

STEEP

*A High Quality
Science and Technology Education Program
for*

*High School Students from
Himachal Pradesh and Jammu & Kashmir*

*An Initiative of the
Indian Institute of Technology, Mandi
(IIT Mandi)*

*In cooperation with the
Education Departments and the State Governments of
Himachal Pradesh and Jammu & Kashmir*

30 November 2015

INTRODUCTION

Human resource development in science and technology is an essential ingredient in economic development of a country. Recently, only about 18% of the high school students in Himachal Pradesh were estimated to have opted for higher education [1]. Only a small fraction of those students enroll for professional education in science and engineering. One of the main recommendations of a report by the Himachal Pradesh Planning Board was to "motivate students to continue education up to higher levels and join technical/professional courses" [2]. The situation in the State of Jammu & Kashmir is likely to be more or less similar to Himachal Pradesh in this regard.

The proposed initiative aims to motivate a small sample of bright students from Himachal Pradesh and Jammu & Kashmir to go for higher studies in science and engineering.

PROGRAM OUTLINE

The proposed initiative is named STEP for convenience (Science and Technology Education Program) for High Schools students from Himachal Pradesh and Jammu & Kashmir. Under this program, a total of about 20 "Plus one" (or Class 11) students would spend about 2 weeks in early June 2016 at the IIT Mandi Campus area. The students would have the opportunity to interact with some of the nation's top class faculty from over a dozen different disciplines in science and technology, and be exposed to over 20 different exciting topics likely to kindle an interest in those students to strive for higher education in science and technology. The students would be selected primarily on the basis of their marks in Class 10 from each of the states of Himachal Pradesh and Jammu & Kashmir. An attempt will be made to select at least 2 students from the same school so that the young students arrive in the company of someone familiar to them.

Table 1 has a representative list of topics the students might experience. The students would live in the hostels normally built for B.Tech./M.Sc./Ph.D. students and eat in the mess halls meant for the students and faculty of IIT Mandi.

FUNDING

It is proposed that IIT Mandi, the State Governments of Himachal Pradesh and Jammu & Kashmir jointly share the cost of STEP as follows so that bright students from even families with a low income can participate.

- IIT Mandi: The cost of room and board for the duration of 2 weeks. IIT Mandi to take responsibility for providing class rooms, laboratories.

equipment, consumable instructional materials.

- State Government of Himachal Pradesh: The cost of informing the schools within the state about the STEP program, and the cost of round trip transportation of approximately 10 students from their home town/village to and from IIT Mandi.
- State Government of Jammu & Kashmir: The cost of informing the schools within the state about the STEP program, and the cost of round trip transportation of approximately 10 students from their home town/village to and from IIT Mandi.

PROPOSED TIMELINE

1. Approval by the HP and J&K Boards of Education (Jan 31, 2016)
2. Inputs by HP and J&K Board Coordinators and Finalization (Mar 15, 2016)
3. Dissemination of Information to the respective schools (March 31, 2016)
4. Reminders to the Schools (April 15, 2016)
5. Review of applications, selection of candidates, and notification (May 10)
6. Implementation of Program (early June, exact dates to be determined)

DELIVERABLES

The students would prepare a hand-written summary and a short video with the help of IIT Mandi faculty. The report and video will be shared with the originating schools, the education departments of Himachal Pradesh and Jammu & Kashmir.

CONTACTS:

IIT Mandi:

Dr. Suman Kalyan Pal, Dean (Students), E-Mail: deanstudents@iitmandi.ac.in

Dr. Bhavender Paul, Adjunct Professor, E-mail: bp@iitmandi.ac.in

HP Board of Education:

Please name the coordinator(s), and add e-mail address(es)

J&K Board of Education:

Please name the coordinator(s), and add e-mail address(es)

TABLE 1
REPRESENTATIVE SAMPLE OF THE TYPES OF ACTIVITIES TO BE EXPERIENCED BY THE STUDENTS (Not intended to be the exact program)

Day	Activity
1	Arrival and escort to respective rooms. Unpacking. Orientation Meeting: Introductory Session
2	Tour of IIT Mandi Kamand Campuses (South & North) Landmarks in Technology Science & Engineering in Everyday Life General Techniques for studying better; how to prepare for entrance exams Documentation of experience Time with the Astronomy Club, IIT Mandi
3	Introduction to Nanomaterials Experiments in Nanomaterials Experiments in superconductivity
4	Possible outing to a location not too far from IIT Mandi
5	Engineering Drawing CAD Design Documentation of experience
6	Electrical Machines, Power Systems, Power Electronics Electricity and transportation without coal and petroleum Introduction to Photovoltaic Technologies Workshop in Photovoltaic Technologies
7	Digital World of Electronics Applications in Signal Processing

	<p>Introduction to Biotechnology</p> <p>Cultural Night</p>
8	<p>Relevance of Mathematics in Engineering Field</p> <p>Reverse Engineering</p>
9	<p>Science in Everyday Life</p> <p>Electron Microscopy of Materials</p> <p>Actual Fabrication from a CAD design – Session 1</p> <p>The Art of Communication</p> <p>Documentation of experience</p>
10	<p>Evolutions in Civil Engineering</p> <p>Overview of Mechanical Engineering</p>
11	<p>Possible visit to some location not too far from IIT Mandi.</p>
12	<p>Wind Turbine Technology</p> <p>Control Theory Applications</p> <p>Preparing for Higher Studies in Science and Engineering</p> <p>Documentation of experience</p>
13	<p>Follow the researcher day (students shadow a Ph.D. scholar in small groups)</p> <p>Time with B.Tech. students from the IIT Mandi</p> <ul style="list-style-type: none"> ■ Electronics/Robotics Club ■ Programming Club <p>Documentation of experience</p>
14	<p>Final Review Session:</p> <p>Session for the students to share their experience and Questions. IIT Mandi hosts to respond with their comments Screening of Video documentation produced.</p>
15	<p>Catch-up with any pending activities and packing and the return journey</p>

REFERENCES:

1. Education in Himachal Pradesh. <http://www.bestindiaedu.com/himachal-pradesh.html> (2011)
2. Education, Himachal Pradesh Development Report, Planning Commission, Government of India, Chapter 7 (2003)