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# LTSN Maths, Stats & OR Network Prospectus

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The following was compiled for a new edition of the LTSN prospectus, and is included for the information of our readers.

*Main location:* University of Birmingham  
*Other sites:* University of Glasgow, Nottingham Trent University.

*Collaborators:* Consultants from the Royal Statistical Society Centre for Statistical Education, Heriot-Watt University, Loughborough University and Aston University

The Network supports the teaching of Mathematics, Statistics and Operational Research (MSOR) wherever these are taught in higher education.

Because of the core nature of these disciplines there is close collaboration with cognate subject centres, notably Physical Sciences, Engineering and Computer Science.

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## **Information and resources**

To meet the considerable demand for resources which directly support students, we have commissioned a range of materials in printed or electronic form. Good practice guides for staff are also available in both formats, as is our newsletter. Our website resources are extensive and searchable, and we deal with a number of personal enquiries.

## **Web based resources**

Our comprehensive, ever growing website provides a range of support to staff teaching MSOR. There is a general area with information and discussion of material common across all three subject areas. This section contains news about the activities of the Network and across our disciplines; funding opportunities; rich resources from our workshops and learning and teaching projects; a monthly e-journal on CAA in mathematics; and full electronic versions of all our printed publications. Currently there are also separate sections supporting Mathematics and Statistics/OR. We are working towards integrating the site and making all the resources retrievable by a single comprehensive search facility. This will involve a serious cataloguing exercise; as metadata is added according to agreed UK standards the resulting resource bank will be interoperable with other subject areas.

## **Newsletter – MSOR Connections**

This is a substantial quarterly publication of average

size 60 pages, with a circulation of around 2,300. Around ten articles each quarter describe current practice and emerging issues in a range of HE departments, and there are regular columns *Something that worked for me* and *Have you seen this?* as well as updates on activities, reviews of books and courseware, and conference and workshop reports.

## **Publications to support students and staff**

- **Facts and Formulae:** six fold leaflets available free of charge for distribution to students. To date we have distributed over 25,000 of these.
- **Algebra and Calculus Refreshers:** revision material for students before or in the early stages of a university mathematics course. Printed copies are available at cost price, and some 4,500 copies of the Algebra Refresher and 3,000 copies of the Calculus Refresher have been supplied to date. The contents are also available to be downloaded and customised for local printing in both English and Welsh.
- **Learning and Teaching in MSOR:** an occasional series of good practice guides. There are five titles in the series, the latest being the second edition of *Good Practice in the Provision of Mathematics Support Centres, Flexible Learning in Statistics and Widening Participation in MSOR*.
- **MathsTEAM booklets:** case studies to support the learning of mathematics in science and engineering, under the headings *Diagnostic testing for mathematics, Maths support for students and Maths for engineering and science*.
- **Effective Learning and Teaching in Mathematics and its Applications:** edited by Peter Kahn and Joe Kyle, published by Kogan Page 2002.

## **Engagement with the community**

We have established contacts in nearly all departments in our discipline, and have followed many of these up through staff development activities, either visits or workshops, on key learning and teaching issues facing the community. We also involve members of the discipline in writing articles for the newsletter and reviewing books or courseware.

## **Induction Course for new members of staff**

This popular course is aimed at people who have started teaching MSOR in UK higher education institutions within the last three years, whether they are new graduates or coming from industry or from outside the

273. Si igitur pro  $\alpha, \beta, \gamma, \delta, \&c.$ , unitas per singulos omnes numeros primos scribatur, ac ponatur

$$P = \frac{1}{\left(1 - \frac{1}{2}\right)\left(1 - \frac{1}{3}\right)\left(1 - \frac{1}{5}\right)\left(1 - \frac{1}{7}\right)\left(1 - \frac{1}{11}\right)\left(1 - \frac{1}{13}\right) \&c.},$$

fiet

$$P = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8} + \frac{1}{9} + \&c.,$$

ubi omnes numeri tam primi, quam qui ex primis per multiplicationem nascuntur, occurrunt. Cum autem omnes numeri vel sint ipsi primi, vel ex primis per multiplicationem oriundi, manifestum est, hic omnes omnino numeros integros in denominatoribus adesse debere.

**Euler, *Introductio in analysin infinitorum*, 1748, para 273. Reproduced with permission from the Special Collections Department, University of Birmingham. Classmark, ML Spec Col rQA35.**

UK. The course lasts 24 hours, and the cost is kept as low as possible – £75 in 2003. Attendance has been recognised as contributing towards introductory institutional programmes in learning and teaching for new staff (certificated or otherwise), and in 2003 the course attracted 38 delegates from a whole range of institutions.

#### **Day Break Programme of Workshops**

Building on a programme of regular workshops on assessment and applicable mathematics, a survey of departments on their training needs has resulted in a series of rather different workshops. These are run regionally, hosted by a department with a particular interest in that topic. Under some headings (*Risk-Based Decision Analysis, Online Objective Tests*) an acknowledged expert is brought in to deliver a whole day course. In other cases (*Virtual Learning Environments, Sharing Project Practice*) practitioners with some experience come together to share their experiences with the rest of the group. Events are advertised nationally, attracting between 15 and 50 delegates depending on the topic, venue and date. Colleagues within the host department attend for free while outside delegates pay between £35 and £45.

