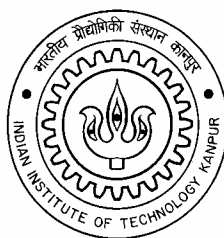


Proposal for Setting up
Centre for Environmental Science and Engineering
at
Indian Institute of Technology Kanpur



INDIAN INSTITUTE OF TECHNOLOGY KANPUR

November 2007

Centre for Environmental Science and Engineering

1.0 Preamble

India's rapidly growing economy and development of industry and infrastructure pose greater human and ecological health challenges leading to depletion of environmental resources. As a result, environmental issues/problems have become increasingly complex and inter-disciplinary requiring solutions, which are based on principles of engineering science, biology and medicine. Although independent solutions from these areas have been developed, an interfacial integration of these three areas can lead to more effective and comprehensive solutions. With this specific objective of integrating the engineering science, medicine and biology to address environmental issues, IIT Kanpur has taken the initiative to create a research Centre for environmental science and engineering (CESE). This Centre will bring together experts from various disciplines to focus on providing solutions to specific environmental problems including environmental health issues. This initiative is being generously funded from the MPLADS scheme, pledged by Mr. Arun Shourie, Hon'ble Member of Parliament, and Rajya Sabha.

The mission and objectives of the proposed Centre have been finalized after taking the inputs from the following faculty members: YN Mohapatra (Phy), Satyendra Kumar (Phy), Avinash Agarwal (ME), N.S. Vyas (ME), Shantanu Bhattacharya (ME), D. Kunzru (ChE), Ashutosh Sharma (ChE), S. Panda (ChE), P.K. Bhattacharya (ChE), J.K. Singh (ChE), N. Verma (ChE), Mukesh Sharma (CE) , Tarun Gupta (CE), S.K. Iyer (EE), S.P. Das (EE), J. John (EE), P. Sinha (BSBE), and Ashok Kumar (BSBE).

2.0 Mission and Objectives

Mission

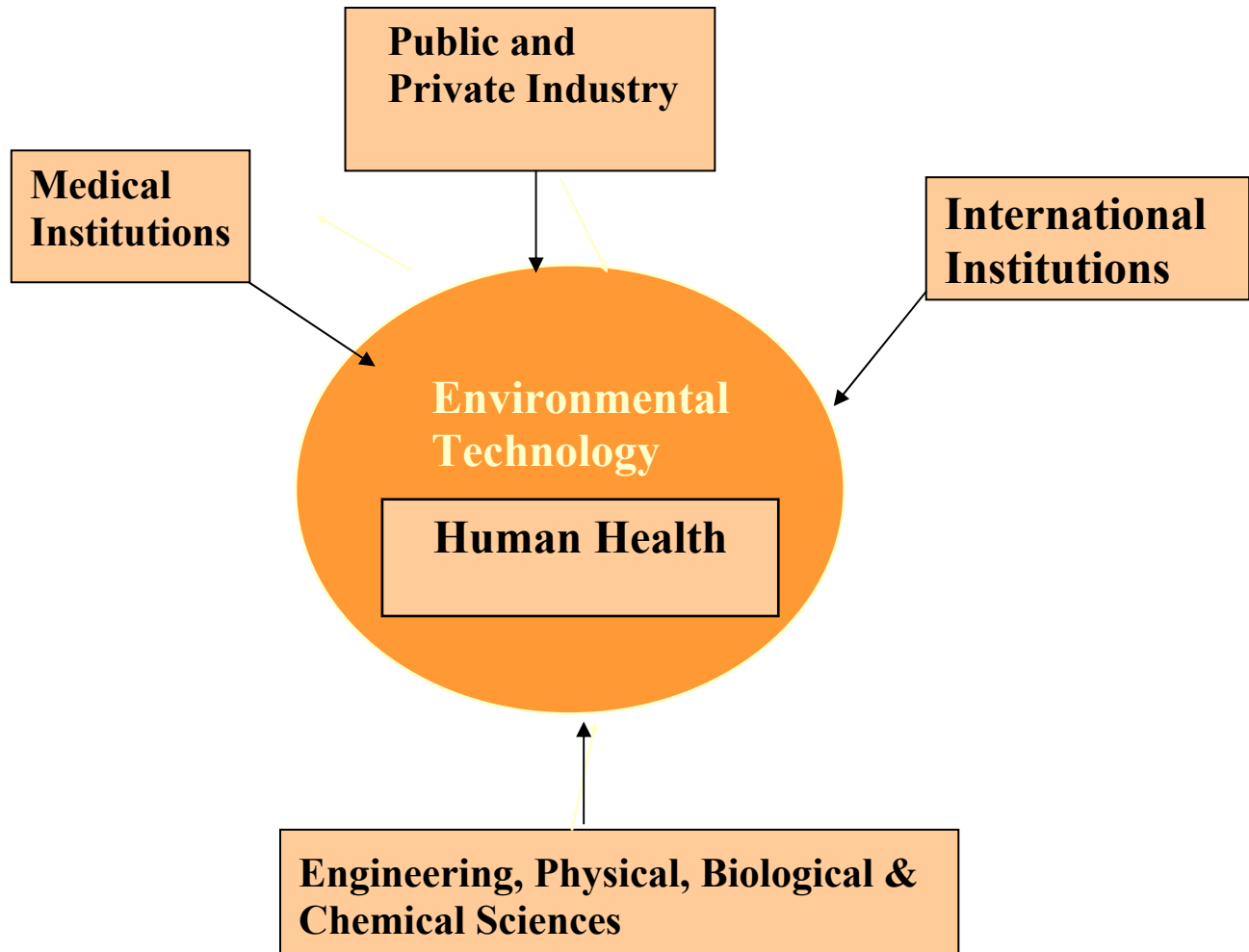
The mission of Centre for Environment Science and Engineering is to carry out high quality interdisciplinary research, leading to technology development and competency building in various areas related to environmental problems, thereby providing solutions to Indian industry, medical professionals and policy makers.

