



**Sessions which can be offered by MEI professional officers to interested groups of teachers and students at MEI branch meetings or elsewhere.**

All the sessions described below are suitable for teachers of any specification unless stated otherwise.

Some sessions are also suitable for students; these are clearly indicated.

Where two or more presenters are listed it will usually be the case that the session is delivered by one of them, depending on availability and location.

If you would like to offer any of these sessions at one of your meetings, please contact the presenters whose e-mail addresses are listed at <http://www.mei.org.uk/contact.shtml>

For further information about MEI see [www.mei.org.uk](http://www.mei.org.uk)

## MEI Programmes and MEI Specifications

### **National mathematics developments** (MEI specific)

This talk will cover some or all (as appropriate) of the latest developments being planned for school/college mathematics. Opportunities to contribute to national discussion of the issues involved will be highlighted.

(Roger Porkess, Charlie Stripp, Richard Browne)

### **MEI programmes** (MEI specific)

This talk will cover some or all (as appropriate) of the programmes that MEI are running, and discussion of them. Currently this includes the Further Mathematics Support Programme, Teaching Advanced Mathematics (TAM), Teaching Further Mathematics (TFM), and Support for university service courses. This talk could be combined with that on MEI development work.

(Roger Porkess)

### **MEI development work in progress** (MEI specific)

This talk will cover some or all (as appropriate) of the development work that MEI are running, and discussion of them. Currently this includes working on resources for GCSE twin pilots and the new CPD we are offering, including online courses. This talk could be combined with that on MEI programmes.

(Roger Porkess)

### **MEI A level syllabus** (MEI specific)

A complete modular scheme for AS/ A Level Mathematics and Further Mathematics, and related subjects. There are 21 modules in five strands:

Pure Mathematics, Mechanics, Statistics, Decision Mathematics, Numerical Analysis. Introduced in 1990, this was the first modular A Level syllabus. Since then it has been adapted to meet changes to the common core and new regulations, and in response to comments from teachers and students. However it has retained its essential structure.

(Stella Dudzic)

### **MEI AS Statistics** (MEI specific)

This AS is designed for students who wish to study Statistics without also studying Pure Mathematics; the first module, Z1, is the same as Statistics 1 for MEI AS/A Level Mathematics. The other two modules cover probability models, Poisson and Normal distributions, hypothesis testing and correlation.

(Stella Dudzic)

### **MEI Foundations of Advanced Mathematics** (MEI specific)

This level 2 FSMQ is designed for a variety of students:

- Those with limited success at GCSE who aspire to go on to take AS and possibly A Level.
- Mature students who wish to update their mathematics before embarking on AS/A Level.
- Students not doing AS/A Level Mathematics who nonetheless plan to take Higher Education courses that include a numerate element.
- Students taking AS/A Levels (other than mathematics), or VCEs, that require mathematical competence. A number of OCR VCE mathematics units are based on this specification.

(Stella Dudzic)

## **Further Mathematics and the Further Mathematics Support Programme**

### **Further Mathematics and the Further Mathematics Support Programme**

This talk answers the questions:

Who should study Further Maths and why?

How can the Further Mathematics Support Programme support the delivery of Further Maths in all schools and colleges, whether or not they teach it directly themselves?

Other talks on any issues relating to Further Mathematics for staff, students or parents can be organised through the Further Mathematics Support Programme by contacting your local Further Mathematics area coordinator: <http://www.furthermaths.org.uk/>

(Charlie Stripp, Richard Lissaman, Sue de Pomerai, Richard Browne)



## CPD programmes

### **The 'Teaching Advanced Mathematics' (TAM) Programme**

TAM is a 17-month CPD course to support teachers who wish to teach mathematics beyond GCSE for the first time. Many participants do not have a mathematics qualification beyond A level. In this session the TAM programme will be explained and we will discuss the opportunities for experienced teachers in your area to provide support to course participants.

(Bernard Murphy)

### **The 'Teaching Further Mathematics' (TFM) Programme**

This course, spanning four terms, supports teachers of A level Mathematics who wish to learn more mathematics. The modules covered are FP1, FP2, NM and DE. Support is provided through web resources, by e-mail, four course days and through contact with the local FM Support Programme Centre.

