

The Ramanujan Mathematical Society

Initiative for strengthening Higher Mathematics education

The following list of sample UGTE programmes will give an idea about the kind of programmes RMS wishes to run. The potential organizers of the programmes may devise similar programmes suitable for their needs.

The RMS Committee on Regional Programmes thanks Prof.s Katre, Kumaresan, Srinivas, and Sujatha, for their inputs.

The **Ramanujan Mathematical Society (RMS)** is a premier national mathematical society in India. It is working for the last 28 years, with a membership of over 1000, and growing. Its members are highly educated, distinguished in many ways, university professors, along with UG-college faculty and a few students. Some of its members have been Fields Medalists, or their advisers, international and national award winners, such as Abel Prize, Bhatanagar awards, Swarnajayanti awards, or coming close to getting such prizes.

Yet, besides publications activities, its activities reaching the larger mathematical community are still very few. It is conducting one four-day, **national, annual conference**. Naturally, the annual conference has entirely research orientation, with emphasis on the latest research developments. It is the intention of the newly elected Executive Committee, to increase the community activities of RMS by emphasizing **regional** meetings and regional **School-UG-PG activities**, all over India. The regional meetings will give much better opportunities for younger researchers to present their research, and for all mathematicians in the distant parts of India, to **develop networking of like-minded people**.

To this end, the RMS has formed a **Regional Programmes Committee**, chaired by the President, Prof. Ravindra Kulkarni. Its other eight members are: Prof. G. K. Bakshi (Panjab U, Chandigarh), Prof. Tarun Das, (Maharaja Sayajirao U, Baroda), Prof. D. Dhaigude (Dr. Babasaheb Ambedkar Marathwada U, Aurangabad), Prof. S. Ponnusamy (ISI, Chennai), Prof. T. S. S. R. K. Rao (ISI, Bangalore), Prof. K. Srinivas Rao (IMSc, Chennai), Prof. Ajit Iqbal Singh (ISI, Delhi) and Prof. Vinayak Sholapurkar (Pune U, Pune).

To begin with, the Committee has formulated the **Undergraduate Teachers Enrichment (UGTE) Programmes**. In Hindi, the word "UGTE" means "rising". We hope that these programmes will arouse, nurture and fulfil the love of mathematics among the Undergraduate faculty.

UNDERGRADUATE TEACHER ENRICHMENT (UGTE) PROGRAMMES

The UGTE programmes are meant for all interested **undergraduate faculty across India**. Our idea is to form a large **mathematics discussion group** dealing with aspects of undergraduate mathematics, in the colleges affiliated to universities. This would include statistics, operational research and computer science departments and Engineering colleges as well. In fact, Mathematics includes all areas of pure, applicable, and engineering mathematics,

Many of these faculty are isolated. At many places infra-structural facilities are poor. The difficulties become severe in non-metropolitan areas. Working conditions, for example, heavy

teaching loads, stringent leave rules, lack of peer contact, lack of contact with the PG-faculty, lack of computer facilities, pressure to publish, often make it difficult to foster proper appreciation of higher mathematics. We shall try to overcome these problems by developing **proper networking**.

The UGTE programmes will be **largely interactive**. An old stanza in Sanskrit describes the process of learning as "1/4th from a teacher's teaching, 1/4th from one's own efforts, 1/4th from discussion with the like-minded people, and 1/4th from sleeping over the material for a long time". The programmes will follow the second and third steps in this process.

For the UGTE-programmes, there is some **funding** available in RMS. In addition to that, the **National Centre of Mathematics (NCM)**, which is a joint activity of TIFR and IIT (Bombay), and based at IIT (Bombay), has provided Rs.20 lakhs to start the activity. Eventually, based on the response, RMS hopes to apply for support from the national funding agencies like DST or NBHM, or other corporate and individual sources.

The UGTE Programmes are still in a "**pilot mode**". Committee members will encourage undergraduate faculty to organise UGTE workshops in their institutions and render all possible guidance and help. The undergraduate teachers are expected to approach a committee member from their region.

GOALS OF UGTE PROGRAMMES

UGTE programmes have been designed with following goals in mind.

