

The background is a vibrant red color with a complex geometric pattern of thin, light-colored lines. These lines form a grid of squares and rectangles, with some lines radiating from a central point, creating a sense of depth and movement. In the bottom right corner, there is a diagonal bar composed of two parallel lines, one light grey and one dark grey, creating a 3D effect.

the **Further Mathematics** network

the **Further Mathematics** network

www.fmnetwork.org.uk



How can the Further Mathematics Network help Electrical Engineering?

Charlie Stripp, Programme Leader, FM Network

9 January 2008

How can the FM Network help Electrical Engineering?



There are two key ways

- ❑ By enabling students to study Further Mathematics, which will improve their mathematical preparation for their degree
 - ❑ By helping to promote Electrical Engineering to sixth formers who are studying AS/A level Maths and Further Maths
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AS/A level Further Mathematics

Why is Further Mathematics useful to engineers ?



- ❑ The 2004 changes to Mathematics specifications mean that AS Further Mathematics is now a true AS qualification, suitable for **all** students who wish to study for a strongly maths-related degree
 - ❑ In the past both AS and full A level Further Mathematics were elite qualifications
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Why are Further Mathematics qualifications useful to engineers ?



- ❑ Students who have studied AS Further Mathematics as well as A level Mathematics are much better prepared for the mathematical elements of engineering degree courses
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Why are Further Mathematics qualifications useful to engineers ?



- ❑ The compulsory 'pure' maths element of AS Further Mathematics introduces fundamental topics such as complex numbers and matrices 
 - ❑ Students can also learn more about topics such as numerical analysis, calculus and differential equations, as well as options in mechanics, statistics and decision mathematics
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Why are Further Mathematics qualifications useful to engineers ?



- ❑ Studying AS Further Mathematics reinforces students' standard A level Mathematics and improves their general mathematical fluency
 - ❑ For example, a student who might have achieved a grade C in a single Mathematics A level will often end up with a B in A level Mathematics and a C in AS Further Mathematics
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Why are Further Mathematics qualifications useful to engineers ?



- ❑ AS Further Mathematics can be studied in year 12, alongside AS Mathematics, or in year 13, alongside A2 Mathematics
 - ❑ The full A level Further Mathematics is a demanding qualification, suitable for stretching the most mathematically able
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The Further Mathematics Network

The Further Mathematics Network



- ❑ The FM Network is a national, government-funded initiative
 - ❑ The FM Network is managed by MEI (an independent charity) and is based on a successful pilot project that was funded by the Gatsby Charitable Foundation
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The Further Mathematics Network



- ❑ The Network consists of 46 regional FM Centres that cover England
 - ❑ The FM Centres involve schools, colleges, Local Authorities and universities working together
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The Further Mathematics Network



- All schools and colleges are encouraged to register with their local FM Centre – around 1500 are currently registered

 - The FM Centres have strong working links with the mathematics departments in their local schools and colleges
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The Further Mathematics Network



Two of the FM Network's key roles are

1. To ensure all students who could benefit from AS/A level Further Mathematics have access to tuition
 2. To promote the study of AS/A level Mathematics and Further Mathematics and the study of STEM subjects at university
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How does the FM Network support Further Mathematics tuition?



- ❑ For students in schools and colleges that are unable to offer tuition 'in-house', the FM Network offers expert tuition organised through the local FM Centres
 - ❑ Students tutored through the FM Network achieve comparable results to those taught traditionally
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How does the FM Network support Further Mathematics tuition?



- For schools and colleges that are able to offer Further Mathematics tuition 'in-house', the FM Network offers free access to extensive resources and expert advice
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Is it working?



Further Mathematics increases from summer 2004 to summer 2007

	A level FM increase	AS FM increase	Proportion of A level Maths taking A level FM
England	39%	89%	1 in 7
Wales and N. Ireland combined	16%	38%	1 in 14

Almost 80% of the increases are from students educated in the state sector



How does the FM Network promote Mathematics in the sixth form and STEM subjects at university?

- ❑ FM Centres run enhancement and enrichment events all over England, often hosted at local universities
 - ❑ These events have been attended by thousands of students
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How does the FM Network promote Mathematics in the sixth form and STEM subjects at university?

The events include

- AS/A level revision days
 - Enrichment events for KS3/4 students
 - Enrichment events for sixth formers
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How does the FM Network promote Mathematics in the sixth form and STEM subjects at university?

- These events provide excellent opportunities to encourage KS3/4 students to study mathematics in the sixth form, to promote careers in engineering and to encourage sixth formers to apply for engineering degrees at university

How can the FM Network help Electrical Engineering?



- ❑ Electrical Engineering departments can (and should) now encourage sixth formers to take FM qualifications, so that they are better prepared for their degree courses
- ❑ The FM Network is keen to work with the engineering community to help promote degree courses and careers in engineering



How can the FM Network help Electrical Engineering?



