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GULF COLLEGE – MUSCAT – SULTANATE OF OMAN

UNDERGRADUATE COMPUTING PROGRAMME

ACADEMIC YEAR: 2020-2021, S2

[**SEMESTER 2**]

PORT1- Portfolio

Module Title: MATHEMATICS FOR TECHNOLOGY	
Module Code: GIS3002	
Method of Assessment: Portfolio	
Weighting: 50%	**Module Credits: 20**
Level: 3	**Semester/Teaching block: 1**
Morning/Evening session: BOTH	**Examiner: Mr. Noman**
Additional Information (if any): **Word Length: 2000 words equivalent, to be worked individually.**	

Module Title	Module Number	JACS Subject Code and % of each subject	ASC Category
Mathematics for Technology	GIS3002	G100	6

Level (3 - 8)	Credits	ECTS Credit	Module Value	% Taught in Welsh	Module Type
3	20	10	1.0	0%	Taught

Teaching Period	Pre-requisites
Term 1	None

Module Leader	School	Campus
Noman Tahir	Faculty of Computing Sciences	Gulf College, Oman

Assessment Methods

Assessment Code and Method	Duration/Length of the Assessment Method	Weighting of Assessment	Threshold	Approximate Date of Submission
PORT1 - Portfolio	2000 words equivalent	50%	1	End of term
CTEST1 - Class Test	2 hours (2000 words equivalent)	50%		Mid-term

Aim(s)

This module introduces students to basic concepts in mathematics in a context of solving real-world problems. As such, the module will provide students with the foundation required for further development in both engineering and computer science programmes, including the basics in hardware, data and usability.

Learning Outcomes

On successful completion of this module, students should be able to:

- Demonstrate understanding of fundamental mathematical concepts required for further studies in engineering and computer science.
- Demonstrate an appreciation for how basic aspects of mathematics (algebraic) can be used to solve

- real-world problems and help with general problem-solving skills
- Apply basic mathematical concepts to solve real world problems.

Learning and Teaching Delivery Methods			
Method	**Rationale**	**Type of Contact (scheduled/ guided independent study/placement)**	**Total hours**
Lectures	To allow core content to be delivered to the whole module cohort.	Scheduled	12
Workshops	To allow exploration of all aspects of module content (knowledge, understanding, skills & other attributes) in an interactive group setting	Scheduled	36
Independent Study	To enable students to independently develop their understanding of the module concepts and to complete formative & summative assessment activity	Guided Independent Study	152
Total			200

Indicative Content
• Basic mathematics for problem solving, such as algebraic manipulations.

Required Reading
Epp, S (2019) Discrete Mathematics with Applications. 5th Edition. Cengage Learning   Anton, H., Bivens, I.C., Davis, S. (2016) Calculus. 11th Edition. Wiley

Recommended Reading
Hill, C. (2016) Learning Scientific Programming with Python. Cambridge University Press.

Protter, M.H., Morrey, C.B.J (1997) A First Course in Real Analysis.4th Edition. Springer.

Przemieniecki, J.S (2012) Theory of Matrix Structural Analysis Dover Publications Inc.

Access to Specialist Requirements

None

GULF COLLEGE – FACULTY OF COMPUTING SCIENCES – In academic

Affiliation with **CARDIFF SCHOOL OF TECHNOLOGIES**

Assignment/coursework general submission requirements

A. **Written work**

- Student name and identification number must be clearly stated at the top of each page of the work. Where work is to be marked **anonymously**, only include the student number.
- A signed declaration that the work is your own (apart from otherwise referenced acknowledgements) must be included after the title page of your assignment
- Each page must be numbered.
- Where appropriate, a contents page, a list of tables/figures and a list of abbreviations should precede your work.
- All referencing must **adhere** to School/Institutional requirements.
- A word count must be stated at the end of your work.
- Your programme, year of study and the relevant module must be included as "footer" on each page.
- Appendices should be kept to the minimum and be of direct relevance to the content of your work.
- All tables and figures must be correctly numbered and labelled.
- Your assignment/coursework should be submitted by uploading it to Turnitin on the dates indicated for submission.

