



**COM7023**

**Mathematics for Data Science  
Component 2 of 2**

**Level 7**

**Date for Submission:** Please refer to the timetable on ilearn

**(The submission portal on ilearn will close at 14:00 UK time  
on the date of submission)**

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Template: V5



## Assignment Brief

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As part of the formal assessment for the programme you are required to submit a written **Mathematics for Data Science** assessment. Please refer to your Student Handbook for full details of the programme assessment scheme and general information on preparing and submitting assignments.

**Module description:** Written assessment 40%

**Description:** The overall assessment is a written assessment and has been designed to check your fundamental understanding of the mathematical topics which underpins Data Science methodologies.

### Learning Outcomes:

	Assessment
Develop an advanced understanding of mathematical concepts and their application in data science. <b>LO 1</b>	X
Apply mathematical principles to solve data science-related problems. <b>LO 2</b>	X
Deploy mathematical functions and equations to derive advanced analytical solutions. <b>LO 3</b>	X
<b>Graduate Attribute</b> Identify and solve novel and complex problems related to aims and desired outcomes. Critically evaluate and reflect on the approaches and solutions identifying and embedding possibilities for originality or creativity. <b>LO 4</b>	X

**All learning outcomes must be met to pass the module.**



## Guidance

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Your assignment should include: a title page containing your student number, the module name, the submission deadline and the exact word count of your submitted document; the appendices if relevant; and a reference list in (see referencing section for more information). You should address all the elements of the assignment task listed below. Please note that tutors will use the assessment criteria set out below in assessing your work.

**You must not include your name** in your submission because Arden University operates anonymous marking, which means that markers should not be aware of the identity of the student. However, please do not forget to include your STU number.

**Maximum word count:** 1000 words equivalent

Please refer to the full word count policy which can be found in the Student Policies section here: [Arden University | Regulatory Framework](#)

The word count includes everything in the main body of the assessment (including in text citations and references). The word count excludes ***numerical data in tables, figures, diagrams, footnotes, reference list and appendices. All other printed words ARE included in the word count.***

Students who exceed the wordcount up to a 10% margin will not be penalised. Students should note that no marks will be assigned to work exceeding the specified limit once the maximum assessment size limit has been reached.



## Assignment Task

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### Component 2 of 2– Mathematical Assessment

#### Detail of component 2

Before your line managers give you a more in-depth topic on conditional probability, they wish to determine your understanding of the topic, both numerically and through coding.

Therefore, they want you to assign probabilities for purchases made on 40,000 randomly generated data points for the following age intervals 20, 30, 40, 50, 60 and 70, within an arbitrary time interval. Weighted probability will be based on purchasing and age, i.e. younger less likely to purchase than older. The focus of the investigation is to determine the probability of randomly purchasing an item, given the person is 70 years old.

Once you have evaluated the weighted dependencies on ages, remove the weighted condition and calculate the same conditional probability using the same data points and ages. Clearly state and critically analyse the results of the conditional probability comparative study for the targeted age in a short-written statement.

**(40 Total marks)**  
**(800 words equivalent)**  
**(200 words for written results)**  
**(LO's: 3 & 4)**

**End of questions**



You are to submit a single Word document for component 2. All workings out and final answer mathematical solution should be given using an appropriate mathematical text editor. NO HANDWRITTEN OR PHOTOGRAPHED submissions will be accepted. You are to provide screen shot evidence of your code with descriptive justifications at each stage. Your code should also be placed in an Appendix so it can be verified. Your student ID number must be clearly defined upon the uploaded file.

As technology and platforms may change, your module tutor will provide you with up-to-date details.

### Formative Feedback

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You are encouraged to submit your portfolio for feedback **once** and it is 30% of your entire submission. You, the student, are to choose 30%, **not the tutor**. The last day for guaranteed feedback hand in is Monday of week 9 at 23:58. No formative feedback will be given after the time specified above for blended learning.

The Feedback is designed to help you develop areas of your work, encouraging academic skills and independent learning.

If you are a Distance Learning student, then you are encouraged to send 30% of your portfolio for feedback by email to your tutor, no later than two weeks before your final submission date. Dates will be given to you by your tutor on a module-by-module basis.



## Referencing Guidance

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You **MUST** underpin your analysis and evaluation of the key issues with appropriate and wide ranging academic research and ensure this is referenced using the AU Harvard system(s).

Follow this link to find the referencing guides for your subject: [Arden Library](#)

## Submission Guidance

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**Assignments submitted late will not be accepted and will be marked as a 0% fail.**

Your assessment can be submitted as a single Word (MS Word) or PDF file, or, as multiple files.

