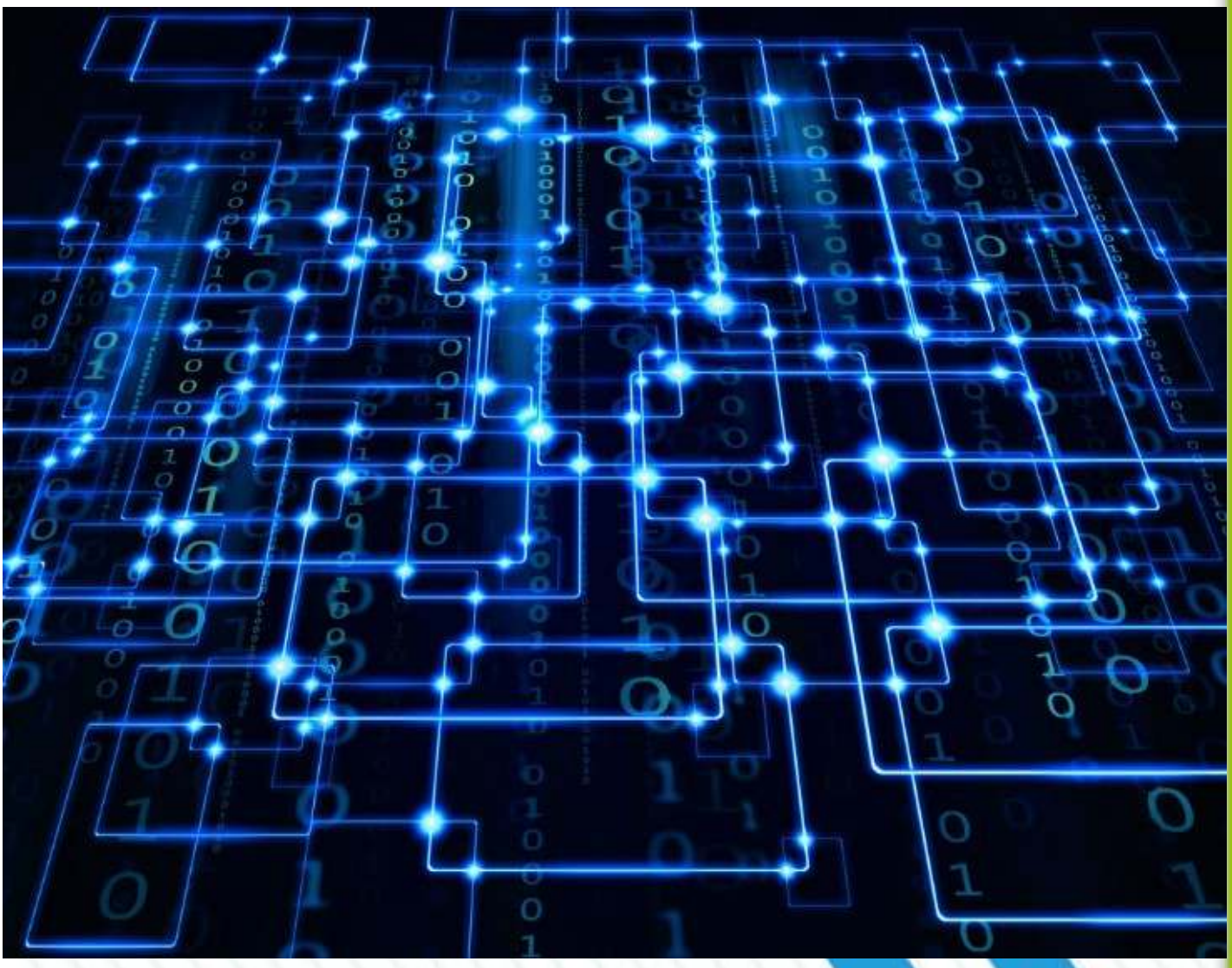
MONASH College

Monash College Diploma



Diploma of Information and Technology

Unit Outline
MCD4710
Introduction to Algorithms and Programming

Unit Outline

Contents

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Unit Improvements

Monash College is committed to Continuous Unit Improvement. Student feedback is integral to this process and throughout your studies with us you will be encouraged to provide feedback on every unit you are enrolled in.

Feedback provided by previous students through student surveys in the previous trimester has shown that overall students are satisfied with the learning and teaching experience in this unit.

