.00 |
| Private Study  | 60.00 |

## ASSESSMENT DETAILS

| Description               | Marks out of | Wtg (%) | Due date                    |
|---------------------------|--------------|---------|-----------------------------|
| ASSIGNMENT 1              | 100.00       | 5.00    | 29 Mar 2009<br>(see note 1) |
| ASSIGNMENT 2              | 100.00       | 15.00   | 19 Apr 2009                 |
| ASSIGNMENT 3              | 100.00       | 20.00   | 17 May 2009<br>(see note 2) |
| ASSIGNMENT 4              | 100.00       | 5.00    | 31 May 2009                 |
| ASSIGNMENT 5              | 100.00       | 5.00    | 14 Jun 2009                 |
| 2 HOUR CLOSED EXAMINATION | 100.00       | 50.00   | END S1<br>(see note 3)      |

### NOTES

1. Assignments 1 - 5 are due 11:59:59 PM Australian Eastern Standard Time on each due date. Refer to the Study Materials for the assessment details.
2. Part of the assessment for Assignments 3 and/or 5 will be a short (maximum 15 minutes) presentation by the student with the examiner or his nominee, normally in the week following submission at a time agreed between the examiner and the student. Such presentations will either be conducted face-to-face or online. Their purpose is to explore the student's understanding of their own work submitted for assessment. Further details will be provided in the study materials.
3. 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:  
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 of the examiner then a penalty of 5% of the total marks gained by the student for the assignment may apply for each working day late up to ten working days at which time a mark of zero may be recorded. No assignments will be accepted after model answers have been posted.
- 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 next examination period.
- 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 USQ Electronic Assignment Submission Environment (EASE). 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. Assignments are due 11:59:59 PM Australian Eastern Standard Time on each due date.
- 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 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. The student will be assigned the following grade: IDM (Incomplete 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. Students will require access to e-mail and have internet access to USQConnect for this course.
  - 2 Students can expect that questions in assessment items in this course may draw upon knowledge and skills that they can reasonably be expected to have acquired before enrolling in the course. This includes knowledge contained in pre-requisite courses and appropriate communication, information literacy, analytical, critical thinking, problem solving or numeracy skills. Students who do not possess such knowledge and skills should not expect to achieve the same grades as those students who do possess them.
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