B. **Other types of coursework/assignments**

- Where coursework involves oral presentations, discussions, poster presentations, etc., specific instructions will be provided by your module leader/team.

This PORTFOLIO assesses the following learning outcome:

- *Demonstrate the understanding of fundamental mathematical concepts required for further studies in engineering and computer science.*
- *Demonstrate an appreciation for how basic aspects of mathematics (algebraic) can be used to solve real-world problems and help with general problem-solving skills.*

This class test is aimed at developing the following graduate attributes in students:

Graduate Attribute	Description
Continuous self-learning	Ability to continually undertake self-directed learning and take responsibility for one's own progress
Innovative	Ability to create something using novel ideas or methods
Critical Thinking	Ability to use various strategies to form an objective judgment
Problem Solving	Ability to solve real-world problems by applying the learnt principles and concepts in the discipline

Portfolio Overview

TASK 1

Choose any 7 members of your family. You may select your brothers, sisters, cousins or anyone who belongs to your family. As their weights in kilograms and heights in meters.

a) Find BMI (Body Mass Index) of each of them. You may use the following formula:

$$\text{BMI} = \frac{m}{h^2}$$

Once you finish calculating BMI for each of them, fill the following table:

Sn.	Members	BMI values
1	[Name of the first member]	[Value]
2	[Name of the second member]	[Value]
3	[Name of the third member]	[Value]
4	[Name of the fourth member]	[Value]
5	[Name of the fifth member]	[Value]
6	[Name of the sixth member]	[Value]
7	[Name of the seventh member]	[Value]

Once you accomplish the above part of this task,

b) Find the standard deviation of all BMIs. Use the following table to find it out.

Sn.	X	$\overline{x}$	$X - \overline{x}$	$(X - \overline{x})^2$
1	[BMI value of the first member]			
2	[BMI value of the second member]			
3	[BMI value of the third member]			
4	[BMI value of the fourth member]			
5	[BMI value of the fifth member]			
6	[BMI value of the sixth member]			
7	[BMI value of the seventh member]			

Note: $\overline{x}$ = mean value

c) Consult the following table where the list of BMIs are given according to weight and height:

BMI	19 to 24	25 to 29	30 to 39	40 to 54
Category	Normal	Overweight	Obese	Severely Obese

Suggest each of the member's weather he/she lies in the category of 'Normal', 'Overweight', 'obese' or 'Severely Obese'

TASK 2

As we know that the Sun rises in the east and sets in the west. Find out a suitable time from morning till 11:00 AM and stand under the Sun. The Sun will cast a shadow of yours on the earth. Calculate the size of your shadow (from the end of the toe till the head of the shadow) in centimetres.

a) Calculate the angle of depression from the top of your head till the top of the head of your shadow.

b) Select any suitable time from 02:00 PM to 03:00 PM and repeat the same process to calculate the angle of depression from the top of your head to the top of the head of your shadow.

c) Select any suitable time from 03:00 PM to 04:00 PM and repeat the same process to calculate the angle of depression from the top of your head to the top of the head of your shadow.

d) Select any suitable time from 04:00 PM to 05:00 PM and repeat the same process to calculate the angle of depression from the top of your head to the top of the head of your shadow.

e) Draw the graph of angles calculated in part b), c) and d)

f) Analyse the graph carefully and suggest a suitable time when the angle of depression approximately be the same as you calculated in a)

Suggestion: Please fix a complete day to accomplish this task

PORTFOLIO SUBMISSION DETAILS

TASKS	START	FINISH
Task 1	Beginning of week # 8	End of week # 10
Task 2	Beginning of week # 10	End of term

Note: You are required to follow the submission deadlines strictly. Late submission might be penalised as deduction in marks.