- Please contact your local FM Network Centre
via www.fmnetwork.org.uk



Maths in Electronics

Free Talks to Enthuse Maths Students

Sixth-Form Talk – “Maths in Electronics and Communications”

This talk, for students in the first year of their A-level programme, aims to inspire students with the use of the maths they are learning now and to open their eyes to the sort of maths they would be doing in a degree in electronic or communication engineering.

- Relates A-level maths to applications in electronics and communications.
- Audio-visual demonstration of the mathematics behind touch-tone dialling.
- Stability demonstration provides taster of mathematics beyond A-level with two-dimensional (complex) variables (and provides practice in factorising quadratics).
- Exhorts students to choose a career that uses their maths skills to maximise their chances in the job market.
- Reveals electronics and communications as a well-paid, creative and exciting *mathematical* career.

Fifth-Form Talk – “What Use is Maths?”

This talk is designed for Year 11 students doing the higher tier GCSE maths course. It aims to encourage them to continue with maths at A-level by showing them how exciting the subject is and the rewarding careers in electronics and communications for those good at maths.

- Highlights the essentiality of A-level Maths for many university courses and its usefulness for many others.
- Shows how microelectronics systems pervade all aspects of everyday life and their dependence on mathematics.
- Audiovisual demonstrations of the mathematics underlying digital sound and image processing linked to the GCSE syllabus.
- Emphasises the importance of A-level choices exhorting students to think beyond their A-levels to choice of degree course and career.

Further Information:

For further information, please return the tear-off slip or contact Dr Dik Morling
Telephone: 020 7911 5084 Fax: 020 7580 4319 Email: morling@cmsa.westminster.ac.uk
Department of Electronic Systems University of Westminster 115 New Cavendish Street London W1W 6UW

Please contact me to arrange:

- a visit to our top-GCSE maths class(es) to encourage them to continue with maths at A-level
- a visit to our sixth-form maths class(es) to talk about how mathematics is used in modern electronic and communication systems
- participation in our careers event on (date)

Name

Daytime Telephone Number Fax.

Evening Tel. Number (optional) Email.

School/College

Address
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Maths in Electronics Awareness Course for Maths Teachers 2007

This free one-day course has been designed specifically for teachers of A-level mathematics, and focuses on the extensive use of maths in the design of electronic and communication systems. It highlights the application of mathematics in these industries. The methods used will mostly be well known to maths teachers and some will be part of the syllabus they are teaching.

The date for the course this year is: **10:00-16:00 Wednesday 13th June 2007**

Course venue: **Cavendish Campus 115 New Cavendish Street London W1W 6UW**

The course will enable teachers to:

- Increase the relevance of their mathematics teaching
- Better equip pupils for further study
- Advise more effectively on career opportunities for maths students

The course will provide 'hands-on' experience using industry-standard tools for mathematical analysis and simulation and will include:

- **Use of transforms for the analysis of dynamic systems**
- **Complex numbers and their uses in the representation of communication signals**
- **Use of series in the digital signal processing of audio data**

Attendance is **free of charge** to maths teachers but places are limited so you are advised to apply promptly. Lunch and refreshments will be provided. To register, please return (or Fax) the slip below to:

Dik Morling School of Informatics, University of Westminster,
London W1W 6UW

For more information:

Telephone: 020 7911 5084 Fax: 020 7911 5089 Email: morling@westminster.ac.uk
Web site: <http://www.wmin.ac.uk/electronics>

Name

Daytime Telephone Number

Email

School/College

Address

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Please reserve a place for me on the **Maths in Electronics** course on 13th June 2007

West Oxfordshire Curriculum Partnership

Maths at Work Day

Tuesday, 16th October 2007
Henry Box School
Year 11 students

Morning

Burford, Chipping Norton, & Marlborough Schools to attend.

9.30 – 9.40 am Dik Morling (University of Westminster) to introduce Day and talk about choosing Maths A level and A level options in the school hall

Students and presenters move to nearby classrooms for workshops
Students to attend each workshop in turn

Workshops presented by

- Dik Morling – University of Westminster – electronics
- Thomas Hall & Dominic Hughes – Nielsen Analytic Consulting
- Ben Fisher & Peter Davidson – Xafinity Consulting, actuaries
- Eddie McCarron – mechanical engineer, RAL

9.45am – 10.10am Workshop 1

10.10am – 10.35am Workshop 2

10.35am – 10.45am Break (students to bring their own bottles of water and a snack)

10.45am – 11.10am Workshop 3

11.10am – 11.45am Workshop 4

11.45am Students return to schools

11.45am – 12.30pm Lunch for presenters

Afternoon

Henry Box, Carterton and Wood Green Schools to attend.

12.30pm – 12.40pm Dik Morling introduction

12.45pm – 1.10pm Workshop 1

1.10pm – 1.35pm Workshop 2

1.35pm – 1.45pm Break (students to bring their own bottles of water and a snack)

1.45pm – 2.10pm Workshop 3

2.10pm – 2.35pm Workshop 4

2.45pm Students return to schools

Students will remain in their school groups.

All students should be asked to bring a:

- Pen / Pencil
- Calculator
- Notebook
- Bottle of water and a snack