|  |
| --- |
| Unit Information |
| Faculty of Science and Technology  HIT365 C Programming   | Credit points | 10 | | --- | --- | | Assumed knowledge/Prerequisites | None | | Semester/Year | 2023 S1 | | Mode & Location | Internal (Casuarina), External | | Learning method | OLR | |  | | | Unit Coordinator | Erwin Chan | | Phone | 89466354 | | Email | erwin.chan@cdu.edu.au | |

# Unit Description

The unit covers C programming including: C fundamentals, program control statements, data types, variables and expressions, decision making and data type modifiers, arrays and strings, pointers, searching and sorting, structures, and dynamic data structures. Students will combine practical coding skills with associated theoretical concepts.

## **Learning Outcomes**

On completion of this unit a student should be able to:

1. Critically apply problem-solving skills using various techniques and hence recommend solutions to specific programming tasks.

2. Analyse the mathematical techniques required to solve problems when programming a computer.

3. Critically apply programming techniques, including the use of functions, local and global variables, parameters, and the four basic logic structures.

4. Critique and validate data structures, including arrays and databases.

5. Use effective oral, written, numeric and communication methods to convey ideas and principles.

**Assessment Overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Assessment title** | **Volume** | **Value (of total mark)** | **Related outcomes** |
| 1. Two quizzes | 0.5 hour and 2 hours | 30% | 1-4 |
| 1. Two coding assignments |  | 30% | 1-5 |
| 1. Final exam | 2 hours | 40% | 1-4 |

## Teaching and Learning approach

Students will learn through individual work, and experiential and case based learning. The content and various learning activities will be delivered through Learnline supplemented with video materials. Student learning is paced and guided by a weekly study guide available on Learnline. The guide includes assessment items.

**Participation**

For internal students, attendance to all scheduled classes is expected, however there are no minimum attendance requirements.

For external students, regular interaction via Learnline is expected. External students are welcome to attend the internal lecture and tutorials classes.

The recommended study commitment for all students is 12 hours per week, which includes the semester weeks, mid-semester study period, revision week and examination period. For internal students, the recommended study commitment includes formal contact hours.

Specific details of individual class times can be obtained by accessing the class timetable at: <http://www.cdu.edu.au/timetable/>.

# Resources

### Required textbook

Deitel H. M. and Deitel P. J., “C How to program”, Pearson.

Required textbook can be ordered from the CDU Bookshop through their website at [www.cdu.edu.au/bookshop](http://www.cdu.edu.au/bookshop)

**Additional Resource**

**Software:** Microsoft Visual Studio, which can be downloaded from <https://visualstudio.microsoft.com/downloads/>.

**Learnline (Online Learning System)**

The Faculty of Science and Technology has implemented a consistent approach for the use of Learnline for all units delivered through the Faculty.

Learnline will be used to provide all students (both internal and external) access to:

* regular important announcements about the unit
* the unit outline, weekly content topics, including introductory notes, audio-visual resources, and other relevant study materials, readings and assessment items
* a communication point for web conferencing and asynchronous discussion forums for student interaction with other students and lecturers
* feedback from tasks and grades for assessable work

For Internal students, Learnline resources for the unit will supplement lectures and tutorial sessions.

For External students, Learnline will be used to provide all of the resources required for completion of the unit (except for those units in which include a compulsory intensive block).

Where relevant, all students will be expected to access unit assessments and make assignment submissions through Learnline. Assessment feedback will also be provided through Learnline.

Discussion Board forums will be established in Learnline to encourage interaction between lecturers, internal students and external students.

**Referencing the Output of Artificial Intelligence Language Models**

Output text of an artificial intelligence language model (such as a ChatBot) for written assessment items of this unit will not be treated as your own work. If any output text is used, it must be quoted in italics, and the app or website must be referenced appropriately (AI language model Name/Chatbot Name, Developer or Organization, date accessed).