Marking Rubrics

	Very Poor	Poor	Satisfactory	Good	Very Good	Excellent
Task 1 (a)	Not solved.	Issues found in both calculations as well as in the answers. Table is filled partially.	Enough mistakes are found but most of the answers are correct. Many steps are not followed in order to reach final answer. Table is filled	There are some errors found in the calculations and some of the steps are not followed appropriately. Given table is filled.	All calculations are correct. Only minor steps are not presented in finding the BMI of each member. Given table is filled.	All calculations are correct. All steps are followed to compute the BMI for 7 members. No mistake found. Given table is filled.
Task 1 (b)	Not solved.	The part of the task is attempted poorly. There are considerable steps missing as well as wrong calculations found.	There are considerable steps not followed but overall method of calculation is correct.	There are some errors found in the calculations and some of the steps are not completed.	All calculations are correct and answers are provided by apply appropriate number of steps. There are minor errors found in calculations of decimal parts.	All calculations are correct and the answer is completed by applying full steps to solve. Answer is provided with two decimal part accuracy.
Task 1 (c)	Not solved.	The part of the task is attempted poorly. Incomplete understanding of the topic	Satisfactory statements provided to members according to the calculated data above. Comparison is not appropriate	Suggestions to each member made partially and not exactly stated as per the standards required to be followed. Little mistakes found while providing the suggestions compared to the given data.	Suggestions to each member made and stated as per the standards required to be followed. Little mistakes found while providing the suggestions compared to the given data.	Suggestions to each member made and stated as per the standards required to be followed. No mistake found while providing the suggestions compared to the given data.

Task 2 (a)	Not solved.	The part of the task is attempted poorly.	The part of the task is solved appropriately. There are some computational mistakes found. Some of the errors are also found. Overall satisfactory effort shown.	Evidence of data collection is not justified appropriately. Trigonometric steps are followed in computation and illustration of the situation. Minor errors found.	Real data is collected. All trigonometric steps are followed to compute the angle. Steps are illustrated well throughout the process. Little are found.	Real data is collected. All trigonometric steps are followed to compute the angle. Steps are illustrated well throughout the process. No calculation errors are found.
Task 2 (b)	Not solved.	The part of the task is attempted poorly.	The part of the task is solved appropriately. There are some computational mistakes found. Some of the errors are also found. Overall satisfactory effort shown.	Evidence of data collection is not justified appropriately. Trigonometric steps are followed in computation and illustration of the situation. Minor errors found.	Real data is collected. All trigonometric steps are followed to compute the angle. Steps are illustrated well throughout the process. Little are found.	Real data is collected. All trigonometric steps are followed to compute the angle. Steps are illustrated well throughout the process. No calculation errors are found.
Task 2 (c)	Not solved.	The part of the task is attempted poorly.	The part of the task is solved appropriately. There are some computational mistakes found. Some of the errors are also found. Overall satisfactory effort shown.	Evidence of data collection is not justified appropriately. Trigonometric steps are followed in computation and illustration of the situation. Minor errors found.	Real data is collected. All trigonometric steps are followed to compute the angle. Steps are illustrated well throughout the process. Little are found.	Real data is collected. All trigonometric steps are followed to compute the angle. Steps are illustrated well throughout the process. No calculation errors are found.

Task 2 (d)	Not solved.	The part of the task is attempted poorly.	The part of the task is solved appropriately. There are some computational mistakes found. Some of the errors are also found. Overall satisfactory effort shown.	Evidence of data collection is not justified appropriately. Trigonometric steps are followed in computation and illustration of the situation. Minor errors found.	Real data is collected. All trigonometric steps are followed to compute the angle. Steps are illustrated well throughout the process. Little are found.	Real data is collected. All trigonometric steps are followed to compute the angle. Steps are illustrated well throughout the process. No calculation errors are found.
Task 2 (e)	Not solved.	Graph is poorly designed and values are not appropriately reflected.	Overall graph is appropriate. The points added to the graph from above calculations are correct. However, the derivation of analytical point is not correct.	The graph is drawn appropriately with the obtained data. Overall graph is good. There is some confusion found while understanding the graphical values	A very good graph is drawn. Scale and points are accurately derived from the data. A little bit issue found in graph management	Graph is drawn excellently. Scale and points are exactly instantiated. No error found in graph drawing. Graph supports full analysis and the required time is exactly derived.
Task 2 (f)	Not solved.	Poor statements are written while proving the data analysis.	A satisfactory statement is provided on the analysis of the given data.	The analysis is appropriate and acceptable mathematically. Accuracy issues found.	The analysis is fine enough and proven mathematically. However, little mathematical accuracy issues found.	The analysis is completely logical and mathematically proved. No error found.

