

Subject Description Form

Subject Code	AMA212
Subject Title	Foundation Mathematics
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Role and Purposes	The subject aims to provide students with an understanding of basic concepts of calculus and mathematics. The emphasis will be on application of mathematical methods to solving practical problems.
Subject Learning Outcomes	Upon completion of the subject, students will be able to: <ol style="list-style-type: none"> 1. apply mathematical reasoning to analyse essential features of different mathematical problems; 2. extend their knowledge of mathematical techniques and adapt known solutions to different situations arising in Optics; 3. develop and extrapolate mathematical concepts in synthesizing and solving new problems in Optics; 4. search for useful information in solving different mathematical problems in Optometry related topics.
Subject Synopsis/ Indicative Syllabus	<p><i>Basic mathematics:</i> Trigonometry; Complex numbers; Simple matrices.</p> <p><i>Differential Calculus:</i> Differentiation from the first principle; Rates of change; Differentiation of algebraic, trigonometric, logarithmic and exponential functions; Differentiation of inverse functions and implicit functions; Leibniz's theorem; Geometric and physical applications.</p> <p><i>Integral Calculus:</i> Definite and indefinite integrals; Techniques of integration; Reduction formulas; Applications of integration.</p>
Teaching/Learning Methodology	Two hour lectures will be conducted every week to initiate students into the basic mathematical concepts and techniques of the above mentioned topics. Then an hour tutorial will be held to strengthen students' knowledge and develop their ability for logical thinking and problem solving skill.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
			1	2	3	4
	a. Midterm Tests	30%	✓	✓	✓	✓
b. Tutorial Exercises and Assignments	10%	✓	✓	✓	✓	
c. Examination	60%	✓	✓	✓	✓	
Total	100%					
<p>Continuous Assessment comprises of midterm tests and tutorial exercises. A final examination is held at the end of the semester.</p> <p>Questions used in exercises, assignments, midterm tests and examination are used to assess the student's level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.</p> <p>To pass this subject, students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components.</p>						
Student Study Effort Required	Class contact:					
	▪ Lecture		28 Hrs.			
	▪ Tutorial		14 Hrs.			
	Other student study effort:					
	▪ Assignments		20 Hrs.			
	▪ Self-study		58 Hrs.			
	Total student study effort		100 Hrs.			
Reading List and References	<u>Textbook:</u>					
	K.F. Hung, Wilson C.K. Kwan and Glory T.Y. Pong	Foundation Mathematics & Statistics	McGraw Hill 2011			
	<u>References:</u>					
Anton, H.	Elementary Linear Algebra 9 th edition	John Wiley & Sons 2004				
Thomas, G.B., Weir, M.D. & Hass, J.R.	Thomas' Calculus 12 th edition	Addison Wesley 2009				