- i) To deepen the **understanding of the fundamentals** of the subjects, which the undergraduate teachers teach.
- ii) To provide the **logical** (deductive as well as inductive) **structure** of mathematics, explaining the role of 2-valued logic, set theory, and category theory. In particular, to clarify that many mathematical entities are expressed using numbers, but they themselves are not numbers.
- iii) To provide a broad view of mathematics through an **interdisciplinary perspective**.
- iv) To provide a **semi-historical view** of mathematics, mainly covering development of mathematical ideas, but also covering a few things about the lives of eminent mathematicians, to indicate the social conditions under which they worked.
- v) To prepare the undergraduate teachers to **spot and nurture talent** amongst undergraduate students and to well channelise their **potentials**.

STRUCTURE OF UGTE PROGRAMMES

A tentative structure of UGTE programmes has the following **parameters** and gives the organisers a large amount of **flexibility** in planning the activity.

- i) The **duration** for a UG-Faculty Programme / workshop will be usually from **one day to one week**. However, longer programmes and other modes will also be considered.
- ii) Suggested **schedule** is of **six contact hours**, divided into three to six lectures / interactive sessions **each day**.
- iii) The programme will have a set **theme**, which has to be studied in depth. A set of sample themes with topics (of different time durations) is given in the **Appendix**. The concerned committee member

and expert resource persons can work out further details including books / online material etc. to be used for the programme.

- iv) Expert **resource persons** will be suggested and requested by the concerned **committee member** to kindly lend their expertise and devote their time for this important activity.
- v) The **participants** are expected to be coming from a particular **region**.
- vi) Preferably, the participants will be from younger age-group. But what counts is their **sincerity and aptitude** for learning and active participation. A statement from each one of them about their **interest** in a specific workshop may be sought.
- vii) Because the programmes are regional, the **costs** are expected to be low. The cost may vary from region to region as well. Roughly speaking, for a programme with 30 participants, the total cost for a week-long programme is estimated to be around Rs.1.2 lakhs.
- viii) RMS may give a **grant** for this purpose or recommend the case to **NCM**.
- ix) The organising institution is expected to **contribute towards expenses** in addition to providing the **venue** with all facilities **free of cost**.
- x) An appropriate **Registration fee** may be charged from the participants.
- xi) The organising institution will take the full responsibility on all financial matters.
- xii) Each participant will be asked to fill a **Feedback proforma** giving views and suggestions towards the end of the programme.

PROCEDURE FOR UGTE PROGRAMME

Essential steps of a preliminary procedure are as follows.

Step1. A detailed **proposal** for an RMS-UGTE programme will be prepared by the organising institution, in consultation with the concerned committee member, as outlined above well in time, preferably two months before the event is planned for. This will include the proposed theme, proposed resource persons, proposed academic programme, a draft of the poster of the programme, estimated budget specifying expected expenditure, expected contribution by the institution, suggested registration fee, facilities available at the institution etc.. It will be sent to the President, RMS, and the Chairman of the RMS Regional Programmes Committee. He can consult Committee members and other RMS authorities etc., suggest changes, if any and approve or disapprove the proposal.

Step2. If the proposal is approved, the organising institution will send the information to the resource persons and to the concerned institutions from where participants are likely to come well in time. The institution will send the posters and seek preliminary registration (without any payment or otherwise) from participants, select the participants, inform them and ask them to make payments, if any, for the formal registration. For procedural convenience, a waiting list may be prepared as well.

Step3. The organising institution takes the responsibility of making all arrangements for the programme including the local travel, hospitality and payment of honorarium and national travel, if any for the resource persons.

Step4. After the completion of the programme, the organising institution will send to the President of the RMS, Chairman of the RMS Regional Programmes Committee, a **report** of the activity together with a few photographs of the event, **accounts** and a **summary** of the **feedback** proformas. Copies will also be sent to the Secretary and Treasurer of the RMS and the concerned committee member. All the proformas will be sent, under a separate cover, to the Secretary of the RMS. All this will become property of RMS to be used solely for academic purposes under full confidentiality.