Objectives

- To develop a new generation of sensors for efficient and quick *in situ* detection of environmental conditions including emissions/discharges .
- To develop high performance filters and membranes for effective remediation of contaminants.
- To develop new catalysts and adsorbents for removal of contaminants in air, soil and water environments.
- To utilize nanotechnology for synthesis of sensors, membranes, catalysts and adsorbents.
- To study the impact of environmental pollution on human health
- To develop genetically-engineered specific micro-organisms for bio remediation of contaminants
- To develop environment- friendly technologies for abatement of pollutants.
- To promote environmental considerations in product-design and technology development in all fields of engineering
- To establish a tripartite relationship between industry, academia and government agencies to nurture and support growth of environmental science and technology

The overall interdisciplinary functioning of the CESE is presented in Figure 1.

Figure 1: Multidisciplinary approach of CESE



3.0 Organization

The Centre will have a core faculty group and a team of research engineers and supporting staff assisting the faculty in R&D and in maintaining the facilities and infrastructure. In addition, there will be project staff appointed against the projects running at the Centre. All such staff of Centre will be appointed as per the rules of the Institute/Dean R&D. The Centre will have a Coordinator appointed by the Director chosen from the core faculty group.

National Advisory Committee (NAC)

It is proposed that Centre have a National Advisory Committee (NAC) drawn from reputed persons from various walks of life to advise the Centre on its activities and research and development programmes. The Director, IITK will be the Chairperson of NAC; DORD and the Coordinator will be other members of NAC from IITK. The Coordinator of the Centre will be the Member-Secretary of the NAC. The outside members of NAC may include experts from:

- Academia
- Research Institutes
- Industrial Houses
 - Large Polluting Industries
 - Environmental Technology and Service Industry
- NGOs
- Medical/Public Health Institutions
- Government

The tenure of the NAC will be normally for three years with provision of re-nomination. The NAC will meet at least once a year to review the progress at CESE and to provide specific directions for better performance.

Centre Consultative Committee

There will be a Centre Consultative Committee headed by the Director, IIT Kanpur to monitor the functioning of the Centre, and advise on planning its action for each quarter. The Dean R&D, at least Heads of three Departments/ Programmes of the Institute, two members of the Core faculty group and Coordinator of the Centre will be its members. The Coordinator, CESE will be the Member Secretary of the Centre Consultative Committee.