Generic Marking Criteria

Grade	% Mark	Requirements
	0	No answer has been attempted or evidence of unfair practice.
F (Fail)	1 – 9	The work presented for assessment may be incomplete and/or irrelevant and demonstrates a serious lack of comprehension and/or engagement with the set task. Attainment of the learning outcomes is minimal and assessment criteria are not addressed.
	10 – 19	Misunderstanding or misinterpretation of the set task, providing a short and/or largely irrelevant response. Consequently, no learning outcomes are met in full although there may be minimal attainment in relation to one or two.
	20 - 29	Minimal understanding of the set task and will partially have met some of the learning outcomes. Little knowledge and understanding of the field of study relevant to the task. The limited ability is shown to communicate simple concepts and/or factual information. Significant difficulties in the report's structure and organisation detract from the clarity and meaning overall. Evidence of individual reading and investigation is negligible and the limited referencing of literature and other sources is frequently inaccurate. Demonstrates some ability to describe and report but very little evidence is available to indicate an ability to engage in critical evaluation and reflection.
	30 – 39	Partial understanding of the set task and some of the associated learning outcomes met at a basic level. Factual inaccuracies, errors and misconceptions are evident in important areas and elements of the assessed work may be irrelevant to the task. If attempted, the presentation of arguments and more complex ideas may be confused and clumsily expressed. Some enquiry and analysis relevant to the task attempted but outcomes may be naïve, simplistic and/or unconvincing. Demonstrates limited knowledge of current research/scholarship in the discipline. A restricted range of sources are used but overall, there is an over-reliance on programme materials with little evidence of individual reading and investigation. There are frequent errors in the referencing of literature and other sources. The work is largely descriptive and arguments, if attempted, are rarely substantiated.
D (Third)	40 - 49	Demonstrates a basic understanding of the set task and an ability to have met the associated learning outcomes and addresses the assessment criteria at a threshold level. Displays a basic knowledge and understanding of many aspects of the field of study relevant to the task. Reproduction of information received from elsewhere (e.g. programme materials). Errors and misconceptions will be evident but these are outweighed by the degree of knowledge and understanding demonstrated overall. More success is achieved in describing and reporting factual information rather than communicating complex ideas.

		Generally, the work is appropriately structured although key points may not be logically sequenced. Some limited analysis and enquiry relevant to the task/discipline included and has intermittent success in presenting and commenting on outcomes. A limited ability to critically evaluate and reflect. Although some critical reflection is evident, the balance within the work is likely to be in favour of description and factual presentation.
C (Lower Second)	50 - 59	A secure understanding of the set task and an ability to have met the associated learning outcomes and address the assessment criteria at a satisfactory level. Displays a sound knowledge and understanding of most key aspects of the field of study relevant to the task and there is some evidence of an ability to apply such knowledge. Some evidence of independent thinking beyond programme notes. Overall, the structure and format of the work are appropriate. Occasional faults in the presentation of work, but overall, these do not detract from the clarity of expression. Examples of research/scholarship referred to in the work demonstrate individual reading and investigative ability to critically evaluate and reflect although there may be some over-reliance on description and factual presentation. Arguments are usually substantiated.
B (Upper Second)	60-69	Demonstrates a full understanding of the set task and an ability to have met the learning outcomes and address the assessment criteria at a good level. Detailed knowledge and thorough understanding of key aspects of the field of study relevant to the task are shown. There is clear evidence of an ability to apply such knowledge and, in some contexts, to extend and transform it. Discussion of complex concepts is often tackled successfully and there is evidence of independent thinking. Displays an ability to communicate information, ideas and concepts clearly and succinctly. Work is well presented and the format appropriate. Key points are appropriately organised and the writing style is fluent and arguments are well articulated. Detailed analysis and critical enquiry relevant to the task/discipline is undertaken by making use of appropriate techniques and has considerable success in presenting and commenting on outcomes. There is some linkage between theory and practice. Examples referred to indicate a breadth and depth of individual reading and investigation that extend beyond the sources provided. The referencing of literature and other sources is almost always accurate. Arguments are clearly considered and substantiated and there is evidence of an ability to make appropriate judgements and to suggest solutions to problems.
A (First)	70 – 79	Demonstrates a full and detailed understanding of the set task and an ability to have met the learning outcomes and address the assessment criteria at a very good level. Detailed knowledge and systematic understanding of key aspects of the field of study relevant to the task are evident. There is strong evidence of an ability to extend, transform and apply such knowledge. The student also