#### **Brokerage and collaboration**

Each year we commission 3-5 projects to investigate an aspect of learning and teaching in our discipline areas.

The projects involve practitioners closely in the Network and enable the sharing of practice at many levels. We also have an ongoing collaborative project looking at pedagogic practice.

#### **Learning and Teaching Projects**

Sometimes called miniprojects, many of these are the result of invitations to tender, so that the topics are chosen from within the community. Recent examples include *Java Applets for Pure Mathematics* and *Research into Teaching and Learning of Performance Measurement in UK Undergraduate OR Degrees*. Others have been funded as a recognition of existing good practice: these include *Good Practice in Assessment of MSOR* and *Teaching Simulator for Industrial Statistics*.

#### **Mathematicians as Educational Co-Researchers**

This project, which ran from October 2002 to December 2003, has engaged practising mathematicians as educational co-researchers in developing educational theory and teaching practice alongside colleagues from mathematics education. Initially data sets on six themes were developed, consisting of a short literature review, a bibliography of educational research, samples of students' written work and excerpts from interview transcripts collected in the course of previous research projects. The group of mathematicians was asked to study the data set and participate in a half-day focus group meeting to discuss their responses. They were

also encouraged to support these views with brief samples of data that they had collected themselves. The results from these focus group meetings have been analysed and the results will be published in mathematics education research journals, and disseminated more widely through LTSN.

### **Subject policy and development**

Currently our discipline is undergoing a huge programme of review and change at the national level, and we are engaging in debates and responding to a large number of consultation documents. Additionally we are developing new ways of providing subject-based professional development.

#### *The Post-14 Mathematics Inquiry*

This was announced by the Government in July 2002. In March 2003 the Secretary of State for Education and Skills announced a National Centre of Excellence in Mathematics Teaching. Charles Clarke added that he would be asking the Chair of the Post-14 Mathematics Inquiry to advise him on the 'costs and options' for the NCEMT. We have met with the Inquiry and responded to three of their consultations. It is expected to report in January 2004.

#### *Distance Learning course for Statistics Lecturers*

Statistics feature in a wide variety of degrees in other subjects and the teaching of statistics has its own specific issues and concerns. In order to support lecturers faced with situations such as teaching statistics to six hundred, possibly reluctant, first year Business students, the Maths, Stats & OR Network has developed a distance learning unit designed as the equivalent of a twenty post-graduate credits unit. This will enable lecturers to:

- have a critical understanding of a wide range of methodologies for teaching statistics
- be able to select and deliver the most appropriate methods to design, prepare, teach and assess a statistics curriculum
- consider critically their own teaching and the issues involved in teaching statistics
- develop a range of learning and teaching skills that will be crucial for dealing with the speed of growth and computer based diversity of both their subject and the teaching environment

### **Interdisciplinary Collaboration**

Because mathematics is such a core subject, it is a prerequisite for learning within many other disciplines. We have been working with a number of other Subject Centres to provide mathematics support and resources.

#### *MathsTEAM – Engineering, Maths Stats & OR, Materials, Physical Sciences*

Four LTSN subject centres formed the LTSN MathsTEAM in response to concerns about the growing deficiency in mathematical skills amongst science and engineering students. The MathsTEAM conducted an in-depth survey of current resources and teaching methods, in order to identify suitable material for inclusion in three information packs:

- **Diagnostic testing for mathematics:** an in-depth review of current diagnostic testing including the results of a focused project and national survey. There are detailed case studies as well as brief outlines of the actual testing procedures within various institutions.
- **Maths support for students:** as Engineering and Science departments face the problems of inadequate mathematical preparation by students, many are setting in place networks of support-based activities, eg maths learning centres. This booklet presents examples of these initiatives through a series of case studies.
- **Maths for engineering and science** looks at teaching mathematics to engineering and science students. Case studies from contributing authors describe the execution of the learning activities, the support needed, the implementation difficulties, evidence of success and suggestion of how other academics could reproduce the activity.

All the packs are available in print and electronic format. Survey results, relevant generic information, annotated references and links to useful resources are also available online.

#### *Mathematics for computer scientists*

A number of staff in computing departments teach maths topics to a greater or lesser extent, and are addressing the same problems as in disciplines involved in the MathsTEAM. We therefore plan to run a series of workshops with LTSN Information and Computer Science raising awareness of available resources.

#### *mathcentre – the UK Mathematics Learning Support Centre*

This is a national resource delivering mathematics support materials. It aims to alleviate difficulties that many students, across a range of disciplines, face at the school/university interface. Free of charge, resources are available to academics for use in supporting students, and directly to students themselves, from <http://www.mathcentre.ac.uk>