If concepts of the output of an artificial intelligence language model are used for written assessment items of this unit, the app or website must be referenced appropriately (AI language model Name/Chatbot Name, Developer or Organization, date accessed).

**Continuous Improvement Strategies**

We will provide more detailed explanation of the teaching material based on previous year student comments.

# Learning Schedule

| Weeks | Topic/Lecture | Tutorial/Laboratory/Other Learning Activities | Assessments Submission |
| --- | --- | --- | --- |
| 1 | **INTRODUCTION TO COMPUTERS AND C PROGRAMMING**   * Basic computer concepts * Different types of programming languages * History of C programming language * Simple C program * Simple input and output statements | - |  |
| 2 | **INTRODUCTION TO C PROGRAMMING**   * Fundamental data types * Arithmetic operators * Simple decision making statements * Problem-solving techniques | Tutorial 1: Tutorial problems related to lecture topics. |  |
| 3 | **STRUCTURED PROGRAM DEVELOPMENT IN C**   * If… else statement * While repetition statement * Counter-controlled repetition structured programming * Increment, decrement and assignment operators | Quiz 1 (0.5 hour, 5% of total mark)  (Closed book) | Quiz 1 (0.5 hour, 5% of total mark)  (Closed book) |
| 4 | **C PROGRAM CONTROL**   * Repetition essentials * For repetition statement * Switch multiple-selection statement * Do… while repetition statement * Logical Operators | Tutorial 2: Tutorial problems related to lecture topics. |  |
| 5 | **C FUNCTIONS**   * Program modules in C * Math library functions * Functions | Tutorial 3: Tutorial problems related to lecture topics. |  |
| **Mid-semester break** | | | |
| 6 | **C FUNCTIONS AND C ARRAYS**   * Random number generation * Recursion * Arrays * Defining arrays | Tutorial 4: Tutorial problems related to lecture topics. |  |
| 7 | **C ARRAYS**   * Passing arrays to functions * Using array to sort and search lists and tables of values * Multidimensional arrays * Bubble sort * Linear search and binary search | Tutorial 5: Tutorial problems related to lecture topics. | Coding assignment 1 |
| 8 | **GRAPH THEORY AND C POINTERS**   * Directed and undirected graphs * Trees * Breadth-first search and depth-first search * Pointer variable definitions | Tutorial 6: Tutorial problems related to lecture topics. |  |
| 9 | **C POINTERS, C CHARATERS AND STRINGS**   * Pointer operators * Pointer expressions and pointer arithmetic * Arrays of pointers * Fundamentals of strings and characters | - |  |
| 10 | **C CHARATERS AND STRINGS, AND C STRUCTURES**   * Standard input/output library functions * Structure definitions * Initializing structures * Accessing members of structures | Quiz 2 (2 hours, 25% of total mark)  (Closed book) | Quiz 2 (2 hours, 25% of total mark)  (Closed book) |
| 11 | **ENUMERATIONS AND C FORMATTED INPUT/OUTPUT**   * Enumeration constants * Formatting output with printf * Printing integers and floating-point numbers * Printing strings and characters | Tutorial 7: Tutorial problems related to lecture topics. |  |
| 12 | **BIT MANIPULATIONS AND C FILE PROCESSING**   * Bitwise operators * Bit fields * Files and streams * Reading data from a sequential-access file | Tutorial 8: Tutorial problems related to lecture topics. | Coding assignment 2 |
| 13 | Revision Week |  |  |

***Note:*** *This Learning Schedule may change during the semester and it is the responsibility of the student to check the accuracy of important information (e.g. quizzes, submission dates etc.) on Learnline. Any changes will be announced on Learnline and, where convenient, during lectures.*

**Engineers Australia Graduate Attributes**

University education provides the learning base upon which competence for a professional engineering career is built.  It is important that the education provides the graduate with generic attributes as outlined by Engineers Australia. Details of the Engineers Australia graduate attributes addressed in this unit can be found at the Learnline site Engineering Central – Engineers Australia – Engineers Australia Graduate Attributes.