Science Academies’ Lecture Workshop on 
Elementary Mathematics for First Year Undergraduate Students

Organized by
Department of Mathematics, Christ University, Bangalore-29

November 19-21, 2014

Report
The three-day Science Academies’ Lecture Workshop on Elementary Mathematics for First Year Undergraduate Students convened by Professor Alladi Sitaram, of the department of Mathematics, IISc, Bangalore and organized by the department of Mathematics, Christ University was very special in many respects. This workshop has been designed with the specific objective of introducing some of the basic concepts in mathematics in its beauty and rigour to the young students of mathematics. The magnanimity of all the professors in sharing their knowledge and spending sufficient time for interaction with the participants made the Workshop more meaningful and helped them gain deeper insights into the concepts presented during the lectures. Since the number of participants was restricted to 50, the interactions were more effective and fruitful.

The participants were first year undergraduate students from five autonomous colleges in the city of Bengaluru. The students from colleges affiliated to Bangalore University could not participate in the Workshop as they were busy with their end-semester university exams.

Details of Participants from various colleges

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<th>Sl. No.</th>
<th>Institution</th>
<th>No. of Students</th>
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<td>1.</td>
<td>Jyoti Nivas College</td>
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<td>2.</td>
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<td>3.</td>
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<td>5.</td>
<td>Christ University</td>
<td>28</td>
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<td></td>
<td><strong>Total</strong></td>
<td><strong>53</strong></td>
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Among the 300 first year B.Sc. students pursuing undergraduate studies (in 5 different combinations; *Physics, Mathematics, Chemistry; Physics, Mathematics, Electronics; Economics, Mathematics, Statistics; Computer Science, Mathematics, Statistics; Computer Science, Mathematics, Electronics*) at Christ University with Mathematics as a major subject, 28 were chosen based on their interest and academic performance in the previous semester. The remaining 25 students were chosen as per the recommendations by the concerned heads of the departments from the invited colleges in Bengaluru; Jyoti Nivas College, St. Joseph’s College, Kristu Jayanti College and Mount Carmel College.

**Resource Persons and Topics**

The prime reason for the success of the Workshop was the careful choice of the resource persons and the topics. Professor Alladi Sitaram deserves the full credit for this. There were 12 lectures, each having one hour duration, covering a variety of topics like Probability and Statistics, Real Analysis, Fourier Series and Geometry. The final lecture was a public lecture and was attended by 200 students from the first year B.Sc. Mathematics classes of Christ University. Following are the names of the speakers and the corresponding topics.

1. Professor Alladi Sitaram, IISc, Bangalore (*Infinite sequences and series*)
2. Dr T Krishnan, Consultant, Mu Sigma (*Some concepts in probability and statistics*)
3. Professor Kaushal Verma, IISc, Bangalore (*Infinite sequences and series*)
4. Professor Arvind Ayyer, IISc, Bangalore (*Tilings*)
5. Professor Joseph Samuel, RRI, Bangalore (*Divergent Series: some physics applications*)
6. Professor S Thangavelu, IISc, Bangalore (*The basics of Fourier series*)
7. Professor B Sury, ISI-Bangalore Centre (*“15 and 290 theorems” and Manjul Bhargava, the Fields medallist*)
8. Professor M S Narasimhan, TIFR and IISc, Bangalore (*Public Lecture: Geometry beyond Euclid*)

The first lecture by Professor Alladi Sitaram introduced the participants to the concept of sequence and series and it was developed further by Professor Kaushal Verma through three lectures. Dr. Krishnan’s lecture helped the students understand intricacies involved in identifying appropriate tools for statistical analysis. Professor Arvind Ayyer’s lecture exposed them to the concept of Tilings whereas Professor Thangavelu’s lecture provided a brief introduction to Fourier series. Professor Joseph Samuel’s presentation highlighted the importance in having a clear understanding of Mathematics in higher learning of Physics while Professor Sury gave a taste of the research studies carried out by this year’s Fields medallist Dr. Manjul Bhargava. The public lecture by
Professor M.S. Narasimhan gave a beautiful sketch of Geometry beyond Euclid. He explained very clearly how new concepts were conceived and developed from Euclidean Geometry to Differential Geometry. Apart from the lectures, the professors spend a lot of time to interact with the students. This was beneficial even for the second and third year UG/PG students of Christ University as many of them could get their doubts clarified. All the participants were unanimous in saying that Workshop was very useful. Most of them said that they had no difficulty in following the lectures and several of them appreciated the idea of having 4 sessions dedicated to deal with one topic. This approach has helped them gain a clear idea of the concept of infinite sequence and series.