Description

This unit introduces programming fundamentals and the Python language to students. The unit provides a foundational understanding of program design and implementation of algorithms to solve simple problems. Fundamental programming control structures, built in and complex datatypes and mechanisms for modularity will be presented in Python.

Topics covered will include basic input and output, program control structures, basic data structures and modular program structure. Problem-solving strategies and techniques for algorithm development, iteration and recursion, algorithm efficiency and the limitations of algorithms will be introduced.

Prerequisites

Completed at least one of: (MCD1220, MCD2130, MCD4170, MCD4490, OR MCD4500) and MCD4720.

Aim

This unit aims to allow students to develop algorithms to solve a wide variety of problems.

Objectives

At the completion of this unit, students should be able to:

1. recognise the relationship between a problem description and program design;
2. implement problem solving strategies;
3. demonstrate how basic data structures (list, graphs, trees, sets, tables) function;
4. investigate different strategies for algorithm development and evaluate these to select an appropriate solution to a given problem;
5. decompose problems into simpler problems;
6. determine the complexity of simple algorithms;
7. recognise the limitations of algorithms.

Learning and Teaching

- **Lecture, tutorials and labs classes**
- This teaching and learning approach helps students to initially encounter information at lectures, discuss and explore the information during tutorials, and implement solutions during labs.
- **Problem-based learning**

Students will be presented with information and guided on how to best find solutions for a given problem.

Minimum total expected workload equals 12 hours per week comprising:

(a) Contact hours for on-campus students:

- 2 x 1.5 hour lectures
- 1 x 2 hours tutorial
- 1 x 2 hour laboratory

(b.) Additional requirements (all students):

- A minimum of 2-3 hours of personal study per one hour of lecture time in order to satisfy the reading, tutorial, practical and assignment expectations.

English Language Outcomes

Speaking

1. Perform effectively in English during prepared responses in front of peers
2. Participate effectively in groups during group work and discussions of unit related content in English

Listening

3. Listen to and mostly comprehend spoken texts including classroom instructions, multimedia texts and sequential and logical instructions
4. Use note-taking strategies to record information from spoken texts and show understanding

Reading

5. Use a range of reading strategies to assist comprehension of written texts including text books and programming instructions
6. Identify key information and produce accurate notes from written texts to demonstrate understanding

Writing

7. Demonstrate ability to explain logical and sequential processes under timed conditions

University Skills & Australian Socio-cultural Awareness

8. Show effective independent research and learning skills
9. Show socio-cultural awareness of Australian university contexts

Unit Schedule

Week	Topic and Learning objectives	Learning Activities
1	Introduction to the unit, algorithms, and Python	
2	Selection, loops, and repetition.	In-lecture quiz due Practical work due ***Release Assignment 1***
3	Introduction to data structures, decomposition and data (including file reading and writing)	In-lecture quiz due Practical work due
4	Understanding Python	In-lecture quiz due Practical work due **Mid-Trimester Test 1**
5	Sorting and Graphs	In-lecture quiz due Practical work due
6	Invariance and Complexity	In-lecture quiz due **Assignment 1 due** ***Release Assignment 2***
7	Decrease and Conquer and Divide and Conquer	In-lecture quiz due Practical work due
8	Recursion and Graph traversal, Stacks, Queues	In-lecture quiz due Practical work due
9	Transform and Conquer and Advanced Python	In-lecture quiz due Practical work due **Mid-Trimester Test 2**
10	Gaussian Elimination and Optimization and Greedy approach	**Assignment 2 due** In-lecture quiz due Practical work due
11	Brute Force approach and Backtracking	In-lecture quiz due Practical work due
12	Complexity Classes and Revision	In-lecture quiz due Practical work due
	Examination period	LINK to Assessment Policy: http://policy.monash. edu.au/policy-bank/academic/education/assessment/ assessment-in-coursework-policy.html

Assessment & Feedback

We are committed to providing you with assessment tasks which cater for the needs of all learning styles, which are administered in a clear and fair manner and which are assessed transparently. All students are entitled to understand how to excel in any assessment task, to be provided with the support required to ensure your success and to be provided with fair and timely feedback which supports your future learning.

Assessment is at the heart of your learning experience, and is a key focus for students. Assessment acts as the main link between the learning outcomes, the curriculum content and the teaching and learning activities. It provides the mechanism for staff and students to monitor and improve learning.

