

# Unit Assessment Brief

## MSc Computer Science

**Unit Title:** Advanced Algorithms and Programming

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**Unit code:** IU000283

**Unit credit:** 20 credits

**Unit duration:** Weeks 2-12

**Year / Level:** 1 / 7

**Unit briefing date:** Wednesday 1<sup>st</sup> October 2025

### Unit introduction

You will be introduced to advanced algorithms through mathematics and programming, including linear algebra for advanced analysis of data and machine learning optimisation. You will create and analyse computational models using approaches such as procedural algorithms, graphs and networks, recursive algorithms, and genetic algorithms, among others. This will develop your understanding of how algorithms might be improved to tackle current and emerging problems.

You will learn different algorithm design techniques and paradigms (greedy, divide-and-conquer algorithms, heuristics), and you will learn to decide why and when to apply them for specific real-life problems.

You will implement from foundational to state-of-the-art algorithms and analyse their performance, describing their complexity in detail using order of complex terms, and present results in written and oral form.

You will use big-O notation to describe asymptotic upper bounds and expected case bounds on time and space complexity respectively.

The limitations and nuances of classical algorithmic evaluation and analysis approaches will also be discussed. For instance, considerations such as bias, reliability, and availability of data; reliance on specialised hardware such as microcontrollers, GPUs, and FPGAs;

consequences of applying algorithmic methods to social data, and environmental impacts of computation all come into play when designing and evaluating real-world systems.

Please read the Learning Materials that accompany this document. This may include project briefs, unit guidelines, glossary, additional reading lists or event and presentation information. This information will be published together on Moodle.






## **Learning outcomes and assessment criteria**

On completion of this unit you will be able to:

- LO1 You will be able to use and evaluate advanced algorithms through imperative programming (Process)
- LO2 You will be able to use notation to interrogate algorithmic complexity and selection and describe your findings in written and oral form (Communication)
- LO3 You will be able to apply advanced algorithms to a selection of real-world problems (Realisation)

## **Assessment Criteria**

Your work in this unit will be marked against the UAL assessment criteria, which are designed to give you clear feedback on your achievement. The full assessment criteria descriptions can be found on the [UAL Assessment](#) webpage.

	<b>F</b>	<b>E</b>	<b>D</b>	<b>C</b>	<b>B</b>	<b>A</b>
 <b>Enquiry</b> Engagement in practice informed by comprehensive analysis and evaluation of diverse complex practices, concepts and theories	Little or no evidence	Insufficient evidence	Satisfactory evidence	Good evidence	Very good evidence	Excellent evidence
 <b>Knowledge</b> Critical analysis and synthesis of a range of practical, conceptual and technical knowledge(s)	Little or no evidence	Insufficient evidence	Satisfactory evidence	Good evidence	Very good evidence	Excellent evidence
 <b>Process</b> Experiment and critically evaluate methods, results and their implications in a range of complex and emergent situations	Little or no evidence	Insufficient evidence	Satisfactory evidence	Good evidence	Very good evidence	Excellent evidence
 <b>Communication</b> Articulation of criticality, clarity and depth. Communicating a diverse range of intentions, contexts, sources and arguments appropriate to your audiences	Little or no evidence	Insufficient evidence	Satisfactory evidence	Good evidence	Very good evidence	Excellent evidence
 <b>Realisation</b> Advancing the personal, professional and academic standards of production	Little or no evidence	Insufficient evidence	Satisfactory evidence	Good evidence	Very good evidence	Excellent evidence

## What you have to produce

A portfolio comprising of weekly programming tasks representing your regular engagement with the learning materials and a piece of software to demonstrate and compare advanced algorithms for addressing real-world problems (mini project). This work should exhibit what you have learned in the term.

This unit is assessed holistically (100% of the unit). There is no breakdown of grades for the different assessment evidence listed. Instead, the evidence is considered together and the tutors use their academic judgment to arrive at a grade for the unit as a whole. All components of the assessment must be submitted to pass the unit.

## Submission information

**Submission date and time:**

**By 2:00pm (14:00) GMT, Friday 12<sup>th</sup> December 2025**

<b>Adjusted assessment submission date and time:</b>	<p><b>By 2:00pm (14:00) GMT, Friday 16<sup>th</sup> January 2026</b></p> <p>Adjusted Assessment (AA) is applicable to students with Individual Support Agreements. To confirm that you intend to use adjusted assessment, please email <a href="mailto:cci.pg@arts.ac.uk">cci.pg@arts.ac.uk</a> two weeks in advance of the standard deadline.</p>
<b>Submission method:</b>	<p>File submission via Moodle, maximum file size 1GB, acceptable file types: zip file containing all the assignments.</p>
<b>Anonymous marking:</b>	<p><b>No:</b> It is not possible for this unit to be marked anonymously. However, all unit assessments are internally moderated to maintain fairness in assessment.</p>
<b>Date to expect feedback by:</b>	<p><b>30 January 2026</b></p> <p>You will receive feedback online via <a href="#">Assessment Feedback</a>. Please note grades and feedback are indicative until confirmed following the Exam Board.</p>
<b>Submission queries:</b>	<p>Please contact <a href="mailto:cci.pg@arts.ac.uk">cci.pg@arts.ac.uk</a> in advance of the submission deadline.</p>

