

INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY

INSTITUTE REVIEW

PERIOD

2008-2012 JULY 31 and AUG 1, 2014

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PERIOD: 2008 - 2012

July 31st and Aug 1, 2014

This is the report of the Review Committee set up by MHRD to carry out an institute-level review of the Indian Institute of Technology Bombay. The members are:

1. Prof. M.S. Ananth, Former Director, IIT Madras, India
2. Dr. Naushad Forbes, Director, Forbes Marshall, Pune, India
3. Prof. Pramod P. Khargonekar, Eckis Professor of Electrical and Computer Engineering and Dean Emeritus, College of Engineering, University of Florida and Assistant Director (Head of Engineering Directorate), National Science Foundation, USA
4. Prof. Vijayalakshmi Ravindranath, Chairperson, Centre for Neuroscience, IISc, Bangalore
5. Prof. Indira Samarasekara, President and Vice-Chancellor, University of Alberta, Canada

*The Committee visited IITB on July 31 & Aug 1, 2014.
Dr. Naushad Forbes could not be present for the review.

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THE VISIT SCHEDULE

July 31st, 2014

1.	10:00 10:15	Round of introductions in Director's Conference Room
2.	10:15 11:00	Briefing by Chairman BoG and Director
3.	11:00 13:00	Presentation on IITB & discussions (C, D, DDs, Deans)
4.	13:00 14:00	Lunch
5.	14:00 17:00	Visits to select Depts/Laboratories/Incubator (DD)
6.	17:00 19:50	Meeting with Students on Academic Matters
7.	20:00 21.30	Dinner
8.	10:00 10:15	Round of introductions in Director's Conference Room

Aug 1, 2014

1.	9:00 - 10:00	Campus Visit on Infrastructure (Dean IPS)
2.	10:00 - 11:00	Meeting with all HoDs
3.	11:00 - 11:45	Meeting with Young Faculty Members
4.	11:45 - 13:15	Meeting with Students on Life Enrichment Experience on Campus
5.	13:15 - 14:30	Lunch with BoG Members
6.	14:30 - 15:30	Meeting with BoG Members
7.	15:30 - 17:00	Internal meeting of Reviewers
8.	17:00	End of Review

II. BRIEFING BY CHAIRMAN, BOG AND DIRECTOR

Prof. Devang Khakhar, Director, welcomed the Review Committee Members. The present review follows the decision of IIT Council and all the required information about academic and research activities of IIT Bombay have been provided in hard copy as well as in soft copy to the Review Committee.

Dr. Anil Kakodkar, Chairman, Board of Governors, highlighted the need for the review: India is growing fast to become the third largest economy in the world, but has to face and overcome many challenges. India is poor in resources, but rich in manpower. Only option to move forward is through technological advancement which can be achieved through education, science and engineering research, and innovations to address societal needs.

IITs that were started about 50 to 60 years ago were primarily focused on world class UG Programmes. With the aspirational goal of becoming world class research universities, they are now focusing much more on research than in previous decades. Admissions to the Ph.D. programmes have gone up steeply. Periodic reviews of the IITs have been made to help them keep up with the best institutions globally while remaining relevant to India's needs. During the last decade, as a result of the Parliamentary mandate to suddenly increase the student intake numbers, the IITs have experienced tremendous stress on the existing facilities.

The present review is to be carried out in two phases. Accordingly, in the first phase, all academic units of IITB that had completed at least 5 years of existence underwent the review process. Subsequently, taking cognizance of the first phase of the review, this committee of external experts has been formed to conduct the final phase of the peer review.

Dr. Kakodkar suggested that Prof. M S. Ananth be identified as the spokesperson of the Review Committee to interact with IIT Council and IIT Bombay. His long association with IIT Bombay and the IIT system will be of help in assisting the review team.

III. SUMMARY OF DIRECTOR'S PRESENTATION ON IITB

Introduction

Indian Institute of Technology Bombay (IITB) was set up in 1958. In 1961, the Parliament decreed IITs as 'Institutes of National Importance'. IITB is now recognised worldwide as a leader in the field of engineering education and research.

Fact Sheet

The institute is housed on 530 acres of scenic land in Powai. It has 25 academic units, 9042 students on rolls, 580 full time faculty members and 1110 permanent non-teaching staff. In the last

convocation, IITB awarded 1808 degrees (including 181 Ph.D degrees) were awarded. The budget for 2013-14 approved by MHRD was Rs. 30684.5 lakhs (Plan) and Rs. 35023.9 lakhs (Non-Plan), while the R&D grants totaled Rs. 21360 lakhs. The faculty and students published 1457 papers that were cited 21659 times. It is a fully residential institute, with all its students and a majority of its faculty members staying on the campus. The students are accommodated in 16 hostels with in-house dining and excellent amenities for sports and other recreational facilities.

Governance

The governing principles of the IITs are set out in the 'Institutes of Technology Act' of the Parliament. The broad policies of the IIT system are framed by the IIT Council which is headed by the Minister of Human Resource Development (HRD). IITB has a Board of Governors (BoG) selected by the HRD Ministry, which is the final authority in taking any decision. It has its own 'Statutes' which may be revised from time to time. The Director is the executive head and Chairman of the Senate and is chosen by the Visitor (the President of India) under the nomination from the HRD Ministry. The Director reports to the Chairman, BoG.