Assessment is an integral component in all curriculum development activities. Linked to the learning outcomes, it ensures that you will be able to demonstrate the **Monash University Graduate Attributes (see below**). Feedback will be provided in line with the Assessment Feedback Procedure.

Every trimester, you have the opportunity to provide feedback on your Diploma units through the Student Evaluation of Teaching and Units (SETU) process. You will be emailed information about this survey during the trimester. Your feedback is highly valued, and is used to refine existing curriculum design and assessment tasks.

You can find more information in the Assessment Feedback Diplomas Procedure found on the website

https://www.monashcollege.edu.au/about-us/policies-procedures/assessment

Assignments

All submissions are to be submitted via Moodle by the due date unless a prior arrangement has been made with the Unit Leader or Team Leader.

Online Submission of Assignments:

All written assessments / assignments must be submitted on Turnitin. **Please follow the submission instructions.** You will be required to read and accept a **Student Statement** before submitting.

Student statement

I agree that:

- Plagiarism, collusion or cheating or any other breach of the Student Academic Integrity Policy and Procedure has not occurred
- I understand the consequences of breaching academic integrity as outlined in the procedure
- The assessment task is my own original work
- I have taken care to safeguard my work and made reasonable efforts to ensure it could not be copied
- The teacher, for the purposes of assessment, can reproduce the assessment and
- provide it to another teacher and/or any external marker, and/or
- submit it to a text matching/originality checking software (the database may retain a copy of the assessment for future checking of plagiarism).

Your assignment must be submitted by *11.55pm* on the due date.

You must keep an electronic copy of your assignment. We also recommend that you keep a hard copy.

Assessment Schedule

Assessment Task	Weight	Week Due
Mid-trimester test 1	8%	4
Assignment 1	8%	6
Mid-trimester test 2	12%	9
Assignment 2	10%	10
In-lecture quizzes	6%	Weekly
Tutorial class work	6%	Weekly
Laboratory class work	10%	Weekly
Examination	40%	13-14

Requirements to Pass this Unit

In order to achieve a pass in this unit, a student must obtain all of:

- an overall unit mark of 50% or more

Not passing these hurdles will lead to a mark not greater than 48N. Your overall mark combines your internal assessment marks and your exam mark.

If you receive a 49N grade, you will automatically be awarded a 48N result.

Graduate Attributes

All Monash College courses will develop the following graduate attributes:

- Communication - demonstrated by effective communication in a variety of contexts
- Collaboration - demonstrated by working positively with others to achieve common goals
- Social and Cultural Engagement - demonstrated by respect for diversity and recognition of ethical responsibilities, including towards knowledge creation and academic integrity
- Critical Thinking and Problem Solving - demonstrated by the ability to analyse, evaluate and synthesise information to solve problems and innovate
- Independent Learning - demonstrated by the initiative, reflective practice and resilience necessary for self-directed learning, and possession of the foundational discipline knowledge and skills appropriate to commence their destination studies
- Academic Skills - demonstrated by understanding and appropriate application of scholarly practices and standards.

Learning Resources

Details of the prescribed and recommended resources for successful completion of this unit are listed below.

Required Textbook

None

Recommended Readings/Resources

Levitin, A. (2012). Introduction to the Design and Analysis of Algorithms. (3rd Edition) Addison- Wesley

Perkovic, L. (2012)**.** Introduction to Computing using Python: An Application Development Focus.

John Wiley & Sons, Inc.

Learning Management Systems (Moodle)

Moodle is an online teaching and learning environment which aims to enhance learning. It delivers important resources which may include: lecture and tutorial notes, links to websites, self-assessment quizzes, and online discussions which allow you to interact with fellow students.

To access this site, go to: https://lms.monashcollege.edu.au and log in using your authcate username and password. Once you are logged in, you will see a list of units you are enrolled in that use Moodle. If you expect to see a unit and it is not there, contact your lecturer.

Your lecturer will demonstrate how to use the Moodle site and explain what is expected of you including any online assessment that must be completed there. Check Moodle regularly to be kept up-to-date with important information for your unit as it becomes available

Getting Help

If you have any issues with Moodle please speak to your teacher. If they are not able to solve the problem then send an email to eSolutions: servicedesk@monash.edu

Student Code of Conduct

We are committed to providing you with an inclusive and safe learning environment where you feel welcomed and respected. The Student Code of Conduct provides guidelines and standards for your behaviour. A copy of the Student Code of Conduct is available on the Monash College website:

https://www.monashcollege.edu.au/about-us/policies-procedures/student-rights-and-responsibilities

Library

The Monash College Library website contains details about your borrowing rights and how to search the catalogues.