		demonstrates an ability to engage in a confident discussion of complex concepts and to recognise the limitations and ambiguity of disciplinary knowledge. Independent thinking and original insights are also present in the report. The ability is shown in communicating information, complex ideas and concepts in a coherent and succinct manner. The standard of presentation is high and the format appropriate. Key points are logically organised and in written work, the style is lucid and mature. Detailed and thorough knowledge of current research/advanced scholarship in the discipline. The use of scholarly reviews/primary sources is confident and a breadth and depth of individual reading and investigation, extending beyond the sources provided, is apparent. The referencing of literature and other sources is accurate and in line with academic conventions. An ability to engage in critical evaluation of concepts/arguments/data and to make appropriate and informed judgements is shown. Arguments are well developed, sustained and substantiated. Where relevant, assumptions are challenged and there is a clear recognition of the complexities of academic debate. Appropriate and sometimes innovative solutions are offered to problems.
	80 - 89	Beyond the above, a full and detailed understanding of the set task and an ability to have met the learning outcomes and address the assessment criteria at an excellent level is displayed.
	90 - 100	Beyond the above, demonstrates a full and detailed understanding of the set task and an ability to have met the learning outcomes and address the assessment criteria at an outstanding and exceptional level. Work is of a standard deemed to be worthy of publication Reference citations extend significantly beyond the main body of reading normally expected in the discipline/field of study.

Plagiarism

1. **Plagiarism,** which can be defined as using without acknowledgement another person's words or ideas and submitting them for assessment as though it were one's own work, for instance by copying, translating from one language to another or unacknowledged paraphrasing. Further examples of plagiarism are given below:

Use of any quotation(s) from the published or unpublished work of other persons, whether published in textbooks, articles, the Web, or in any other format, which quotations have not been clearly identified as such by being placed in quotation marks and acknowledged.

Use of another person's words or ideas that have been slightly changed or paraphrased to make it look different from the original.

Summarising another person's ideas, judgments, diagrams, figures, or computer programmes without reference to that person in the text and the source in a bibliography or reference list.

Use of services of essay banks and/or any other agencies.

Use of unacknowledged material downloaded from the Internet.

Re-use of one's own material except as authorised by the department.

2. **Collusion**, which can be defined as when work that has been undertaken by or with others is submitted and passed off as solely as the work of one person. This also applies where the work of one candidate is submitted in the name of another. Where this is done with the knowledge of the originator both parties can be considered to be at fault.

3. **Fabrication of data**, making false claims to have carried out experiments, observations, interviews or other forms of data collection and analysis or acting dishonestly in any other way.

Plagiarism Detection Software (PDS)

As part of its commitment to quality and maintenance of academic standards, the University reserves the right to use Plagiarism Detection Software (PDS), including Turnitin. Such software makes no judgement as to whether a piece of work has been plagiarised - it simply highlights sections of text that have been found in other sources, thus giving the student the opportunity to rephrase or rewrite such section.

Turnitin has two basic functions – first, as a developmental tool and second, as a plagiarism policing agent. As a developmental tool, Turnitin can be used to provide students with formative feedback through a well-designed scoring rubric, helping them develop and improve their writing skills. As a plagiarism policing agent, Turnitin would facilitate understanding of plagiarism, citations and the proper way of referencing thus helping the student avoid plagiarism issues.

Further information and guidance can be found in the University's policy on the Use of Plagiarism Detection Software.