If you chose to submit multiple files, you must name each document as the question/part you are answering along with your student number ie Q1 Section A STUXXXX. **If you wish to overwrite your submission or one of your submissions, you must ensure that your new submission is named exactly the same as the previous in order for the system to overwrite it.**

You must ensure that the submitted assignment is all your own work and that all sources used are correctly attributed. Penalties apply to assignments which show evidence of academic unfair practice. (See the Student Handbook which is available on the A-Z key information on iLearn.)



### Assessment Criteria (Learning objectives covered - all)

<p><b>Level 7</b> is characterised by an expectation of students' expertise in their specialism. Students are semi-autonomous, demonstrating independence in the negotiation of assessment tasks (including the major project) and the ability to evaluate, challenge, modify and develop theory and practice. Students are expected to demonstrate an ability to isolate and focus on the significant features of problems and to offer synthetic and coherent solutions, with some students producing original or innovative work in their specialism that is potentially worthy of publication by Arden University. A clear appreciation of ethical considerations (as appropriate) is also a prerequisite.</p>		
Grade	Mark Bands	Generic Assessment Criteria
<b>Distinction</b>	80%+	Outstanding analysis of key issues and concepts/. Outstanding development of conceptual structures and argument, making consistent use of scholarly conventions. Outstanding <i>research skills, independence of thought, an extremely high level of intellectual rigour and consistency, exceptional expressive / professional skills, and outstanding creativity and originality.</i> Outstanding <i>academic/intellectual skills. Work pushes the boundaries of the discipline and</i> demonstrates an awareness of relevant ethical considerations. <i>Work may be considered for publication by Arden university.</i>
	70-79%	Excellent analysis of key issues and concepts/. Excellent development of conceptual structures and argument, making consistent use of scholarly conventions. <i>Excellent research skills, independence of thought, an extremely high level of intellectual rigour and consistency, exceptional expressive / professional skills, and substantial creativity and originality.</i> <i>Excellent academic/intellectual skills. Work pushes the boundaries of the discipline and</i> demonstrates an awareness of relevant ethical considerations. <i>Work may be considered for publication by Arden university..</i>
<b>Merit</b>	60-69%	Very good level of competence demonstrated. High level of theory application. Very good analysis of key issues and concepts. Development of conceptual structures and argument making consistent use of scholarly conventions. Some evidence of original thought and a general awareness of relevant ethical considerations.
<b>Pass</b>	55-59%	A good performance. A good knowledge of key issues and concepts. Fairly descriptive, with some analysis of existing scholarly material, and some argument development. Limited evidence of original thought. Some awareness of relevant ethical considerations. Good professional skills (where appropriate).
<b>Pass</b>	50-54%	A satisfactory performance. Basic knowledge of key issues and concepts. Generally descriptive, with restricted analysis of existing scholarly material and little argument development. Use of scholarly conventions inconsistent. The work lacks original thought. Limited awareness of relevant ethical considerations. Satisfactory professional skills (where appropriate).

<b>Marginal Fail</b>	40-49%	<i>Limited research skills impede use of learning resources and problem solving. Significant problems with structure/accuracy in expression. Very weak academic professional skills. Limited use of scholarly conventions. Errors in expression and the work may lack structure overall</i>
	39% and below	<i>A poor performance in which there are substantial gaps in knowledge and understanding, underpinning theory and ethical considerations. Little evidence of research skills, use of learning resources and problem solving. Major problems with structure/ accuracy in expression. Professional skills not present. Very weak academic professional skills. No evidence of use of scholarly conventions.</i>

#### Rubric Task 1: Mathematics for Data Science assessment (40 Marks)

Criteria	Outstanding 80% and above	Excellent 70% - 79%	Good 60% - 69%	Pass 50% - 59%	insufficient 40% - 49%	Incomplete < 39%
<b>Task 1</b>  <b>Assessment</b> <b>(40% Marks Overall)</b>	An outstanding formulation of the practises involved when conducting mathematical investigations. The correct mathematical processes have been applied and workings out given. Processes and solutions are correct.	An excellent formulation of the practices involved when conducting mathematical investigations. Mathematical processes have been Applied. Almost all workings out and solutions are correct.	A very good formulation of most of the practices involved when conducting mathematical investigations. Workings out and solutions are mostly correct.	A good formulation of most practices involved when conducting mathematical investigations. Some workings out and solutions are correct. Some solutions are correct	A basic formulation of the practices involved when conducting mathematical investigations. Minimal workings out and solutions have been given and mostly incorrect	A limited formulation of the practices involved when conducting mathematical investigations. No workings out and solutions have been completed.