

Advance Training in Mathematics Schools

Supported by National Board for Higher Mathematics

ATM Schools for Lecturers

Background: There are more than 250 Universities and 14,000 colleges in our country providing undergraduate education to our students. About 50% of these institutions are engaged in teaching of Mathematics as one of the major disciplines. It is, therefore, obvious that we have about 25 to 30 thousand teachers engaged in teaching mathematics to our undergraduates and postgraduates. These teachers are appointed on the basis of their academic merit and a NET/SET examination conducted by the UGC and several individual States. Bulk of our research scholars learn their first lessons of higher mathematics only from these teachers. Unfortunately, however, the subject-knowledge of these teachers is mostly imperfect or vague and they are quite often unable to encourage their students to learn mathematics in the right spirit. Working out mathematical exercises, for instance, which is the best method of learning mathematics, is almost nonexistent in most of our colleges and universities. Consequently, even the best of the students are unable to get any kind of excitement of doing mathematics and are rather left confused. This is quite a serious drawback in our teaching of mathematics. Therefore, something concrete needs to be done to remedy this situation.

The proposal: Looking at the positive impact of the ATM programmes on research scholars, there has been a constant thinking among the members of the National Coordinating Committee and also of the NBHM Advisory Committee that there should be a separate programme, on the pattern of the above ATM programmes, exclusively meant for our young university and colleges teachers. Clearly, the contents of these programmes for have to be different from the contents for research scholars. Training these teachers is very desirable because our future mathematicians get their first encounter of learning serious mathematics only through such teachers. It is for this reason that, this matter was included as an agenda item in a joint meeting of the National Coordinating Committee and the NBHM Advisory Committee in December 2005. After a through discussion of the issues involved it was unanimously agreed by the joint committee that a separate training programme for the University and College teachers must be started under the umbrella of ATM programmes.

Resolution of the joint Committee: It is believed that the quality of mathematics teaching is gradually deteriorating in colleges and universities across the country. The members felt the need of establishing a regular training programme specially for college teachers. Due to gap in the age and difference in motivating factors, it is not possible to allow them in large numbers in the Annual Foundation Schools and the Advanced Instructional Schools. Moreover the level of courses can not be as high as it is in the current ATM schools which are primarily designed for research scholars.

Salient features of this programme

1. **Duration:** Since college teachers cannot find time for long duration, these programmes are proposed to be of two weeks duration during Winter vacation and one month long duration in Summer vacation.

2. **Subjects:** Each one month (two week) long programme will be dedicated to two (one) subjects.
3. **Number of speakers:** In a two week programme two speakers will share teaching for one and half hour each day in the mornings. In a month long programme a total of four speakers will conduct the whole programme. The speakers will conduct tutorials with the help of two tutors in the afternoon for two hours.
4. **Lecture notes:** Booklets of lecture notes and problem-sets will be distributed during the programme. The lecture notes will emphasize novel examples and connections with other field of mathematics.
5. **Mathematical software:** Lectures and tutorials of free mathematics softwares in the subjects of the school will be arranged. Teachers will also be informed of free journals and data bases such as MathSciNet available on the Net.
6. **Special lectures:** One or two special lectures will be organized per week on interesting themes related to the subjects being covered.
7. **Eligibility:** Only those teachers are eligible to participate who have passed NET/SET or an equivalent examination. Younger teachers will be given preference in selection.
8. **Criteria for selection**
 - (a) Every participant must be a permanent lecturer in a College/University.
 - (b) He must be preferably below 30 years of age and should have cleared NET/SET/Ph.D.
 - (c) Preference will be given to teachers who are involved in Maths Olympiad etc.

9. **Subjects :**

Basic branches of mathematics included in the entire spectrum of undergraduate and post-graduate courses broadly consist of algebra, analysis and geometry. Every teacher must have thorough command over all of these branches together with their subtle points, so that teaching any kind of course can be made fascinating. In order to give them complete exposure of fundamentals of mathematics, we can have the following modules.

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| • Algebra | • Functional Analysis |
| • Linear Algebra | • Number Theory |
| • Multivariate Calculus | • Combinatorics |
| • Differential Geometry | • Numerical Analysis |
| • Topology | • Differential Equations |
| • Real Analysis | • Functional Analysis |
| • Complex Analysis | • Data Structures & Algorithms, |
| • Measure Theory | • Probability Theory |
| • Graph Theory | • Cryptography |