



M. T. & T. S.  
Programme

Ajit Kumar &  
S. Kumaresan

# MATHEMATICS TRAINING AND TALENT SEARCH PROGRAMME

(FUNDED BY: NBHM)

Ajit Kumar & S. Kumaresan

Homepage: <http://www.mtts.org.in/>

ICM 2010

August 26, 2010



# Key Points of the presentation

M. T. & T. S.  
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Ajit Kumar &  
S. Kumaresan

- Brief introduction of MTTS Programme



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- Brief introduction of MTTS Programme
- Historical Perspective



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- Challenges and Hurdles



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- Brief introduction of MTTS Programme
- Historical Perspective
- Selection Procedures
- Teaching Methodology
- Challenges and Hurdles
- Impact of this Programme



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- Brief introduction of MTTS Programme
- Historical Perspective
- Selection Procedures
- Teaching Methodology
- Challenges and Hurdles
- Impact of this Programme
- Benefits of this Programme (via VYM)



# Introduction to MTTTS Programme

M. T. & T. S.  
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Mathematics Training and Talent Search Programme (M.T. & T.S.) is a national level four weeks intensive summer training programme in mathematics and has been running since 1993 in India. This programme is funded by the National Board for Higher Mathematics (NBHM) and is directed by S. Kumaresan since its inception. It is one of the most significant and successful training programmes and has made an impressive impact on mathematical scene in India over the years, especially at undergraduate and post graduate levels.



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About 170-180 talented students in three levels, selected from all over the country, undergo this training programme every year at various centres in India.



# How it began?

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S. Kumaresan submitted a proposal along the lines of MTTTS in the Conference “Development of Mathematics” organized by NBHM in 1989. During “Discussion Meeting on Harmonic Analysis” held at the Indian Institute of Science (I.I.Sc.), Bangalore in 1992, a session was devoted to discuss the academic preparation of the students who come for Ph.D. programmes in Mathematics. S. Kumaresan suggested that a training programme with the aim to expose young minds to the excitement of doing mathematics and enabling them to have a meaningful career in mathematics should start at an early stage perhaps at B.Sc. level itself. The NBHM was approached with the proposal, which promptly agreed to support such an endeavour and the programme, christened as MTTTS Programme, took off in 1993.



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- To provide a platform for students where they can interact with their peers and experts in the field



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- To expose and attract young minds to the excitement of doing mathematics and choose mathematics as a career
- To promote independent thinking and exploration
- To provide a platform for students where they can interact with their peers and experts in the field
- To improve the teaching methodology of mathematics in the country in the long run



# Academic Programme

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# Faculty for MTTTS

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From various leading institutions of the country, not confined to the institute of the venue. People who are experts in the field, who are known for their teaching and who have a commitment towards betterment of mathematics. As a rule each course is taught by a single expert. This paves the way for better interaction between the faculty and students and also imparts a perspective of the field among the students. **The faculty is required to be present for all the sessions — not for their sessions only!** The teachers identify the difficulties of the individual students.



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Giving individual attention is one of the unique features of mttS which makes it highly successful.



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- Allotting centres to Level 0 students



# Facilities to the Selected Students

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- MTTS spends about 10 to 12 thousand rupees (approximately 250 USD) on each student.



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*"The best way to teach students is to think in front of them".*



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All sessions are highly interactive and the students are asked to think and understand in the classroom.



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When a new concept is introduced or a new result is proved, students are given typical situations or problems. Many examples are given as soon as new definitions are made and the students have to verify that they are examples of the concept just introduced. Only if the teacher is convinced that the majority has understood he proceeds further.



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The students are encouraged to discuss among themselves before writing the final proof. It has two benefits;

- (i) they can learn thoroughly by discussing with their peers
- (ii) they can enhance their communication skills and consolidate their understanding while explaining others.



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## **While asking any questions in the class:**

Students are asked to write brief answer, which is examined by the instructors. This allows us to identify the problem area of the students in the beginning and remedial measures are taken.



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Invariably while giving seminars, the students follow the methodology of MTTTS by making it highly interactive.



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For last few years after one week or so, students are divided into groups of 4-5 and are encouraged to discuss topics. At times each group is assigned some topic for discussion which they need to present at the end in front of the entire class. This feature has been so successful that students want more time for the group discussion.



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In each level, almost every day one writing assignment is given to the students which is critically evaluated by the concerned teacher. The assignment is discussed either with the entire class or individually.



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It is a matter of great pride that no student 'fails'.



# Evolution of MTTS

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- In the beginning Level I and Level II at one center



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- Mini feedback form at the end of the first week. Extensive feedback at the end.



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- Eligibility criteria has been suitably modified so that students can attend two consecutive levels
- Online applications and registration.
- So far at 20 different venues



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The continuous evolution of this programme is due to the extensive feedback sought from the faculty and the participants.



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- Follow-up of MTTTS



# Impact of MTTTS

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- Large no. of requests from college teachers to attend MTTS to learn and adopt its teaching methodology.



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Many students after attending just one level of MTTS do get selected for of the Visiting Students' Research Programme (VSRP) programmes of leading research institutions in the country. This just shows the confidence that these institutes have on MTTS training.



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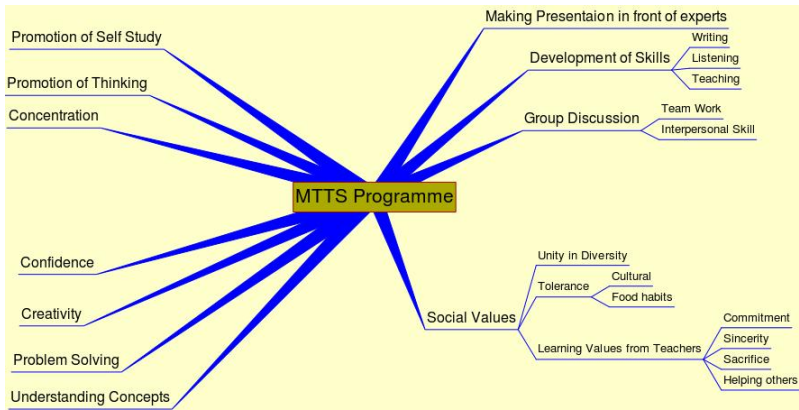
To quote one of the senior professors from Tata Institute of Fundamental Research, India, "Earlier, when we interviewed candidates for Ph.D., we would be happy to find 2 or 3 out of 100. Due to efforts of MTTS programme, we now interview about 30 to 40, none of them is a dud, we could see that they are confident to tackle unseen problems and have a clear understanding of the concepts and all of them can be traced back to MTTS"



# Benefits of MTTTS

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# Conclusion

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MTTS programme is one of most popular and intensive summer training programmes of this country. It has made a remarkable impact on mathematical scenario in India. However, catering to only 170-180 students annually for a country as big as India is not sufficient. MTTS programme has shown that if its methodology is followed and more such programmes are organized at many more places, it can really change the face of mathematics of the nation. We sincerely hope that lot many mathematicians, mathematics teachers across the country and also MTTS alumni would come forward and take a lead to get involved in such endeavors and make a valuable contribution for the cause of mathematics in India.



# Conclusion

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Research in fundamental sciences is key to scientific innovations. However, trends show that recently not many students opt for higher studies in basic sciences due to various reasons. Therefore, if programmes like MTTS are organized in other sciences like Physics and Chemistry, it can revolutionize education in basic sciences. Many developing countries can also start such a programme to improve mathematical background of the students and to encourage them to make a career in mathematics.



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# THANK YOU!