Title:	Engineering Maths 102 APPROVED
Long Title:	Calculus 1 for Eng Maths

Module Code:	MATH6006	**Duration:**	1 Semester

Credits:	5
NFQ Level:	Fundamental
Field of Study:	Mathematics
Valid From:	Semester 2 - 2015/16 (January 2016)
Module Delivered in	7 programme(s)
Module Coordinator:	David Goulding
Module Author:	AINE NI SHE
Module Description:	This module is designed to provide an introduction to fundamental calculus techniques used in engineering.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Differentiate various functions.
LO2	Apply differentiation to calculate the equations of tangent and normal lines, maximum and minimum values and rates of change.
LO3	Differentiate functions of several variables.
LO4	Evaluate integrals and apply integration to areas, volumes, length of curves and mean values.

Pre-requisite learning
Module Recommendations *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).*
Incompatible Modules *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.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *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

Module Content & Assessment

Indicative Content
Differentiation Limits of functions. Definition of the derivative. Standard derivatives. Differentiation of polynomial, trigonometric, inverse trigonometric, exponential,logarithmic and hyperbolic function. Implicit, parametric, and logarithmic differentiation. Tangents and normals to curves. Maximum and minimum values.
Partial differentiation Functions of several variables. Partial derivatives of functions of several variables.
Integration Standard integrals. Integration techniques to include substitution, completion of the square and partial fractions. Integration of trigonometric functions. Integration by parts. Applications to include areas, volumes, mean values and length of curves.

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	Assessment 1 - Differentiation	1,2	15.0	Week 5
Short Answer Questions	Assessment 2 - Integration	3,4	15.0	Week 10

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				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Class based instruction	3.0	Every Week	3.00
Tutorial	Based on exercise sheets	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Review of lecture material, completion of exercise sheets	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Workload: Part Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Class based instruction	3.0	Every Week	3.00
Lecture	Based on exercise sheets	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Review of lecture material, completion of exercise sheets	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

- **K. A. Stroud 2001, *Engineering Mathematics*, Palgrave Macmillan 2001**
- **A. Croft and R. Davison 2003, *Mathematics for Engineers*, 2nd Ed., Prentice Hall [ISBN: 978-0131201934]**
- **Glyn James, *Modern Engineering Mathematics***

This module does not have any article/paper resources

This module does not have any other resources

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_EBIOM_8	Bachelor of Engineering (Honours) in Biomedical Engineering	2	Mandatory
CR_ECPEN_8	Bachelor of Engineering (Honours) in Chemical and Biopharmaceutical Engineering	2	Mandatory
CR_EMECH_8	Bachelor of Engineering (Honours) in Mechanical Engineering	2	Mandatory
CR_CSTRU_8	Bachelor of Engineering (Honours) in Structural Engineering	2	Mandatory
CR_EOMNI_8	Engineering Common Entry (Level 8)	2	Mandatory
CR_CCEEE_9	Master of Engineering in Civil Engineering (Environment and Energy)	2	Mandatory
CR_CSTEN_9	Master of Engineering in Structural Engineering	2	Mandatory