

MK:U Assignment Brief

Module Information	
Module Name	Digital Maths & Programming
Module Code	MK4006
Module Credit Value	30
Module Manager	Dr Artur Szymanski
Assignment Level	
This assignment is for apprentices at the following level only	4
Assignment Details	
Assignment number	1
Assignment Type	Report
Assignment Format (Group or Individual)	Group (in pairs)
Word Limit/Pages/Duration	Group document including reflective statement – maximum 2500 words. Where: 1500 words – report 500 words – reflective statement for one individual
Contribution [% of module mark]	35%
Hand-in point [canvas? In class?]	Canvas
Due Date	12 th May 2023 at 14:00

Marks will be Returned on	Within 20 working days
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Please read this assessment brief in its entirety before starting work on it.

The Assignment Task

For this assignment you are asked to choose and investigate a practical real-world application of a topic that we have covered in units 1-4: foundation maths for computing, discrete maths, data, optimisation. Several links to possible topics (not exhaustive) are provided on the course canvas page.

The group document should consider:

- the project proposal describing the motivation for the project; how the project objectives were developed
- a description of any resources used
- an overview of relevant mathematical or computational methods used.

In addition to this there should be an individual piece of writing to include:

- an assessment of the contributions made by the other member of your team.
- a personal reflection on your own development journey and what you have learnt in relation to the relevant KSBs/ILO covered by these units. This section should be at most 500 words (1 page).

Intended Learning Outcomes

Upon completion of this assignment, you will have covered the following module ILOs.

- ILO 2: Demonstrate mathematical concepts relevant to digital problems.

Please see the rubric for further details of the criteria against which you will be assessed.

Formatting Requirements

- PDF report in Arial 11pt or Time new Roman 12pt, 1.5 line spacing.

Formative Activities

The formative activities that you have undertaken will assist you in choosing and developing your submission for this assignment.

Assignment Support

You will undertake activities within this module to assist you in preparing for your assignment. Several links to possible topics (not exhaustive) are provided on the course canvas page. The Study Skills pages have relevant links to resources covering material in units 1-4. Also relevant are the study skills resources on academic writing.

Knowledge Skills and Behaviours¹

Upon completion of this assignment, you will have undertaken work contributing to the following KSBs, you are expected to reflect on these within your apprenticeship portfolio:

DATA SCIENCE DEGREE APPRENTICESHIP		
ID	EPA	KNOWLEDGE COMPETENCIES
K1	PD	The context of Data Science and the Data Science community in relation to computer science, statistics and software engineering. How differing schools of thought in these disciplines have driven new approaches to data systems.
K3	KT&PD	How data can be used systematically, through an awareness of key platforms for data and analysis in an organisation including:
K3.1	KT	Data processing and storage, including on-premise and cloud technologies

¹ Where this is an option module for you, please review your apprenticeship's KSBs to identify the appropriate match.

K4	KT	How to design, implement and optimise analytical algorithms – as prototypes and at production scale - using:
K4.1	KT	Statistical and mathematical models and methods.
K4.2	KT	Advanced and predictive analytics, machine learning and artificial intelligence techniques, simulations, optimisation, and automation
K4.5	KT	Development standards, including programming practice, testing, source control.
K5.1	KT	Sources of data including but not exclusive to files, operational systems, databases, web services, open data, government data, news and social media.
K5.2	KT	Data formats, structures and data delivery methods including “unstructured” data.
K5.3	PD	Common patterns in real-world data.
ID	EPA	SKILLS COMPETENCIES
S2	WBP	Perform data engineering: create and handle datasets for analysis. Use tools and techniques to source, access, explore, profile, pipeline, combine, transform and store data, and apply governance (quality control, security, privacy) to data.
S3	WBP	Identify and use an appropriate range of programming languages and tools for data manipulation, analysis, visualisation, and system integration. Select appropriate data structures and algorithms for the problem. Develop reproducible analysis and robust code, working in accordance with software development standards, including security, accessibility, code quality and version control
ID	EPA	BEHAVIOURS COMPETENCIES
B6	PD	A commitment to keeping up to date with current thinking and maintaining personal development. Including collaborating with the data science community

DIGITAL TECHNOLOGY SOLUTIONS APPRENTICESHIP	
ID	CORE - KNOWLEDGE COMPETENCIES
CK3	Contemporary techniques for design, developing, testing, correcting, deploying and documenting software systems from specifications, using agreed standards and tools.
ID	CORE - SKILLS COMPETENCIES
CS2	Analyses business and technical requirements to select and specify appropriate technology solutions.
CS3	Designs, implements, tests, and debugs software to meet requirements using contemporary methods including agile development
ID	CORE - BEHAVIOURS COMPETENCIES
CB14	Logical thinking and creative approach to problem solving.

Late Submissions

Where you fail to submit an assignment by the specified deadline (without prior approval) this will result in the mark being capped at 40% if submitted within one week of the specified deadline, and thereafter a failure to complete the assignment being recorded. For further details, please contact your SAS Lead who will be able to guide you through the extension/deferral request process.

Academic Integrity, Referencing and Plagiarism

It is important that that the work you submit for assessments is your own and adheres to the University's guidance. Please ensure that you have worked through the "Referencing and Plagiarism" section on the Study Skills Hub.