Core Faculty Group

The Centre will have a core faculty group, consisting of 3-4 faculty members, whose interests lie in areas related to environmental science and technology. In the beginning, this core group will be appointed by the Director. Later on, when the Centre is operational, the Core group will be selected by the Director from the faculty members who have ongoing projects at the Centre. The core group will meet with the project investigators at least once a month under the Chairmanship of the Coordinator to monitor the progress of the projects and activities. The minutes of the meeting will be forwarded to all members of Centre Consultative Committee to keep them abreast of the progress of activities.

Operational Aspects

All interested faculty members can participate in fulfilling the research objectives of the Centre. The participating faculty should obtain sponsored/consultancy projects on relevant areas from external agencies. The proposals submitted to obtain such sponsorship should have the consent of Coordinator, CESE and Dean, R&D, IIT Kanpur.

Affiliate Members

It is also proposed that the Centre shall have organizations from outside IITK as Affiliate Members. Affiliated membership can be obtained by paying an annual subscription fee. It is expected that there will be a large number of institutions who

would like to become affiliate members. The potential agencies that may become members include:

- Private Industries
- PSUs
- City administrations
- Research institutions
- Public health institutions
- Ministries and regulatory bodies

Members may participate in seminars/ meetings/ conferences of the Centre, and will have access to research publications, reports etc. of the Centre. Affiliate members will be able to highlight and suggest need-based research and technology development that will be beneficial to the society and the industry.

Student Research and Fellowship

The Centre will actively support research carried out by students. The faculty advisors and students working on projects of interest to the Centre will have full access to the facilities of the Centre. The Centre will try to provide special fellowships to students who will be working on projects that are operational at the Centre.

4.0 Budget, MOU and Agreements

The budget for research at the CESE will be generated through sponsored projects from external agencies and from Affiliate membership. For maintenance and augmentation of support structures, the Centre may request the Institute for additional funds.

IIT Kanpur will establish an appropriate MOU /Agreement with Industries with a view to support personnel, maintenance, travel and other expenditure needed to

run the Centre. The MOU/ agreement will have appropriate provisions as agreed by the two parties.

Additional organizational structures may be sought in a specific MOU or agreement with the sponsoring agency to review and monitor sponsored projects, work packages etc.

5.0 IPR & Procedures of Conduct of Sponsored Research

All rules and procedures of IIT Kanpur in force at any time regarding conduct of sponsored research and IPR will be implemented by the Centre.

In addition, as special cases, IIT Kanpur may have IPR agreements with sponsoring agencies and industries for specific projects that the Centre obtains as a part of its activities. Any such agreement should be covered as a part of MOU / Agreement with the Sponsoring Agency.

6.0 Facility

An infrastructural facility (building) including laboratories, faculty and conference rooms is being developed. The location of building was selected between nursery and aerospace building. There are several important features of the building like eco-friendly products in construction, energy efficient features, power saving sensors, use of non-conventional energy such as solar and passive cooling techniques. More information on the building is given at Annexure-1.

Initial Grant

An initial grant of Rs. 5 crore, apart from Rs 6 crore for the building, is available for starting the research activities from the MPLADS fund.

Building

This facility is meant to focus on research in various areas of environment that is air, water and the impact of human interference with the objective of solving problems. The location of building was selected between nursery and aerospace building. There are several features like eco friendly products in construction, energy efficient features, power saving sensors, use of non-conventional energy sources such as the solar, passive cooling techniques and proper landscape are the basic features of the building. The building is designed to be environment friendly. The building shall also be rated on the parameters of green features and TERI (The Energy and Resources Institute) has been appointed as a consultant for incorporating green features, their cost benefit analysis and design. TERI shall also be providing rating under TERI –GRIHA (Green Rating for Integrated Habitat Assessment) System.

Based on the above examination, the building will be provided a rating in terms of number of stars. The rating is based on the quality of environmental-friendly design, energy savings, conservation of water, utilization of appropriate material, use of non-conventional energy sources and several other factors. A building can have a maximum of 100 points. If a building gets between 91 to 100 points, it will have a five star rating. If a building gets between 81 to 90 points, it will have a four star rating and so on. Based on the present assessment, it is heartening to note that the building under construction for the environmental science and engineering initiative is likely to have five star rating. The plan of the building is shown in Figure A.1.

Some examples of TERI Rating (points) features are presented below - section ((a) to (c)).

