Module Descriptor

Academic Session	2024/25
Module Title	Pure Mathematics
MTC Module Code	MTCG1018
MTC Owning Department	Foundation Programme Department
MTC Module Coordinator	Mr. Knowledge Simango

Term Taught	2
Notional Hours	100
Scheduled Hours	44

Overview

This module helps students to bridge the gap in mathematical skills between secondary school and higher education.

This module is common to all engineering students and is aimed at preparing the students to have a common foundation of basic mathematics skills that will enable the students to solve engineering problems and to understand other mathematics courses they will do in their engineering curricula.

Notes/Accreditation Information

The contents of this module meet the requirements of OAAAQA (Oman Academic Accreditation Authority and Quality Assurance of Education), 4.2.3 - a, c, d, h, j and k) and the EASA (European Aviation Safety Agency) Part 66 Module 1 for Licensed Aircraft Engineering, 1.2b, 1.3a, 1.3b and 1.3c, except for their assessment strategies.

Contribution to ROSQA Learning Outcomes: (Knowledge (K), Cognitive Skills (CS), General Competencies (GC)):

The attributes delivered in this module are designed to meet ROSQA Learning Outcomes for OQF Level 1 (Certificate).

Requisite Modules	
Module Title	**MTC Code**
--	--

Aims	
1.	To ensure that students are equipped with the mathematical understanding and skills necessary to meet the cognitive and practical requirements of postsecondary or higher education studies in a variety of disciplines.
2.	To provide the knowledge of fundamentals in elementary mathematics and familiarize with its relevant terminology.
3.	To develop the student's mental mathematical skills.
4.	To apply mathematical concepts and procedures to selected real-life problems.
Learning Outcomes – On successful completion of this module, students should be able to:	
1. (5)	Demonstrate understanding of the definition of a function and its graph.
2. (6)	Define and manipulate exponential and logarithmic functions and solve problems arising from real life applications.
3. (7)	Understand the inverse relationship between exponents and logarithms functions and use this relationship to solve related problems.

4.	(3)	Understand basic concepts of descriptive statistics, mean, median, mode and summarize data into tables and simple graphs (bar charts, histogram, and pie chart).
5.	(4)	Understand basic probability concepts and compute the probability of simple events using tree diagrams and formulas for permutations and combinations.
6.	(8)	Define and evaluate limit of a function as well as test continuity of a function.
7.	(2)	Determine the surface areas, the volumes and capacities of common shapes and 3-dimesions figures (square, rectangle, parallelogram, trapezium, cuboid, cone, pyramid and prisms).
8.	(9)	Find the derivatives of standard and composite functions using standard rules of differentiation.
9.	(1)	Use the law of sines and cosines to solve a triangle and real-life problems.

Syllabus - The topics covered in the unit will include:		
1.	(5)	**Functions and graphs** • Definition of function • Domain and range • Types of functions • Composite function
2.	(6)	**Exponential functions** Exponential equations Exponential function and graphs Application in real life
3.	(7)	**logarithmic functions** Logarithm Definition and Properties Logarithmic function and graph Exponential and logarithmic equations Applications of logarithms
4.	(3)	**Statistics** • Basic concepts of descriptive statistics • Measures on central tendency (mean, median & mode) • Measures on dispersion (variance & standard deviation) • Simple graphs (bar charts, histogram, and pie chart)
5.	(4)	**Probability** • Basic probability concepts • Problems based on tree diagram • Formulas for permutations and combinations
6.	(8)	**Limits & Continuity of a function** • Definition of limit • Evaluation of limit • Test of continuity
7.	(2)	**Perimeter, Area and Volume** • Determine area and perimeter for 2-dimesions figures (circle, triangle, square, rectangle, parallelogram, and trapezium)

		• Determine the surface areas and volumes for 3-dimesions figures (cube, cuboid, cone, cylinder, sphere, pyramid and prism)
8.	(9)	**Differentiation of function** Gradient of a curve • Differentiation by first principle • Methods of differentiation • Differentiation of composite function(Chain Rule)
9.	(1)	**Law of sines and cosines to solve a triangle** • Law of sines • Law of cosines

Learning and Teaching Strategy

The module will be delivered in one trimester through lectures, tutorials and practical exercises.

Students will be provided with comprehensive teaching/learning material, worked examples in class and problem sheets to develop their skills. The module adopts an integrated / a student-centered approach to learning & teaching .

Students will undertake Guided Self Study, including the use of the VLE, and directed to resources such as online tutorials, notes, interactive presentations and simulations, including use of videos etc.

Formative tests, with feedback, will be given throughout the module to help the student to prepare for the summative assessment of the module.

Scheduled Activities

#	Activity Type	QAA Activity	Description	No. of sessions	Duration	Hours
1.	Lecture	Lecture	3 hours per week	33	50 minutes	33
2.	Tutorial	Tutorial	1 hour per week	11	50 minutes	11

Assessment Strategy and Schedule

The module will be assessed through formative and summative assessments, namely: Continuous Assessment-1 (CA1), Continuous Assessment-2 (CA2), and the Final Exam.

The Generic feedback on CA1 & CA2 will be provided to the students through Moodle/ Module Teacher. Generic feedback on the Final Exam will also be provided on Moodle.

The minimum passing mark is overall 50%.

Deferred First Attempt Assessment (DFAA): DFAA for Continuous Assessment 1, 2 and final exams will be a different set of exams but will cover the same Learning Outcomes of exam(s) missed. The deferred assessment will also have the same exam duration as the first attempt assessment.

Second Attempt Assessment (SAA/Re-sit) will be 90 minutes examination to cover all Learning Outcomes.

The maximum marks obtained by the students will be capped at 50% (minimum passing requirements).

Module Descriptor

Item	Assessment	Artefact Code	Weighting	Assessment Type	Final Artefact	Description
1.	CA1	PMA1	20%	Written Exam	N	30 Minutes duration
2.	CA2	PMA2	30%	Written Exam	N	45 Minutes duration
3.	Final Exam	PMA3	50%	Written Exam	Y	75 Minutes duration

	Indicative Reading	
	Title/Edition/Author	**ISBN**
1	**College Algebra with Trigonometry-7th Edition,** (2001) by K Raymond A., Ziegler Michael R., Byleen,	ISBN-13: 978-0072368697 ISBN-10: 0072368691
2	**College Algebra and Trigonometry-7th Edition,** (2020) by Margaret L. Lial, John Hornsby, David I. Schneider and Callie Daniels,	ISBN-13: 978-0321671783 ISBN-10: 0321671783
3	**Bird's Basic Engineering Mathematics- 8th Edition,** (2021) by John Bird,	ISBN-13: 978-0367643676 ISBN-10: 0367643677
4	**Engineering Mathematics- 8th Edition,** (2020) by K.A. Stroud and Dexter Booth,	ISBN-13: 978-1352010275 ISBN-10: 1352010275