Detailed Rubric

The assignment will be marked against the following rubric:

	%						
		1st - Excellent 100-70% (1st)	Very Good 69-60% (2:1)	Good 59-50% (2:2)	Satisfactory 49-40% (3rd)	Poor 39-30% (Minor Fail)	Very Poor 29-0% (Major Fail)
Problem - Defining the problem/task in context to introduce the report.	10%	Effectively and concisely explains the aims and objectives of the problem/task. Objectives are specific and measurable. Provides an excellent analysis of the context for the problem/task.	Concisely explains the aims and objectives of the problem/task. Objectives are specific and measurable. Provides a very good analysis of the context for the problem/task	Explains the aims and objectives of the problem/task well. Objectives are reasonably specific and measurable. Provides a good analysis of the context for the problem/task	Satisfactorily explains the aims and objectives of the problem/task. Objectives are reasonably specific and measurable. Provides a poor analysis of the context for the problem/task	Explanation of the aims and objectives of the problem/task is superficial. Objectives are not specific and/or measurable. Provides a poor analysis of the context for the problem/task.	No explanation of project/task aims and objectives. Objectives are not stated. No analysis of the context for the problem/task.
Structure - The structure follows the instructed guidelines e.g. Introduction, Methodology, Results and Conclusion. The report is of an appropriate length	20%	The report uses the same structure from the instructed guidelines. Figures, tables and illustrations are appropriately placed throughout. Appendices are included (where necessary). The report is an appropriate length.	The report structure is based on the instructed guidelines. Figures, tables and illustrations are appropriately placed throughout. An appendix is included (where necessary). The report is an appropriate length.	The report structure is based on the instructed guidelines. Figures, tables and illustrations have been used but occasionally inappropriately placed. An appendix is included (where necessary). The report is an appropriate length.	The report structure is loosely based on the instructed guidelines. Figures, tables and illustrations have been used but are inappropriately placed. An appendix is included (where necessary). The report length is inappropriate.	A structure is evident (e.g. there are section headings) but not based on the instructed guidelines. Some figures, tables and illustrations have been used but are inappropriately placed. An appendix has not been included (where necessary). The report length is inappropriate.	No structure is evident. Figures, tables and illustrations have not been used. An appendix has not been included (where necessary). The report length is inappropriate.

	%						
		1st - Excellent 100-70% (1st)	Very Good 69-60% (2:1)	Good 59-50% (2:2)	Satisfactory 49-40% (3rd)	Poor 39-30% (Minor Fail)	Very Poor 29-0% (Major Fail)
Presentation - Well written with a logical flow. Subheadings, numbering systems, figure headings and captions. Spelling, grammar and use of technical language.	20%	Easy to read; ideas are succinctly presented. Figures, tables and illustrations are well titled, annotated and referenced. Technical terms are used accurately and where appropriate. No spelling or grammatical errors.	Easy to read; ideas presented are relatively succinct. Figures, tables and illustrations are titled, annotated and referenced. Technical terms are used accurately but some missing. Minor spelling and/or grammatical errors.	Relatively easy to read; ideas presented could be more succinct. Figures, tables and illustrations are titled, annotated and/or referenced. Technical terms are used but occasionally inaccurate or missing. Minor spelling and/or grammatical errors	There is a flow between paragraphs and sections, but ideas are occasionally verbose. Figures, tables and illustrations are occasionally titled, annotated and/or referenced. Technical terms are used but occasionally inaccurate and/or missing. Major spelling and grammatical errors.	It is difficult to understand the points being made due to a verbose and poor writing style (flow between paragraphs and sections). Figures, tables and illustrations are rarely titled, annotated and/or referenced. Major spelling or grammatical errors.	The report is illegible due to a verbose and very poor writing style (flow between paragraphs and sections). Figures, tables and illustrations are either missing or without a title, annotation and reference. Major spelling or grammatical errors.
Reading - Ability to research quality academic literature to support argument development and discussion.	10%	A breadth of relevant sources, beyond the core texts, were referred to and discussed in the report, indicating vast further reading around the topic. Source quality was also examined.	A very good collection of relevant sources, beyond the core texts, were referred to and discussed in the report, indicating further reading around the topic was conducted. Source quality was also examined.	A reasonable collection of relevant sources, beyond the core texts, were referred to in the report, indicating some further reading around the topic was conducted. Source quality was considered.	A small collection of vaguely relevant sources, beyond the core texts, were referred to in the report. Source quality was not considered.	A small collection of sources were referred to in the report, predominantly core texts. The quality of additional sources was not considered.	No sources, or at least none beyond the core texts, were referred to in the report, indicating no further reading was conducted.

	%						
		1st - Excellent 100-70% (1st)	Very Good 69-60% (2:1)	Good 59-50% (2:2)	Satisfactory 49-40% (3rd)	Poor 39-30% (Minor Fail)	Very Poor 29-0% (Major Fail)
Mathematics - Demonstration and application of mathematical principles/techniques to solve the problem.	30%	Demonstrated exceptional understanding of key mathematical principles, with the ability to effectively apply them to the problem. All calculations are relevant and correct.	Demonstrated very good understanding of key mathematical principles, with the ability to apply them to the problem. Calculations are relevant and mostly correct.	Demonstrated good understanding of key mathematical principles, with some ability to apply them to the problem. Most calculations are relevant, but some errors are evident.	Demonstrated basic understanding of key mathematical principles, with limited ability to apply them to the problem. Calculations are reasonably relevant but errors evident throughout.	Demonstrated limited understanding of key mathematical principles, with no ability to apply them to the problem. Calculations are mostly irrelevant with errors evident throughout.	Demonstrated lack of understanding of key mathematical principles, with no ability to apply them to the problem. Calculations are irrelevant and with errors evident throughout.
Referencing - A referencing system was used e.g. Author-date, Numbering etc	10%	Referencing is clear, consistent, and error free. An official referencing style has been used.	Referencing is clear and consistent but with minor errors. An official referencing style has been used.	Referencing is relatively clear and consistent but with minor errors. An official referencing style has been used.	Referencing is relatively clear but inconsistent and with obvious errors. An official referencing style has been attempted.	Referencing is inconsistent and incoherent, with obvious errors. An official referencing style has not been used.	No references present.