

# reasons for this study

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# COMMISSION INTERNATIONALE DE L'ENSEIGNEMENT MATHÉMATIQUE (THE INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION)

## MATHEMATICS AS A SERVICE SUBJECT

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### THE REASONS FOR THIS STUDY

Since it was established in 1908, ICMI has always, and rightly, paid considerable attention to the problems which arise when mathematics is taught to students who are primarily engaged in studying other subjects. As early as 1911 a meeting was held on the theme "What mathematics should be taught to those students studying the physical and natural sciences?" (see *L'Enseignement Mathématique*, 13 (1911), 481-496). At the International Congress of Mathematicians held the following year, in 1912, there was a discussion on mathematics for engineers, and who should best teach it. Without doubt the questions of 'service mathematics' should always command ICMI's attention.

Nowadays the teaching of mathematics is much more widespread and varied than it was in the 1910s; indeed, than most people, including many engaged in its teaching, imagine.

All the scientific disciplines and many of today's businesses and professions demand a certain mathematical knowledge and understanding. At the university level an important part of mathematics teaching is that intended for students of other disciplines. It is this 'service' teaching — interesting, important, valuable, but poorly understood and analysed — which is the subject of our study.

The problems are many. They relate, for example, to the nature of the discipline employing the mathematics, to the 'language' of the user, and the manner in which the mathematics is used; they have implications for the education of

senior high school students. Of necessity, the responses to the problems will differ in different countries and institutions, for specialists in the 'major' discipline and their mathematical colleagues will exercise different degrees of control over the formulation of syllabuses and the teaching of courses. Yet everywhere, evolution in the mathematics taught and in methods of teaching is rapid. Who teaches what, and how, and why? What developments can be foreseen?

ICMI and ICSU-CTS (the International Council of Scientific Unions' Committee on the Teaching of Science) decided to mount a joint study in the hope that it would produce a confrontation of all points of view from which a deeper understanding and improved practice might emerge. We are asking users (specialists in a variety of disciplines, students, employers) to reflect on their real needs, and to attempt to identify their objectives in teaching and learning mathematics. We are asking those who teach service mathematics, whether or not they are mathematicians <sup>1)</sup>, to consider how their teaching should be adjusted to cope with new developments and techniques both in mathematics and in their student's major subjects.

It is hoped that in addition to improving the teaching of mathematics as a service subject the study will help reinforce cooperation between mathematicians and non-mathematicians. Finally, we hope that our considerations will also prove of value to those involved in teaching mathematics at a pre-university level.

#### THE ORGANISATION OF THE STUDY

In broad outline the study is being organised in stages similarly to those employed in the study on 'The influence of computers and informatics on mathematics and its teaching'<sup>2)</sup>. The first phase of the study took place in 1985. An informal questionnaire was prepared which sought information on such matters as: the present situation (in which disciplines is mathematics explicitly

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<sup>1)</sup> For the purpose of this paper we shall use the term 'mathematician' to describe someone attached to a Department of Mathematics or who would consider his/her main academic field of interest to be mathematics.

<sup>2)</sup> The Proceedings of the symposium on this theme held in Strasbourg in March 1985 have now been published as the first volume in the ICMI Study Series by the Cambridge University Press (ISBN 0 521 32402 5 Hard cover, 0 521 31189 6 Paperback). A volume of fifty 'supporting papers' which were submitted to the study can be obtained (price FF100) from Dr. F. Pluvinage, IREM, 10, rue du Général Zimmer, 67084, Strasbourg, France.