

## Module: Mathematics A by Rob Eggleton

Code: BLT1009

10 credits at level HE4

### Description and Purpose of Module

This module is designed to bring students from a wide variety of backgrounds to a common level in Mathematics, sufficient to support the analytical work within their Civil Engineering programme.

### Indicative Syllabus Content

#### Indices and Logarithms (15%)

Negative and fractional indices  
Laws of indices  
Laws of logarithms  
Application of logs to solution of indicial equations.

#### Binomial Theorem (15%)

Pascal's Triangle  
Factorials and Binomial coefficients  
Binomial theorem for integer powers  
Binomial theorem for non-integer powers

#### Quadratic Equations (10%)

Solution by factorisation  
Solution using formula

#### Trigonometry (10%)

Definitions of sine, cosine and tangent functions  
Solution of right angled triangles.

#### Differential Calculus (20%)

Differential from first principles  
Derivatives of basic functions  
Chain rule for function of a function  
Product and quotient rules  
Second derivative  
Local maxima and minima

#### Integral Calculus (15%)

Integrations as the reverse process of differentiation  
Integrals of basic functions  
The definite integral and the area bounded by the curve of a graph

#### Partial fractions (15%)

Distinct linear factors  
Repeated linear factors  
Quadratic factors  
Examples requiring long division of polynomials

### Learning, Teaching and Assessment

Learning sessions will consist of lectures, with tutorial work and individual attention for students as appropriate.

#### Indicative Learning Hours:

Lectures and tutorials 38 hours  
Assignment revision 8 hours  
Self Study 42 hours  
Exam revision 10 hours  
End Examination 2 hours

TOTAL 100 hours.

Coursework and an unseen end examination.

### Learning Outcomes and Assessment Criteria

Learning Outcomes when you have successfully completed this module you will:	Assessment Criteria to demonstrate that you have achieved the learning outcome you will:
	For learning outcomes 1 to 3: a Simplify expressions involving indices b Expand brackets using Pascal's triangle

1.	Be able to apply a range of mathematical techniques.	c Derive and use a Binomial series d Solve quadratic equations e Find unknown side lengths and angles in right-angled triangles f Differentiate a range of functions g Integrate a range of functions h Resolve a compound fraction into partial fractions.
2.	Be able to select an appropriate technique for solving a given mathematical problem	See above
3.	Have an appreciation of the need for accuracy in solving mathematical problems	See above.
4.	Have proficiency in the use of electronic calculators.	Show proficiency in the use of an electronic calculator.
5.	Be able to communicate basic calculations clearly and effectively	Present the assignment in a clear and lucid style with well-formulated arguments and justification of results

## Assessment

Your achievement of the learning outcomes for this module will be tested as follows:

<b>Type</b>	CW	EX
<b>Description</b>	One assignment consisting of mathematics problems that will test the student's ability to apply basic mathematical techniques	One unseen 2 hour examination
<b>%age</b>	25	75
<b>Final Assessment</b>	N	Y
<b>Learning Outcomes</b>	1,2,3,4,5	1,2,3,4,5

## Prerequisite Module(s)

There are no prerequisites for this module.

## Barred Combinations

No restrictions apply.

## Indicative Reading

Greer, A and Taylor GW (1983), Mathematics for Technicians III, Stanley Thomas.  
Bird, J O and May, A J C (1994), Technician Mathematics 3, Longman Scientific and Technical.  
Stroud, Ken (1995) Engineering Mathematics, 4th edition, MacMillan.  
James, E (1996), Modern Engineering Mathematics, Addison-Wesley.

<b>Module Type:</b>	CORE
<b>Module Length:</b>	1
<b>Host Subject Group:</b>	
<b>Version Number::</b>	0.1

## Activity Log

User Name	Date Accessed	Action
mj3	01/02/2005 17:10:28	amended
bw2	03/02/2005 11:41:09	amended
co1	08/02/2005 17:19:23	added
co1	09/02/2005 08:31:27	amended
co1	09/02/2005 08:33:31	amended
co1	09/02/2005 08:36:47	amended
co1	15/03/2005 15:46:42	amended
mj3	09/05/2005 17:06:00	amended
mj3	09/05/2005 17:06:11	amended
mj3	09/05/2005 17:10:43	amended
mj3	09/05/2005 17:16:39	amended
mj3	09/05/2005 17:24:07	amended
bw2	09/05/2005 17:41:47	amended
re1	08/11/2005 13:17:06	added
re1	08/11/2005 13:21:09	amended
re1	08/11/2005 13:23:37	amended
re1	09/11/2005 16:23:42	amended
re1	09/11/2005 16:25:09	amended
re1	09/11/2005 16:30:00	amended
re1	09/11/2005 16:31:18	amended
Admin	15/06/2006 15:20:21	amended