(Sue de Pomerai)

### **CPD days**

MEI is now offering pairs of CPD days covering a variety of A level modules which are appropriate to teachers of all specifications. (For example, the 'Introduction to Mechanics' days will cover all the topics which appear on any of the M1 specifications.) No prior knowledge of the material is assumed. Over the two days teachers are introduced to the big ideas in the module with a variety of teaching ideas. The two days are separated by several months in which participants have access to textbooks, web resources and email support.

If you are interested in hosting a course please contact Bernard Murphy at [bernard.murphy@mei.org.uk](mailto:bernard.murphy@mei.org.uk)

## **AS/A-level Mathematics and Further Mathematics: Teaching and Learning**

### **Hypothesis testing using the Binomial distribution** (MEI specific)

The first hypothesis testing students encounter in S1 is using the Binomial distribution. How can you introduce this in such a way that they understand the purpose of hypothesis testing rather than getting bogged down in the detail of the process? How can you help students to approach hypothesis testing with a more confident understanding?

(Stella Dudzic)

### **Numerical Methods (including coursework)** (MEI specific; also suitable for NM students)

A session providing advice on Numerical Methods coursework. In particular it will address use of spreadsheet, error analysis in Numerical Methods and tips for writing up work

(Richard Lissaman)

### **Teaching FP1 and FP2** (MEI specific; also suitable for FP1 & FP2 students)

A session providing advice on how to introduce material in FP1 and FP2 and how to enrich it. Also links between FP1 and FP2 will be addressed.

(Richard Lissaman)

### **FP2 Investigation of curves** (MEI specific; also suitable for FP2 students)

Before the current technology was available, it was not possible for A level students to investigate the properties of many beautiful curves. The introduction of graphics calculators has opened up this area of mathematics for further study. This optional topic from FP2 requires students to analyse families of curves and investigate their cusps, loops, dimples, symmetry, asymptotes, crossover points, ...

(Bernard Murphy)

### **Decision Mathematics** (suitable for students as well as teachers)

This session will give teachers an overview of the content of either D1 or D2 or to focus on a specific aspect. This can be done for any one exam specification or cover all specifications.

(Sue de Pomerai)

### **Why study Decision Maths?** (suitable for students as well as teachers)

Why study Decision Maths? What is Decision maths used for in the "real world"? An overview of the applications of this area of mathematics and the types of degree courses it is useful for.

(Sue de Pomerai)

### **Unravelling the mysteries of Linear Programming** (suitable for students as well as teachers)

A quick guide to linear programming. The session will include hints on how to introduce the simplex method and why it is so important in the modern world.

(Sue de Pomerai)

### **MEI Further Pure 1** (MEI specific)

Ideas for teaching FP1, and a chance for questions and discussion with the principal examiner. This session is aimed at teachers who are already teaching MEI's Further Pure 1 specification, or who intend to teach it in the near future.

(Charlie Stripp)

### **Big ideas in Mechanics**

This talk is designed for people teaching mechanics modules at AS and A Level. It includes a lot of practical tips for making the subject interesting and relevant, embedded in a somewhat philosophical framework.

(Roger Porkess and David Holland)

### **Teaching mechanics**

This session includes ideas for teaching Mechanics, including questioning and class experiments, with practical work. The session can be adapted to focus on any of M1, M2, or M3 for any, or more than one, specification.

(Charlie Stripp, Stephen Lee)

## ICT

### **MEI On-line resources.**

A detailed look at the MEI online resources for teaching AS/A-Level Maths and Further Maths and FSMQ Additional Maths. Ideas will be covered on the best ways of implementing their use and the different models used to deliver modules with the resources.

(Charlie Stripp)

### **Using GeoGebra in the teaching of A level Core Mathematics**

A hands-on session designed to introduce teachers to GeoGebra. Within an hour the beginner can expect to produce GeoGebra files to use in a variety of graphic, trigonometric and algebraic topics, incorporating slider bars and dynamic text boxes.

(Bernard Murphy)

### **Using Autograph and Excel in the teaching of A level Core Mathematics**

A hands-on session looking at how the graphical capabilities of Autograph are complemented by the numerical insights Excel can provide. No knowledge of either Autograph or Excel will be assumed.

