

Advanced Training in Mathematics Schools

Funded by National Board for Higher Mathematics

DAE, Government of India

Advanced Instructional Schools (AIS)

Objectives of AIS

After students gain basic knowledge in algebra, analysis and topology in the annual foundation schools, they are ready for studying several subjects in mathematics at research level. In any AIS, lectures are delivered by experts in two closely related areas. The emphasis in these schools will be, in addition to imparting basic knowledge, in understanding connections between various areas of mathematics and problem solving. Towards the end of these schools special expository lectures will be arranged which introduce the audience to major open problems.

Subject areas of advanced instructional schools

Keeping in mind the expertise available in the country, the following subjects have been chosen for these schools at present:

- (1) Commutative algebra and algebraic geometry
- (2) Algebraic and differential topology
- (3) Functional and harmonic analysis
- (4) Differential Geometry and Lie groups
- (5) Representation theory and its applications
- (6) Algebraic and analytic number theory
- (7) Partial Differential equations and their applications
- (8) Combinatorics and graph theory

Eligibility

Students who perform well in the *Annual Foundation Schools* will have the option of further training in *Advanced Instructional Schools*. In addition, Ph. D. students having fellowship, post doctoral fellows and a few university faculty members will be selected for these based on recommendation letters and performance in M. Sc. and/or Ph. D. courses.

Format of Advanced Instructional Schools

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|-------------|-------------|-------------|------------|-----------|-----------|-----------------|--------------|
| 09.00-10.30 | 10.30-11.00 | 11.00-12.30 | 12.30-2.00 | 2.00-4.00 | 4.00-4.15 | 4.15-5.15 | 5.15-5.45 |
| Lecture | Tea | Lecture | Lunch | Tutorial | Tea | Special Lecture | Refreshments |

Resource Persons and lecture notes

The lectures will be delivered by course instructors and the tutorials will be conducted by course assistants. The suggested load is a minimum of 8 lectures for each speaker. A typical school will require a total of 6 instructors and 3 course assistants. A few Special expository lectures highlighting current developments and open problems will be arranged.

- The instructors will prepare notes of their lectures and send them to the conveners before the programme starts so that copies can be distributed to the students.
- The notes of lectures will contain all the problems sets to be discussed in the tutorials.
- The notes will be more comprehensive than the lectures as the students will use them later for self-study.
- The guest speakers for special lectures will prepare lecture notes outlining recent developments or work done on an important open problem. Effort will be made to provide comprehensive literature survey so that participants may use the notes for self-study.
- After the school is over, the speakers will be encouraged to revise their notes and send them to the secretary of *ATM Schools* for posting on the web-pages of the schools.