## Reading and resource list

### Essential Reading

Cormen, T.H. et. Al. (2022). Introduction to Algorithms, 4th Edition. MIT

Fry, H. (2019). Hello World: How to be Human in the Age of the Machine. Black Swan.

Kneusel, Ronald T. (2024). The Art of Randomness: Randomized Algorithms in the Real World. No Starch Press

## Support

CCI and UAL has a range of services that can support you with your studies. Useful contacts for advice and guidance include:

<b>CCI Academic Support Contact:</b>	<p>You can contact the CCW Academic Support team by email at <a href="mailto:ccw-academicssupport@arts.ac.uk">ccw-academicssupport@arts.ac.uk</a> with any questions regarding the in-course Academic Support offer.</p> <p>Visit Academic Support Online at <a href="http://www.academicssupportonline.arts.ac.uk">www.academicssupportonline.arts.ac.uk</a> to find out about Academic Support tutorials, workshops and learning resources to support your studies.</p> <p>Email in at <a href="mailto:academicssupportonline@arts.ac.uk">academicssupportonline@arts.ac.uk</a> for Academic Support Online enquiries</p>
<b>CCI Disability Adviser Contact:</b>	<p>Caroline Huntley <a href="mailto:c.huntley@arts.ac.uk">c.huntley@arts.ac.uk</a></p>
<b>CCI Subject Librarian Contact:</b>	<p>Benelia Salmon <a href="mailto:b.salmon@arts.ac.uk">b.salmon@arts.ac.uk</a></p>

[UAL Language Centre](#): Offers tailored classes, 1-1 tutorials and speaking and writing workshops to help you with your studies.

[Student Services](#): Find out about services including counselling, health advice, chaplaincy, disability and dyslexia support, and advice on funding and immigration matters.

[Students Union](#): Arts SU offers impartial advice (independent from UAL), and is the place to find other students and learn new skills.

### Cost of study

CCI provides a broad range of resources to support your studies. However, additional costs you may incur whilst studying this unit, depending on personal choice, could include:

- Materials and associated production and finishing costs
- Hiring of additional equipment, venues and other resources
- Printing, framing, installation, binding of work
- Travel and fees associated with trips, visits or location working

You can discuss your choices and likely costs with your Unit Leader prior to starting your work.

Please note that work presented for assessment will be evaluated against unit learning outcomes using UAL's assessment criteria. Increased expenditure on materials to realise your assessment will not equate to increased grades in your assessment.

### Additional guidance

#### General submission information

It is your responsibility to submit your work on time and by the required method, otherwise there may be an impact on your achievement and progression.

#### Online submission information

If you are submitting work online via Turnitin or Moodle, the [Studying Online webpages](#) include useful information on accepted formats, as well as guides to help you in uploading your assignments. You can also contact Digital Learning with queries by raising a ticket with [MySupport](#).

Please note that as part of the submission process, the University will utilise Turnitin UK to check the authenticity and originality of your work.

#### Late Submissions and Failure

If you think you might miss a summative assessment deadline you should discuss this with your Unit Leader/Tutor. You can also find information on the 'Student Guide to Assessment Submissions', located on the [UAL Assessment](#) webpage.

The [UAL Assessment](#) webpage includes details of the university's marking scale and assessment criteria, and what happens if you fail a piece of work.

Visit the [Course Regulations](#) webpage for information on UAL's framework for the assessment of all taught HE students.

<b>Extenuating Circumstances</b>	Extenuating circumstances are defined as circumstances that are unexpected, significantly disruptive and beyond your control. If you are having difficulties with your assessment, you may be able to submit a claim. Further information can be found on the <a href="#">Extenuating Circumstances</a> webpage.
<b>Academic Misconduct</b>	The <a href="#">Academic Misconduct Regulations</a> cover the University's policy and procedures for preventing and addressing cheating and plagiarism.
<b>Referencing</b>	UAL advises that the Harvard Referencing Style is used for all taught courses. <a href="#">Cite Them Right Online</a> is a referencing resource. It will help you to cite and reference just about any source and avoid plagiarism.
<b>Fair assessment</b>	UAL has systems in place to make sure that assessment is conducted fairly for all students. For more information, including the Anonymous Marking Policy, please visit the <a href="#">Fair Assessment</a> webpage.