To learn more about the library and the various resources available, please go to:

https://www.monashcollege.edu.au/current-students/library.

The Librarian can assist you with finding research for your assignments, as well as the following;

- How and where to start researching for your assignment topic
- Effective use of online databases and the internet
- Finding and evaluating academic journal articles
- Searching the Library's collections
- Citing and referencing

For your current and future studies, you will need to build your knowledge and skills around academic searching, using databases, retrieving information and using correct referencing techniques. It's a good idea to refresh and update your skills before you start the assessment tasks. You can do this by completing the tutorials available on the library website.

Referencing requirements

To build your skills in citing and referencing, and using different referencing styles, see the online tutorial Academic Integrity: Demystifying Citing and Referencing at: Monash University's online resources

Learning skills

Online learning support resources are available for off-campus learners and students with a disability. To access the online resources, visit: Monash College Library support

Diplomas Student Policies and Procedures

All policy and procedure information is available on the Monash College website:

https://www.monashcollege.edu.au/about-us/policies-procedures

Academic Integrity

Cheating, Plagiarism and Collusion

We are committed to preventing plagiarism, cheating and collusion to protect the College's reputation and the standards for current and future students.

Severe penalties will be imposed if you engage in, or support other students to engage in activities which undermine the integrity of the assessment process.

Plagiarism: To take and use another person's ideas and/or manner of expressing them and to pass them off as your own by failing to give appropriate acknowledgement, including the use of material from any source, staff, students or the Internet, published and unpublished works.

Cheating: To seek to obtain an unfair advantage in an examination, written, oral or practical work, required to be submitted or completed for an assessment. This includes resubmitting work that has been assessed in another unit, copying another student's answers or work, knowingly providing answers to another student and taking unauthorised material or notes into examinations.

Collusion: Submission of an assessment task which is the result of whole or in part unauthorised collaboration with another person or persons. Collusion occurs when a student works with others to produce an assessment (e.g. group assessments) and the assessment is then presented as the student's own assessment, or the assessment of the other person/s.

Submitting an application for an extension of time to submit an assessment

If you need more time to complete and submit your assessment task due to being affected by a serious illness or other exceptional causes, you will need to apply for special consideration. If you do not submit an item of assessment by the due date and do not have an approved extension of time, you will incur a penalty.

The Special Consideration application form is available on the website:

https://www.monashcollege.edu.au/about-us/policies-procedures/forms

Late Submission Penalties

Unless an extension or special consideration has been granted, or otherwise specified in the unit guide, students who submit an assessment task after the due date will receive a late-submission penalty of 10 per cent of the available marks in that task. A further penalty of 10 per cent of the available marks will be applied for each additional calendar day, or part thereof, the assessment task is overdue.

Tasks submitted more than seven calendar days after the due date will receive a mark of zero for that task.

Academic Progress and Support

You will be contacted via email at the end of each trimester, following result release, if you are 'at risk' of making unsatisfactory academic process (i.e. failing some or all of your units).

A number of interventions are available to support you to achieve satisfactory course progress. This includes attending an Academic Support Meeting to help identify difficulties (academic or other) that are affecting your progress and inform or refer you to other support services.

More information about academic progress is available on the website:

https://www.monashcollege.edu.au/about-us/policies-procedures/enrolment-and-progression

Attending your classes

Attendance is monitored in all workshops and tutorials to support and assist you to achieve positive learning outcomes.

You are required to attend all scheduled classes and a minimum attendance of 80% is expected. This level of attendance provides the best opportunity for you to satisfactorily complete your course requirements.

Students with a disability

If you have a disability, medical or mental health condition that may impact your study, you can apply for support to study at Monash College. Disability Advisers can individually discuss and arrange reasonable adjustments to enable you to participate productively and independently in your studies. These adjustments may include being provided teaching materials in advance of class, recordings of lectures, course materials in an alternative format and flexible deadlines.

For further information contact the Monash University Disability Support Services:
https://www.monash.edu/disability/for-students

Equal Opportunity

Monash College is committed to promoting equal opportunity for staff and students in employment, education and service delivery in accordance with University's principles of equity, fairness and social justice.

For further information refer to the Monash University Equal Opportunity Policy:
https://www.monash.edu/diversity-inclusion/equal-opportunity