

Short Title:	Mathematics 4 APPROVED
Full Title:	Mathematics 4
Language of Instruction:	English

Module Code:	MATH H2005
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Credits:	5
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Field of Study:	Mechanics and metal work
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Module Delivered in	5 programme(s)
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Reviewed By:	DIARMUID RUSH
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Module Author:	CIARAN TAYLOR
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Module Description:	The first aim of Mathematics 4 is to further develop the broad range of standard mathematical techniques in linear algebra, analysis and calculus assimilated in Mathematics 2. The second aim is to enable the student to apply these mathematical techniques to the solution of bounded engineering problems.
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Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Find partial derivatives of functions of several variables.
LO2	Use partial derivatives to find the gradient of a scalar field and the divergence and curl of a vector field. [POa, POB, POd, POg]
LO3	Obtain definite and indefinite integrals of functions using standard integration methods. [POa, POB]
LO4	Obtain eigenvalues and eigenvectors of 2×2 and 3×3 matrices. [POa, POB, POd]
LO5	Use cofactors to find 4×4 determinants and 3×3 inverses. [POa, POB, POd]
LO6	Use appropriate numerical techniques to solve relevant non-linear engineering problems and understand the limitations of these methods [POa, POB, POd]
LO7	Write algorithms to solve problems involving numerical techniques and implement them in programs using a modern programming language.

Module Content & Assessment

Course Work				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Other	Assignment in the visualization of functions in 3-D using appropriate software and the use symbolic of mathematics software. (Using for example MATLAB).		10.00	Week 4
Other	High threshold test in methods of integral calculus.		10.00	Week 7
Continuous Assessment	Assignment on the application of programming to solve problems using numerical techniques.		10.00	Week 9

End of Module Formal Examination				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Formal Exam	End-of-Semester Final Examination		70.00	End-of-Semester

TU Dublin – Tallaght Campus 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	No Description	3.00	Every Week	3.00
Lab	Computer packages, problem solving	1.00	Every Week	1.00
Independent Learning	No Description	4.00	Every Week	4.00
Total Weekly Learner Workload				8.00
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	No Description	2.00	Every Week	2.00
Lab	Computer packages, problem solving	5.00	Week 13	0.38
Independent Learning Time	No Description	6.00	Every Week	6.00
Total Weekly Learner Workload				8.38
Total Weekly Contact Hours				2.38

Module Resources

Required Book Resources

Glyn James 2015, *Modern Engineering Mathematics*, 5th ed. Ed., Pearson Education [ISBN: 1292080736]

Recommended Book Resources

Howard Anton,Chris Rorres 2014, *Elementary Linear Algebra with Supplemental Applications*, 11th ed. Ed., Wiley New York [ISBN: 1118677455]

K. A. Stroud,Dexter J. Booth 2013, *Engineering Mathematics*, 7th ed. Ed., Palgrave MacMillan [ISBN: 1137031204]

Anthony Croft, Robert Davison, James Flint, Martin Hargreaves 2017, *Engineering Mathematics, A Foundation for Electronic, Electrical, Communications and Systems Engineers*, 5th ed. Ed., Pearson [ISBN: 1292146656]

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
TA_EBIOM_B	B.Eng (Hons) in Biomedical Design	4	Mandatory
TA_EAMEC_B	Bachelor of Engineering (Honours) in Mechanical Engineering	4	Mandatory
TA_EAUTO_B	Bachelor of Engineering (Honours) in Mechanical Engineering (Automation)	4	Mandatory
TA_EBIOM_D	Bachelor of Engineering in Biomedical Design	4	Mandatory
TA_EAMEC_D	Bachelor of Engineering in Mechanical Engineering	4	Mandatory