- Total plinth area: 2240 Sq-m
- Total working area: 4240 Sq-m

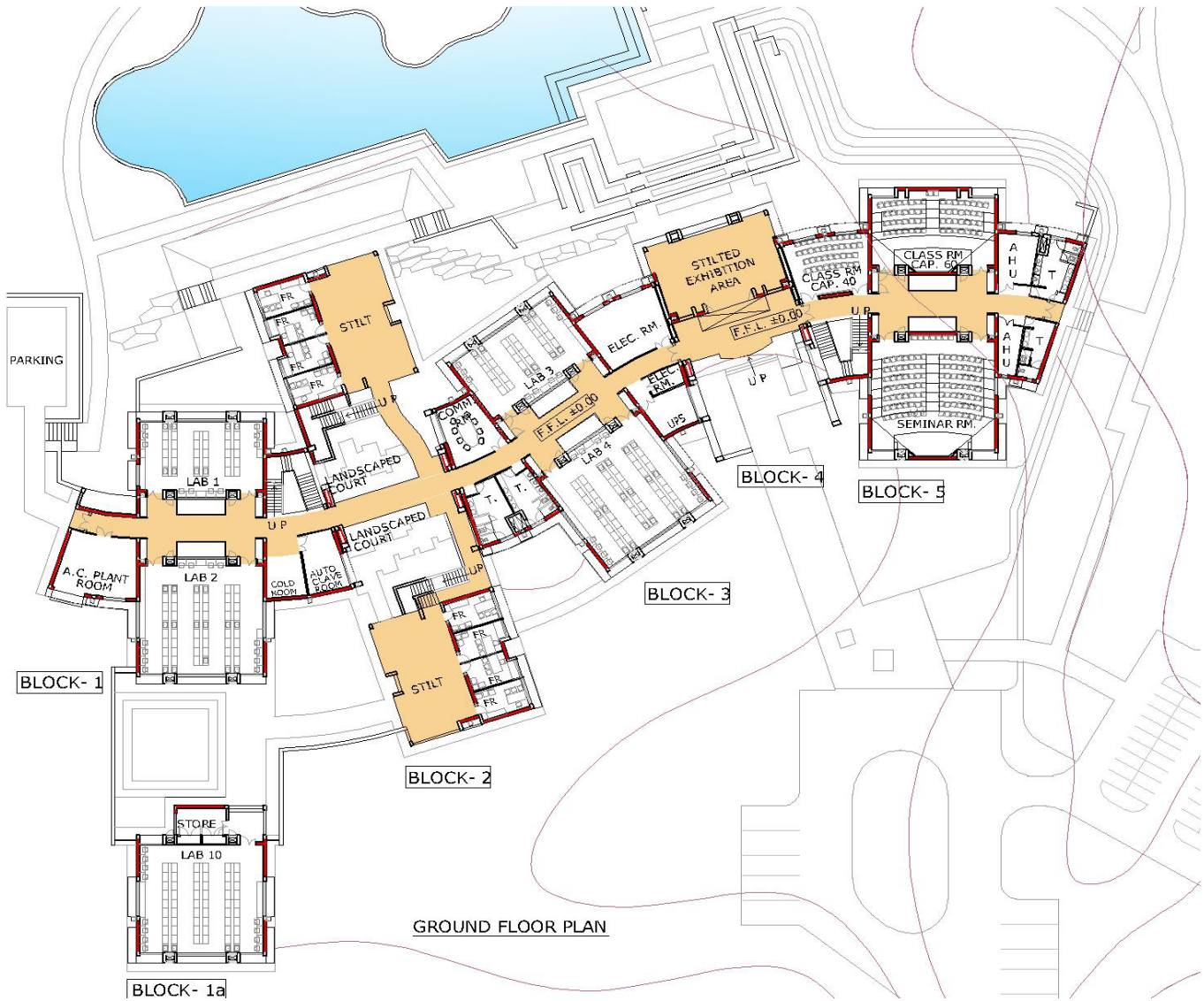


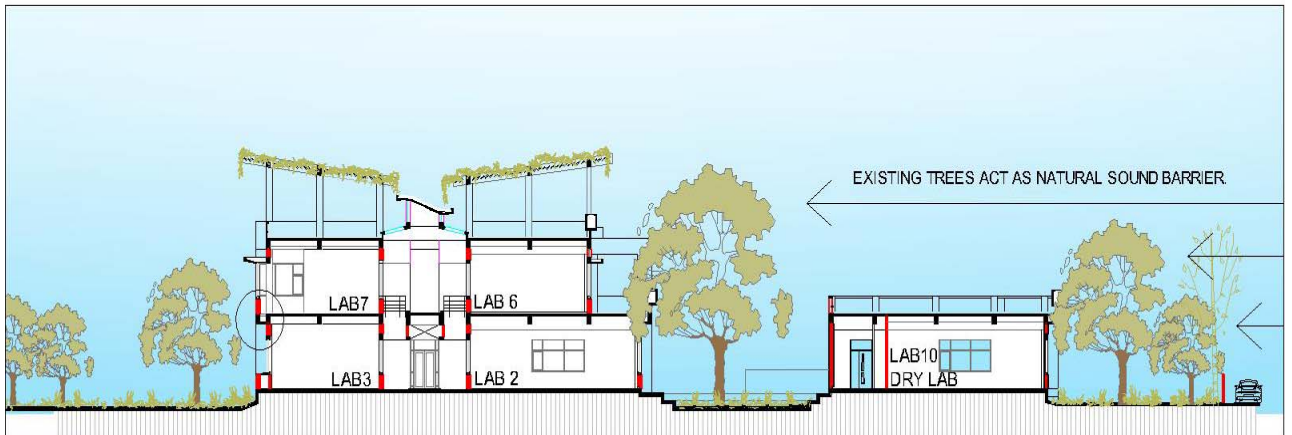
Figure A. 1 Plan of Building

(a) Reduce air pollution during construction

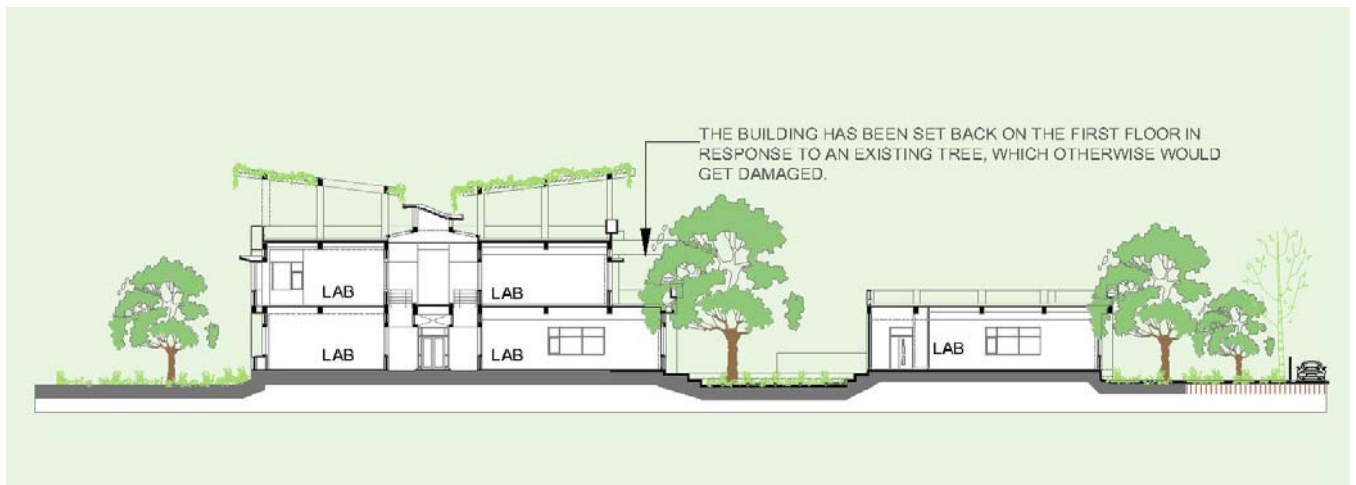


(b) Reduction of Noise

- Planting trees on the periphery will reduce noise disturbance into the building
- Cushioning under floor finish to reduce sound transmission on the lower floors
- Sound absorptive panes in seminar and class rooms



(c) Design to include existing site features



The first floor of the building has been pushed inside to protect a tree outside.