(Bernard Murphy)

## Enrichment

**Giving sixth formers an insight into university mathematics** (suitable for students as well as teachers)

A session designed to give an idea of what to expect to learn in the first year of a mathematics degree. The session attempts to relate material that students will encounter in A-level directly to that they can expect to meet at university.

(Richard Lissaman, Stephen Lee)

**The relevance of mathematics in degrees other than mathematics**

A session aimed to give an insight into the relevance of mathematics in degrees other than mathematics. Such courses include engineering, sciences, business, management and accountancy. Gaining a broader understanding of where mathematics is used can prove to be extremely useful for students who enjoy mathematics, but who are unaware of the vast number of other subjects that use mathematical principles.

(Stephen Lee)

**Career openings, including further study, for those with a mathematics qualification** (suitable for students as well as teachers)

This session aims to give an insight into the possible careers that are open to those with mathematics or mathematics related qualifications. The focus will be at the intersection between university and work, although if specified, the intersection between school/college and work can also be covered. Also included in the session is an introduction to the possibilities of further study, post first degree, including MSc and PhD qualifications.

(Stephen Lee)

**FP1 Enrichment** (MEI specific; also suitable for FP1 students)

Advice on how to enrich the FP1 experience for students. Specific activities relating to series and complex numbers will be looked at in some detail.

(Richard Lissaman)

**The Cubic and the Quartic** (suitable for able A level students as well as teachers)

Ever wondered what these two cousins of the quadratic formula look like? In this session we'll derive both formulae without straying too far from the original 16<sup>th</sup> century methods or using techniques beyond A level algebra. Two hundred years later Euler devised an alternative approach to solving the quartic – if we have time we'll take a look at this too.

(Bernard Murphy)

**Teaching proof**

Some ideas for introducing the idea of proof at GCSE or AS Level covering the following ground: What is proof and how does proof in mathematics differ from what other people might understand by the word? How can you help your students to approach proof questions confidently and correctly?

(Stella Dudzic, Charlie Stripp)

**OCR Additional Mathematics**

This level 3 FSMQ replaces the former MEI Additional Mathematics course. It is intended for the same clientele: those who complete the content of GCSE early, either in Year 10 or in January of Year 11, but do not immediately want to start on AS/A Level units.

The content consists of a number of strands of pure mathematics with associated applications. The applications have been chosen to provide a taste of each of the three major strands of applied mathematics that students may meet at AS level and beyond: Mechanics, Statistics and Decision & Discrete Mathematics.

(Stella Dudzic)

**KS4 enrichment** (suitable for students as well as teachers)

An edited highlights package from the series of Saturday Morning Mathematics Workshops which run annually at Warwick University as part of the Coventry and Warwickshire Further Mathematics Support Programme.

(Richard Lissaman)

**Making links in GCSE Mathematics**

“What are we doing this for?” Sometimes students get the mistaken idea that GCSE maths is a set of techniques that they have to learn for the exam but that have no relevance to anything else. This session will give some ideas for making links with applications that will help students see the bigger picture.

(Stella Dudzic)

**Polygons and Polyhedra** (suitable for students as well as teachers)

This is an enrichment class for KS3/4 pupils with a particular interest in mathematics. The class is designed to take 2.5 hours, including a fifteen minute break in the middle. The class is very interactive and involves group work and lots of discussion. It has been run several times and has proved very successful. Why not invite other schools to send some of their pupils along too?

(Charlie Stripp)

**Stretching students: AS Core**

The session will start with a few pleasing problems (with solutions) which are accessible to more able AS Core students. A selection of other problems will then be circulated which you'll be encouraged to tackle in groups. The intention is that you will leave with about 30 problems which you'll be able to use with your more able students.

(Bernard Murphy)

**Stretching students: A2 Core**

The session will start and end with elegant problems which can be solved using ideas from A2 Core and a certain amount of ingenuity. In between you'll be working on a selection of other problems, chosen mainly for their elegance. The intention is that you will leave with about 30 problems which you'll be able to use with your more inquisitive and persistent students.

(Bernard Murphy)