

## **Executive Summary of Review of Centre of Studies in Resources Engineering**

The review of the Centre of Studies in Resources Engineering (CSRE) was held on January 16, 2014. The members of the committee constituted were Dr. R.R. Navalgund, Prof. Vikram Sarabhai Distinguished Professor, ISRO Headquarters, Bangalore, Prof. M.K. Arora (Department of Civil Engineering, IIT Roorkee and present Director of Punjab Engineering College University of Technology, Chandigarh) and Prof. Seishi Ninomiya (Institute for Sustainable Agro-ecosystem Services, University of Tokyo, Japan). Head, CSRE Prof. (Mrs.) P. Venkatachalam welcomed the Committee members and presented the status of the Centre on various aspects such as faculty strength and their research areas, growth in student numbers and status of academic programmes. The Centre has on rolls 14 faculty, 2 administrative staff, 6 technical staff and 6 supporting staff. The present student strength is 103 out of which 65 are Ph.D. students. During the review meeting the individual presentations were made by all the faculty members on their respective research areas, projects, publications and student guidance. The Committee separately met with a few representatives of M.Tech. and Ph.D. students who presented their perspective of the academic programs in the Centre, academic ambience, suggestions for improvements, and so on. The Committee also noted that as an academic unit of IIT Bombay, the Centre is relatively young, having started the M.Tech. program in 2005 and the PhD program in 2007. The centre offers a UG Minor program in Geoinformatics starting from 2010. In respect of starting a 4-year B.Tech. degree program by the Centre in the area of Geoinformatics engineering, the Committee recommended that meetings and Workshops can be organized first involving the stake holders like research institutions, industry and academic bodies to ensure that there is a good scope for the students completing their B.Tech. in this area have a satisfactory career growth path.

The research activity in the Centre is grouped into theoretical/technology areas such as satellite remote sensing, image processing, geographic information science, global positioning systems, and application areas such as snow/avalanche studies, mineral system studies, terrain evaluation and landuse planning, agro-informatics, landslides, drought, and atmospheric chemistry. The Centre's annual publication record is improving over the years since the commencement of the doctoral program, and the Committee mentioned that it should be possible to double the journal publications of the Centre with some more effort. Teaching and research infrastructure in the Centre has improved to a satisfactory level with state of the art remote sensing and geographic information system software, global positioning system receivers, large format scanner, spectroradiometer, and so on. The Committee suggested a few more important equipment items to be added to the research infrastructure, particularly in respect of field data collection. The Committee found the range of courses offered at the Centre satisfactory, and suggested that a foundation course consisting of advanced mathematics, statistics and probability, and computer programming be introduced for all students. The Review Committee also suggested that a field component be added to the M.Tech curriculum wherein the students carry out field work of

about two weeks as part of their course work. Regarding Ph.D. students, the Committee recommended that a Comprehensive Examination must be conducted for the students before Ph.D. registration. Also M.Tech. students interested in research can be encouraged to continue their research through Ph.D program. It has been suggested that the Centre must prepare a 10 – 15 years road map and identify clearly the future areas of research. There should be some outreach activities to utilize the output of research for social development and welfare. The Committee was highly appreciative of the diligence exercised by the Centre in recruiting faculty members, and suggested that the efforts must be continued to find replacements for faculty members superannuating in the coming 1-3 years.

In order to put an action plan in place based on the recommendations of the Review Committee, the review report was shared with all faculty members so that they too can reflect on it and come up with ideas/suggestions to address areas where and how the Centre should improve. The Centre has started framing a new elective course consisting of advanced mathematics, statistics, numerical methods and programming to improve the analytical skill of the students. Steps are being taken to improve the faculty strength in the areas suggested by the committee. In order to improve the research facilities, the Centre is planning to undertake large scale research projects where there is scope for sizeable funding for new hardware/software. The Centre is working to put in place a regular intra-Centre seminar series to get all the faculty members and postgraduate/doctoral students together to discuss latest developments in different areas. Steps will be taken to introduce a comprehensive exam for Ph.D. students before their registration. The Centre has great scope for further growth academically and in research front. A road map covering the coming 10-15 years will be prepared by the Centre stating its vision and mission and identifying its future areas of research.