The comments/remarks by some of the participants capture the essence of the responses of the participants.

"The mathematics lecture workshop of science academies was extremely exciting and interesting....truly an inspirational start by prof Dr Alladi Sitaram sir....sessions continued by prof Krishnan sir on probability, correlation and regression was truly important and learning infinite sequence and series under Kaushal Verma sir was a central pillar in learning mathematics...an introduction to Fourier series by Dr. Thangavelu was truly amazing.. the public lecture on non - Euclidian geometry truly made me understand in real sense and eternal beauty of subject ...logical poetry in it's pure form ....I also enjoyed the sessions by Dr. Arvind Ayyer, Dr. Sury and Dr. Joseph Samuel. I would love to attend more lecture workshops and educate myself in a better and true sense and also get inspired by them and get ignited towards the subject. Thank you...."

- Nithin Upadhya K.V.

"The Workshop was very effective...the professors were very friendly. They cleared our doubts....helped us know more about the opportunities in Mathematics. It would be really useful if more such Workshops are conducted"

-- Gayathri M.

"The Workshop was indeed an eye opener to my future excellence in Mathematics. All the professors were very friendly and guiding."

- Shridharan

"The Workshop has inspired me to work harder..."

- Kruthika
“The Workshop gave s a new experience. Many new mathematics topics were introduced and the professors showed a new way to view Mathematics”

- Aishmita Biswas

“The Workshop gave s a really unique experience It was really an amazing moment when we were given a chance to interact with great mathematicians of our country. We also experienced that Mathematics is a poetry of logical ideas”

-Alka Sherine Benny

I would like to place on record the appreciation and thanks from the department of Mathematics, Christ University to the Indian Academy of Sciences for the excellent support we received in organizing the Workshop in a systematic way. The financial support by the Academies and the meticulous planning and thoughtful choice of the speakers by Professor Alladi Sitaram coupled with his whole hearted and passionate involvement in conducting the workshop made the entire exercise of organizing the workshop a joyful one. Let me also thank Dr. N. Mukunda and Shri G. Madhavan from Indian Academy of sciences for their pro-active response and wonderful support in organizing the workshop. Professor Mukunda’s presence on the third day of the Workshop was a gesture of encouragement for us. The presence of a supporting environment at Christ University; the management, the support staff and the fellow colleagues was significant in the successful execution of all the plans.

The Workshop underscored the need and necessity of providing a solid foundation in Mathematics to the young students aspiring for higher learning in Mathematics. This is often a big challenge to a teacher in the regular classroom environment; for the teachers often tend to focus on making the average students excellent and spend a lot of time in dealing with the less motivated students. Therefore Workshops of this nature will provide an excellent opportunity for those who learn Mathematics with passion. We look forward in collaborating with the Indian Academy of Sciences in organizing similar programme in the future and contribute in the best way possible in nurturing skills of the young students who love to learn Mathematics.

Report Prepared by: Dr. Mayamma Joseph (Programme Coordinator)

Bangalore-29
December 08, 2014
Resource Persons (8)

Professor Alladi Sitram, IISc, Bangalore; Dr T Krishnan, Consultant, Mu Sigma; Professor Kaushal Verma, IISc, Bangalore; Professor Arvind Ayyer, IISc, Bangalore; Professor Joseph Samuel, RRI, Bangalore; Professor S Thangavelu, IISc, Bangalore; Professor B Sury, ISI-Bangalore Centre and Professor M S Narasimhan, TIFR and IISC, Bangalore.

Student Participants (53)

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Faculty involved (Participation/coordination) (3)

Dr. Mayamma Joseph, Dr. Smita Nagouda, Dr. (Fr.) Joseph Varghese and Ms. Divya Zacharias.

Support Staff (3)

Ganapathy, Karnan and Pappamma.
A View of the Participants

Professor Sury’s Lecture
Professor Narasimhan giving the Public Lecture

Professors Sury, Narasimhan and Alladi Sitaram during interactive session with students
Professor Kaushal Verma interacting with the students

Lecture Session in Progress
Interactive session-I

Interactive session-II
Faculty Members of the department of Mathematics with the resource persons

Dr. (Fr.) Joseph Varghese introducing Professor Joseph Samuel