Series of Fully Funded Pedagogy Workshops
for
Teachers of Under/Postgraduate Science Courses

We invite accomplished and motivated science teachers of undergraduate colleges across India to be part of a program, wherein their talent, expertise and experience in science education is used to help other science teachers, particularly those entering the profession. We conduct a series of workshops to train the teachers to be effective communicators and help other teachers to improve their teaching.

Background:
As India moves from a service economy to knowledge economy, the scientific enterprise in the country, whether academic or industrial or in other domains of society, is set to grow. To meet these demands, science education should empower students with the problem-solving skills that form a part of scientific methodology, such as meticulous observation, analytical abilities, critical thinking, and reasoning. Considering the need to impart quality education for such a large population as ours, it is important to develop less expensive, at the same time, highly interactive pedagogical tools to communicate the fundamental principles of science. Research-based or inquiry-based pedagogical tools considered to be the ideal way of teaching as they treat each chapter in a text book the way knowledge is generated by scientists, by involving students in the process of arriving at scientific concepts. This teaching method recognises, requires and rewards research activity in a classroom setting. The proposed workshops will introduce participants to this tool that develops research skills along with deep content understanding.

Teachers are the best agents to bring about a radical change in perspective of not just students, but also of other teachers. **We appeal to the finest UG teachers in India to become a part of this national movement to help improve science education in the**

country by coming forward to train their peers in newer ways of teaching and learning science. Through their experience in the classroom, a large number of teachers do develop effective pedagogical techniques but they remain largely unknown to other teachers. This series of workshops will provide the most promising teachers an opportunity and a platform to reach out to their peers. Selected teachers will be chosen to become trainers in the regional phase of these workshops after going through two levels of training. A grass-root level peer-to-peer network will also form through these workshops. Through this network, our teacher trainers will be instrumental in identifying scale-able pedagogical tools that can be deployed all over the country, taking into account the syllabi, size of classrooms, availability of facilities, etc.

These exercises not only improve learning and thereby examination performance amongst the students, but also help them develop skills for solving real-life problems using concepts and methods of science.

Structure of Workshops

In this context, we envisage this series of pedagogy workshops to train undergraduate science teachers in developing alternative methods of teaching, especially Research-based Pedagogical Tools (RBPTs). Experts in education from Sheffield Hallam University (sponsored by British Council) and from India will conduct these workshops. This is not the same as project-based learning. These are hands-on workshops that will introduce participants to pedagogical tools that focus on the process of science rather than memorizing facts.

The workshops, which are teacher-centric, will also provide a platform for teachers to present tools that they themselves have developed and form professional networks for exchange of ideas as well as concerns, with like-minded peers. In order to improve overall infrastructure, participants will be given information about government initiatives such as DBT STAR College Scheme, DST-PURSE / INSPIRE that are aimed at improving the quality of undergraduate science education. Experts from DBT / DST / other government agencies will be invited to provide guidance on availing such schemes. The ultimate goal is to make teachers drivers for improving the quality of undergraduate science education.

Level 1 workshops: Several workshops at different locations in the country would be organised (to enable teachers from different parts of the country to attend) for three days for batches of 150 undergraduate science teachers. The concept and need for alternative methods of pedagogy will be introduced, with in-depth discussions on pedagogical tools involving research. There will be group-wise sessions on developing discipline-specific RBPTs. Experts on some or all of the following disciplines: physics, chemistry, mathematics, biology and earth science will be involved, depending upon the background of the participants. The participants will be asked to present tools that they have developed in their classrooms and also be given assignments to come up with novel RBPTs in their discipline. Of these, scale-able tools that can be deployed by everyone will be identified. A network of participants will also be formed, which will enable the participants to keep in touch with their peers and share new ideas and experiences on various pedagogical methods.

Level 2 workshops: Promising participants of Level 1 workshops will be selected to attend advanced Level 2 workshops for becoming Teacher Trainers. These workshops will further strengthen the participant's ability to generate RBPTs for teaching various scientific concepts. The main focus will be on enabling the delegates to take on the role of trainers so that they are able to spread these pedagogical innovations among their peers in their region.

Regional workshops: Teacher Trainers trained through Level 2 workshops would be enrolled to organise smaller regional workshops in their area and act as trainers in these workshops. The regional workshops would be customised for each region, taking into account prescribed syllabus, language, availability of quality teachers, laboratories etc.

Follow-up and Evaluation:
A systematic follow-up on the implementation of new RBPTs in the classroom and the changes in learning outcomes of students, including perceptible improvement in performance at University examinations, will be set up. Accreditation for teachers who have completed such workshops would be planned. On the basis of the new pedagogy, certification for students to indicate their capacity to solve problems by doing research is also envisaged.

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Department of Biotechnology, Ministry of S&T, Government of India

Department of Science and Technology, **Ministry of S&T, Government of India**

British Council – Newton Bhabha Fund (https://www.britishcouncil.in/newton)

Implementation
The project will be implemented through the Centre of Excellence in Science and Mathematics Education (COESME) at IISER Pune. The COESME has been set up under the Pandit Madan Mohan Malaviya National Mission for Teachers and Teaching (PMMMNMTT) scheme of the Ministry of Human Resource Development (MHRD). The goals of COESME are to build a pool of students and educators with a robust skill set in pedagogy and concept based learning, with a focus on pedagogical innovation by and for teachers. (http://www.iiserpune.ac.in/outreach/coesme).

The next Level 1 workshops of the series are planned as follows:

1. 6-9 October, 2017, Raipur, Chhattisgarh
2. 11-14 October, 2017, Kochi, Kerala
3. 10-13 December, 2017, Gandhinagar, Gujarat

Visit COESME, IISER Pune webpage for further updates.

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