Admin	27/07/2007 10:58:32	amended
pjb1	17/08/2007 16:24:52	amended
Admin	01/04/2008 10:42:38	amended
mn2	01/04/2010 18:23:51	added
mn2	07/04/2010 12:34:53	Ammended
mn2	07/04/2010 12:35:58	Ammended
mwj1	24/06/2010 13:39:06	added
mwj1	24/06/2010 13:40:56	Ammended
mj3	24/06/2010 17:59:05	added
mj3	24/06/2010 18:04:59	Ammended
mj3	24/06/2010 18:13:17	Ammended
mj3	24/06/2010 19:04:43	added
mj3	24/06/2010 19:13:52	added
mj3	24/06/2010 19:45:21	Ammended
ch14	25/06/2010 00:18:24	added
ch14	25/06/2010 00:24:14	Ammended
ch14	25/06/2010 00:39:50	added
ch14	25/06/2010 00:48:13	added
ch14	25/06/2010 01:07:29	added
ch14	25/06/2010 01:28:53	added
ch14	25/06/2010 01:43:29	added
acj1	25/06/2010 07:45:20	Ammended
acj1	25/06/2010 07:58:51	Ammended
acj1	25/06/2010 08:15:40	Ammended
acj1	25/06/2010 08:26:54	Ammended
acj1	25/06/2010 08:30:19	Ammended
mn2	25/06/2010 11:56:08	Ammended
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mj3	25/06/2010 13:52:31	Ammended
mj3	25/06/2010 14:18:08	Ammended
mgs1	25/06/2010 15:11:34	Ammended
mj3	25/06/2010 15:18:42	Ammended
ch14	25/06/2010 15:19:26	Ammended
ch14	25/06/2010 15:47:56	Ammended
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ch14	25/06/2010 16:38:22	Ammended
ch14	25/06/2010 16:54:37	Ammended
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ch14	25/06/2010 17:35:26	Ammended
ch14	25/06/2010 17:40:44	Ammended
ch14	26/06/2010 04:45:38	Ammended
ch14	26/06/2010 20:23:35	Ammended
ch14	28/06/2010 00:12:38	Ammended
ch14	28/06/2010 00:15:02	Ammended
ch14	28/06/2010 00:16:02	Ammended
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ch14	28/06/2010 19:12:46	Ammended
ch14	29/06/2010 23:40:17	Ammended
ch14	29/06/2010 23:43:56	Ammended
ch14	30/06/2010 00:32:12	Ammended
lac2	30/06/2010 18:32:21	Ammended

lac2	30/06/2010 18:40:18	Ammended
lac2	30/06/2010 18:43:03	Ammended
lac2	30/06/2010 18:44:25	Ammended
lac2	30/06/2010 18:48:22	Ammended
lac2	30/06/2010 18:51:53	Ammended
lac2	30/06/2010 18:53:37	Ammended
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ch14	01/07/2010 17:49:47	Ammended
lac2	01/07/2010 17:50:03	Ammended
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lac2	01/07/2010 17:52:40	Ammended
lac2	01/07/2010 17:53:59	Ammended
lac2	01/07/2010 17:55:25	Ammended
lac2	01/07/2010 17:58:07	Ammended
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lac2	01/07/2010 21:07:38	Ammended
lac2	01/07/2010 21:12:37	Ammended
lac2	02/07/2010 10:26:38	Ammended
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Admin	16/07/2010 13:17:10	Ammended
Admin	16/07/2010 13:18:39	Revalidated
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mj3	28/07/2010 12:10:51	Ammended
mj3	28/07/2010 12:15:41	Ammended
mj3	28/07/2010 13:21:52	Ammended
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Admin	20/08/2010 16:35:15	Validated
Admin	17/11/2010 17:12:59	Ammended
Admin	17/11/2010 17:29:30	Revalidated
ch14	28/11/2010 13:22:49	Ammended
ch14	29/11/2010 19:12:11	Ammended
Admin	09/12/2010 15:17:49	Validated
Admin	09/12/2010 15:17:51	Validated
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Admin	09/12/2010 15:17:54	Validated
Admin	09/12/2010 15:17:55	Validated
Admin	09/12/2010 15:17:58	Validated
Admin	09/12/2010 15:18:05	Validated