WORK DECLARATION

I, [Name of Student]_____, hereby declare that the uploaded Assignment through Turnitin is my own work. I affirm that this has been researched and completed in accordance with the college rules and regulations on plagiarism.

I acknowledge the advice given by the module tutors on proper referencing to avoid plagiarism and the rules on the academic unfair practice.

I acknowledge that I read and understand the plagiarism guide written at the end of this assessment. Any academic misconduct will be handled according to the rules and regulations of the university.

[Name of Student]

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General instructions:

Assignment must be submitted online through Turnitin before due date. An acknowledgement will be given to you by your teacher upon **presentation of the finance clearance**. This is your receipt, **keep it.**

The only circumstance in which assignments can be uploaded late via Turnitin is if a Mitigating Circumstances (MC) form is submitted at the same time. In these circumstances work may be submitted within five (5) working days. Make sure to secure MC form and submit the same to the concerned staff.

Write the number of words used, excluding references, at the end of your assignment. Provide the list of sources you used at the last page of your assignment with proper label 'References'. You may include diagrams, figures etc. without word penalty. The number of words will be + or – 10% of the total words allowed.

A work declaration must be included just after the reference page of your assignment. This ensures that you prepare your work in good faith. Any form of collusion and/or academic unfair practice will be dealt with according to the pertinent rules and regulations of the partner university. Please read carefully the plagiarism guide.

CARDIFF SCHOOL OF TECHNOLOGIES : VERIFICATION OF INTERNAL MODERATION OF ASSESSMENT   **IV2**

Module Number: *GIS3002*		Module Name: **Mathematics for Technology**		Module Leader: Noman Tahir	Year/Term: 2020-2021, Semester 2
MODULE ASSESSMENT STRATEGY		**BRIEFING INCLUDES:**	**X**	**IV's COMMENTS / RECOMMENDATIONS**	**MODULE LEADER'S ACTION TAKEN**
CTEST1- In-class Test	*50%*	Description of Task/Problem/Topic	☒	Verified all the questions and it covers the learning outcome.	Submitted for external moderation.
PORT1 - PORTFOLIO	*50%*	Hand in Details	☒		
		Guidance Notes	☒		
		Learning Outcomes	☒		
Total	*100%*	Assessment Criteria	☒		
ASSESSMENT DETAILS		Mark Criteria	☒		
Title: PORT1		Marking Scheme	☒		
		Feedback Sheet	☐		
Assessment type: Portfolio		Referencing Requirements Given	☒		
Nominated IV: *Mr. Muhammad Shahzad*			IV Signature:		Date:28/12/2020

CARDIFF METROPOLITAN LINK TUTOR COMMENTS:		EXTERNAL EXAMINER COMMENTS:	
The assessment is adequate but perhaps on the easy side, as I do not know the exact material I will assume it is appropriate to the students, particularly as they are foundation students and it's best to assume less knowledge and teach more. There are a few spelling mistakes that need to be solved before passing onto the external, just a run through a spell check should fix this.			
X	**Please check appropriate box below**	**X**	**Please check appropriate box below**
☐	I confirm that I have considered the above draft assignment/exam and I am happy to approve the content. **Assessment can now be forwarded to the External Examiner for approval.**	☐	I confirm that I have considered the above draft assignment/exam and I am happy to approve the content. **Assessment can now be released to the students.**
☐	I confirm that I have considered the above draft assignment/exam and I am happy to approve the content subject to the above amendments. **Assessment can be forwarded to the External Examiner once these changes have been implemented and verified.**	☐	I confirm that I have considered the above draft assignment/exam and I am happy to approve the content subject to the above amendments. **Assessment can be released to students once these changes have been implemented and verified.**

☐	I confirm that I have considered the above draft assignment/exam and suggest the above amendments. **I would like to see the final amended version before I confirm approval.**			☐	I confirm that I have considered the above draft assignment/exam and suggest the above amendments. **I would like to see the final amended version before I confirm approval.**		
Cardiff Metropolitan Link Tutor: Dr Ana Cadleron	Link tutor signature: ACC	Date 16/02/2021		External Examiner:	EE Signature:		Date: