

Title:	Technological Mathematics 220	APPROVED
Long Title:	TM 220 Technological Mathematics for Electrical & Electronic Engineers	
Module Code:	MATH6041	
Credits:	5	
NFQ Level:	Fundamental	
Field of Study:	Mathematics	
Valid From:	Semester 1 - 2014/15 ( September 2014 )	
Module Delivered in	<a href="#">7 programme(s)</a>	
Module Coordinator:	AINE NI SHE	
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Module Description:	This module builds on the learner's previous knowledge and understanding of differential and integral calculus. New techniques and applications of differentiation and integration are included. The module also provides an introduction to statistics.	
<b>Learning Outcomes</b>		
On successful completion of this module the learner will be able to:		
LO1	Use differentiation to solve optimisation problems and related rates of change problems.	
LO2	Apply partial differentiation to analyse small changes, error analysis and rates of change.	
LO3	Apply various integration techniques. Calculate the mean and root mean square value of periodic and non periodic functions.	
LO4	Describe and analyse descriptive statistics of samples and populations using graphical and analytical methods.	
<b>Pre-requisite learning</b>		
<b>Module Recommendations</b>		
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).		
10244	MATH6045	Technological Maths 2 (Elec)
<b>Incompatible Modules</b>		
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.		
7796	MATH6042	Technological Mathematics 220A
<b>Co-requisite Modules</b>		
No Co-requisite modules listed		
<b>Requirements</b>		
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.		
No requirements listed		
<b>Co-requisites</b>		
No Co Requisites listed		

Module Content & Assessment

**Indicative Content**

**Differential Calculus**

Review of the fundamental rules of differentiation to include product, quotient and chain rules. Differentiation of polynomial, rational, exponential, logarithmic, trigonometric, hyperbolic and inverse functions. The second derivative test and its use in optimisation problems. Application of the Newton Raphson method. Calculation of related rates of change. Implicit differentiation. Introduction to partial differentiation to include first and second order partial derivatives. Applications to small changes, error analysis and rates of change.

**Integral Calculus**

Review of the fundamental techniques of anti-differentiation and integration to include table look-up and the method of substitution. Integration techniques to include integration by parts and partial fractions. Applications of definite integral to include the calculation of the mean and root mean square (rms) of periodic and non periodic functions.

**Introduction to Statistics.**

Graphical display of statistical data including histograms, ogive and boxplots. Calculation of measures of location and dispersion such as the mean, median, mode range and standard deviation.

**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
Other	Series of in class assessments	1,2,3,4	30.0	Every Week

**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	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	Class based instruction	3.0	Every Week	3.00
Tutorial	Working on assignment sheets and carrying out continual assessment	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Exercise sheets	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Skill Practice	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	Class based Instruction	2.0	Every Week	2.00
Lecture	Class based instruction	1.0	Every Second Week	0.50
Independent & Directed Learning (Non-contact)	Skills practice	1.0	Every Week	1.00
Tutorial	Working on assignment sheets and carrying out continual assessment	1.0	Every Second Week	0.50
Total Hours				5.00
Total Weekly Learner Workload				4.00
Total Weekly Contact Hours				3.00

Module Resources
<i>Recommended Book Resources</i>
<ul style="list-style-type: none"> <li>• John Bird 2010, <i>Engineering Mathematics</i>, Sixth Edition Ed., Newnes Oxford [ISBN: 9780080965628]</li> <li>• K A Stroud 2013, <i>Engineering Mathematics</i>, 7th Edition Ed., Palgrave Macmillan Hampshire [ISBN: 9781137031204]</li> </ul>
<i>This module does not have any article/paper resources</i>
<i>This module does not have any other resources</i>

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_EEPSY_8	<a href="#"><u>Bachelor of Engineering (Honours) in Electrical Engineering</u></a>	3	Mandatory
CR_EELES_8	<a href="#"><u>Bachelor of Engineering (Honours) in Electronic Engineering</u></a>	3	Mandatory
CR_EELEC_7	<a href="#"><u>Bachelor of Engineering in Electrical Engineering</u></a>	3	Mandatory
CR_EELXE_7	<a href="#"><u>Bachelor of Engineering in Electronic Engineering</u></a>	3	Mandatory
CR_SINEN_8	<a href="#"><u>Bachelor of Science (Honours) in Instrument Engineering</u></a>	3	Mandatory
CR_EELEC_6	<a href="#"><u>Higher Certificate in Engineering in Electrical Engineering</u></a>	3	Mandatory
CR_EELXE_6	<a href="#"><u>Higher Certificate in Engineering in Electronic Engineering</u></a>	3	Mandatory