

Title:	Technological Mathematics 1 APPROVED
Long Title:	Technological Mathematics 1
Module Code:	MATH6014
Credits:	5
NFQ Level:	Fundamental
Field of Study:	Mathematics
Valid From:	Semester 1 - 2014/15 (September 2014)
Module Delivered in	18 programme(s)
Module Coordinator:	AINE NI SHE
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Module Description:	An introduction to fundamental mathematical calculations and problem solving aimed at consolidating and developing student competence in the mathematical techniques which are central to scientific and engineering programmes.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Perform all manner of arithmetical calculations.
LO2	Use the laws of indices and logs to solve related equations arising in applied problems.
LO3	Formulate and solve equations involving quadratics and cubics. Solve a system of simultaneous linear equations using elimination.
LO4	Reduce equations to linear form and determine parameters from appropriate graphs.
LO5	Use basic trigonometry to determine angles, lengths and areas and solve simple trigonometric equations. Determine the salient characteristics of a sinusoidal waveform.
Pre-requisite learning	
Module Recommendations	
<i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>	
No recommendations listed	
Incompatible Modules	
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements	
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>	
No requirements listed	
Co-requisites	
No Co Requisites listed	

Module Content & Assessment

Indicative Content

The Fundamentals of Arithmetic with Applications

The arithmetic of fractions. Decimal notation and calculations. Instruction on how to use a calculator. Ratio and proportion. Percentages. Approximation, error estimation, absolute, relative and relative percentage error

Basic Mathematics

Indices with a discussion of scientific notation and orders of magnitude. Logarithms and their use in the solution of indicial (exponential) equations. Conversion of units. Evaluation and transposition of formulae.

Algebra

Formulation and solution of linear, quadratic and cubic equations. Formulation and solution of systems of simultaneous linear equations. Simple partial fraction expansions.

Linear Graphs

Reduction of non-linear relationships to linear form. Manipulation of data and plotting of linear graphs to estimate parameters.

Trigonometry

Angle measurement in degrees and radians. Conversion between degrees and radians and vice versa. Length of a circular arc and area of a circular sector. Introduction of the trigonometric ratios via the unit circle. Solution of simple trigonometric equations. Applications of the Sine and Cosine rules to angle, length and area measurement. Graphs of the trigonometric functions with emphasis on the waveform nature of the Sine and Cosine functions. Discussion of general waveforms in terms of amplitude, period, frequency and phase. Treatment of applied problems involving sinusoidal waveforms.

Assessment Breakdown

	%
Course Work	30.00%
End of Module Formal Examination	70.00%

Course Work

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Short Answer Questions	In Class Assessment	1,2	15.0	Week 4
Short Answer Questions	In class assessment	3,4	15.0	Week 9

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	End-of-Semester Final Examination	1,2,3,4,5	70.0	End-of-Semester

Reassessment Requirement

Repeat examination

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time

<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Delivery of course material	3.0	Every Week	3.00
Independent & Directed Learning (Non-contact)	Study of lecture notes and problem solving.	3.0	Every Week	3.00
Tutorial	Solving of exercise problems	1.0	Every Week	1.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

Workload: Part Time

<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Delivery of course material	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Worksheets with feedback	1.0	Every Week	1.00
Tutorial	Problem solving via exercise sheets	1.0	Every Second Week	0.50
Independent & Directed Learning (Non-contact)	Study and skills practice	3.5	Every Week	3.50
Total Hours				7.50
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				2.50

Module Resources
<i>Recommended Book Resources</i>
<ul style="list-style-type: none"> • John Bird BSc (Hons) CEng CMath CSci FIET MIEE FIE FIMA FCollIT, 2010, <i>Basic Engineering Mathematics, Fifth Edition</i> [ISBN: 9781-85617-697-2]
<i>Supplementary Book Resources</i>
<ul style="list-style-type: none"> • Peter Tebbutt 1998, <i>Basic mathematics for chemists</i> [ISBN: 9780471972846] • M. Crockett & G. Dogett 2003, <i>Mathematics for Chemists</i>, Vol.1 Ed., Royal Society of Chemistry [ISBN: 0-85404-677-1] • J.O.Bird 2005, <i>Basic Engineering Mathematics</i>, 4th Ed., Newnes [ISBN: 978-0750665759/0] • K.A. Stroud 2007, <i>Engineering Mathematics</i>, 6th Ed., Macmillan [ISBN: 978-1403942463]
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<ul style="list-style-type: none"> • Website: CITCIT Maths Online http://citbb.blackboard.com

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_EBENS_8	<u>B Eng (Hons) in Building Energy Systems (Ab Initio)</u>	1	Mandatory
CR_EEPSY_8	<u>Bachelor of Engineering (Honours) in Electrical Engineering</u>	1	Mandatory
CR_EELES_8	<u>Bachelor of Engineering (Honours) in Electronic Engineering</u>	1	Mandatory
CR_ESENT_8	<u>Bachelor of Engineering (Honours) in Sustainable Energy Engineering</u>	1	Mandatory
CR_EBIME_7	<u>Bachelor of Engineering in Biomedical Engineering</u>	1	Mandatory
CR_EBSEN_7	<u>Bachelor of Engineering in Building Services Engineering</u>	1	Mandatory
CR_EELEC_7	<u>Bachelor of Engineering in Electrical Engineering</u>	1	Mandatory
CR_EELXE_7	<u>Bachelor of Engineering in Electronic Engineering</u>	1	Mandatory
CR_EMANF_7	<u>Bachelor of Engineering in Manufacturing Engineering</u>	2	Mandatory
CR_EMECH_7	<u>Bachelor of Engineering in Mechanical Engineering</u>	1	Mandatory
CR_EENTE_6	<u>Certificate in Engineering Technology</u>	2	Mandatory
CR_CCIVL_6	<u>Higher Certificate in Civil Engineering</u>	1	Mandatory
CR_EBIME_6	<u>Higher Certificate in Engineering in Biomedical Engineering</u>	1	Mandatory
CR_EBSEN_6	<u>Higher Certificate in Engineering in Building Services Engineering</u>	1	Mandatory
CR_EELEC_6	<u>Higher Certificate in Engineering in Electrical Engineering</u>	1	Mandatory
CR_EELXE_6	<u>Higher Certificate in Engineering in Electronic Engineering</u>	1	Mandatory
CR_EMECH_6	<u>Higher Certificate in Mechanical Engineering</u>	1	Mandatory
CR_EMECN_7	<u>Parttime - Bachelor of Engineering in Mechanical Engineering</u>	2	Group Elective 1