

Title:	Technological Mathematics 221 APPROVED
Long Title:	Technological Mathematics for Electrical & Electronic Engineers 221
Module Code:	MATH6043
Credits:	5
NFQ Level:	Fundamental
Field of Study:	Mathematics
Valid From:	Semester 2 - 2009/10 (February 2010)
Module Delivered in	7 programme(s)
Module Coordinator:	AINE NI SHE
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Module Description:	This module introduces probability, linear algebra and differential equations.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Solve first and second order differential equations using classical methods
LO2	Evaluate determinants and perform matrix operations
LO3	Evaluate probabilities associated with simple and composite events using the basic rules of probability
LO4	Recognise and solve probability problems associated with selected discrete and continuous probability distributions.
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>	
Technological Mathematics II (Elec), TM220 or equivalent.	
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

Differential Equations

Methods used to solve first order differential equations; direct integration, variables separable, integrating factor. Solution of second order linear differential equations with constant coefficients. Method of undetermined coefficients. Applications including electrical circuits.

Linear Algebra

Matrix definition and notation. Matrix algebra. Transpose. Symmetric matrix. Determinants. Matrix Inverse. Cramers Rule. Solution set of a linear system of equations. Singular matrix and inconsistent equations.

Probability

Bayesian and Frequentist definition of probability. Introduction to the basic laws of probability and the solution of composite probability problems using the "AND" and "OR" laws of probability for mutually exclusive and independent events

Probability Distributions

Introduction to discrete and continuous probability distributions. Definition and appropriate use of the Binomial, Poisson and Normal Gaussian distributions. Expected values and variances of distributions. Approximations of distributions.

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	Class assessment	1	15.0	Week 6
Other	Class assessment	2,3,4	15.0	Week 12

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	Questions arising from lectures	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Exercise sheets	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Skills 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	3.0	Every Week	3.00
Independent & Directed Learning (Non-contact)	Exercise sheets	3.0	Every Week	3.00
Independent & Directed Learning (Non-contact)	Skills practice	1.0	Every Week	1.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				3.00

Module Resources
<i>Supplementary Book Resources</i>
<ul style="list-style-type: none"> • John Bird 2006, <i>Higher Engineering Mathematics</i>, 5th Ed., Newson [ISBN: 9780750681520] • K A Stroud 2007, <i>Engineering Mathematics</i>, 5th Ed., Macmillan [ISBN: 9781403942463]
<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	<u>Bachelor of Engineering (Honours) in Electrical Engineering</u>	4	Mandatory
CR_EELES_8	<u>Bachelor of Engineering (Honours) in Electronic Engineering</u>	4	Mandatory
CR_EELEC_7	<u>Bachelor of Engineering in Electrical Engineering</u>	4	Mandatory
CR_EELXE_7	<u>Bachelor of Engineering in Electronic Engineering</u>	4	Mandatory
CR_SINEN_8	<u>Bachelor of Science (Honours) in Instrument Engineering</u>	4	Mandatory
CR_EELEC_6	<u>Higher Certificate in Engineering in Electrical Engineering</u>	4	Mandatory
CR_EELXE_6	<u>Higher Certificate in Engineering in Electronic Engineering</u>	4	Mandatory