IITB has two Deputy Directors (Academic & Infrastructure Affairs and Finance & External Affairs) who help the Director in running the institution. The functional aspects of the administration

are carried out by six different Deans (Academic Programs, Research & Development, Faculty Affairs, Infrastructure Planning & Support, Student Affairs, Administrative Affairs, Alumni & Corporate Relations and International Relations), who report to one of the Deputy Directors. Various academic units (departments, centres and school) are headed by their duly elected Heads. They report to different Deans based on the nature of the task. The responsibility of execution of these decisions rests with the administrative staff of the Institute including the Registrar, Deputy Registrars and Assistant Registrars. The Senate, consisting of all Professors of IITB, is the final authority in all academic matters. All Senate decisions must be formally approved by the BoG. The other important committees at IITB are the Finance Committee, helping the institute to plan its budget, and the Building and Works Committee, helping the institute in planning and approving all construction and redevelopment activities.

Programmes of Study

The Institute offers the following 10 programmes - 4-year B.Tech in engineering, 2-year M.Tech in engineering, 3-year M.Tech for project sponsored students, 5-year dual-degree (B.Tech & M.Tech) programs in engineering and in Engineering Physics, 2-year M.Sc programmes (post B.Sc) in Mathematics, Chemistry, Physics and Biotechnology, 5-year integrated M.Sc in Chemistry, 2-year M.Des in Industrial Design, 2-year M.Mgmt in Management and a 2-year

M.Phil in Humanities and Social Sciences, and a Ph.D. program in all departments.

The existing curriculum is updated periodically through in-depth deliberations in its Senate. New programmes of study are initiated periodically. Four new interdisciplinary Centres offering Ph.D degree programmes were started during the period 2008-2012: Nanotechnology and Science, Education Technology, Climate Studies and Urban Science and Engineering.

Students

IITB has been the preferred destination for students from all over India. In the current year (2014-15 academic year) Joint Entrance Examinations, 44 out of the top 50 rankers in JEE have opted for IITB to pursue their studies. The rate of expansion taking place at IITB is clear from the following two figures pertaining to the degrees awarded in 2001-2002 and 2012-2013 academic years respectively: total degrees - 989 & 1808 and Ph.Ds - 73 & 181.

Faculty

IITB has built a good infrastructure for research and has invested heavily on its faculty members and research scholars. Between 2008 and 2013, publications have gone up from about 900 to 1500, citations from about 10000 to 22000, patents filed from 28 to 79,

sponsored research funding from about Rs. 5800 lakhs to Rs. 18400 lakhs, consultancy project earnings from about Rs. 7300 lakhs to Rs. 22000 lakhs.

Major interdisciplinary areas of research are: Energy (clean, alternate and renewable), Healthcare (biosciences and bioengineering), Nano (materials, technology, applications), Information & Communications Technology, Water & Environment, Infrastructure Engineering and Appropriate Technology for Rural Areas. Some centres have been set up recently to undertake research of strategic, national or scientific importance: Nanoelectronics, Solar Thermal, Photovoltaics, Aerospace Innovation and Research, Biosciences and Bioengineering, Climate Change Research, Steel Research, Communication (Rs. 500 lakhs, Bharti Group) and Mathematics.

IITB has recruited nearly 175 young faculty between 2008 and 2012. It has also created a select number of Chair Professorships from its endowment fund to incentivize the good researchers. It has instituted various annual awards over the last ten years. IITB hosts about 60 foreign academicians as visiting professors for a duration spanning a few weeks to a year. IITB faculty have won nearly 200 major awards during the review period from various national and international professional bodies. Many are in the editorial board of prestigious journals.

International Collaborations

Recently, IITB has set up academic partnership with the many universities with a few of them (Monash University and National University of Singapore) allowing the award of a joint doctoral degree. Some partnerships give IITB researchers access to research facilities not available in the Institute. IITB has now over 75 active MoUs with various universities. IITB also participates in various EU funded Erasmus Mundus academic programmes, such as HERITAGE (managed by Ecole Centrale Nantes), EMINTE (with Lund University), EUPHRATES (with University of Santiago at Compestela), IDEAS (with Malardalen University, Sweden).

Alumni Relations

IITB has enhanced the engagement of alumni with the Institute, developed partnerships with foundations and corporations, managed alumni and corporate funded initiatives to support the critical needs of the Institute, and recognised alumni achievements. IITB has received over Rs. 8000 lakhs by way of donations from alumni and corporations during the review period. IITB has also pioneered the connection of alumni who are faculty members at other academic institutions worldwide to leverage their expertise to benefit IITB.

Infrastructure

IITB has undergone a massive expansion in terms of the number of students, number of faculty recruitment and the number of research projects initiated during the last 7 years. Although there have been inadequacies in creating the infrastructure needed to support the growth in students, faculty, and research, a very significant amount of infrastructure development has taken place. During the period 2008-12 about 160000 sqm of built-up area in the hostel sector, 30000 sqm by way of faculty housing, 27000 sqm of teaching and conference space, 71000 sqm of space in the departments and 19,000 sqm for campus support facilities has been developed.

The Institute Library has about 440,000 books and subscribes to 2682 journals and over 40000 e-journals and databases. The campus is now fully digital compliant. The bandwidth availability has gone up from 108 Mbps in 2008-09 to 2580 Mbps in 2012-13. It has a HPC facility with 380 nodes (3040 core processors) and is one of the main nodes in the National Knowledge Network (NKN) allowing it to broadcast or receive data from any part of the country.

Placement

IITB has a well-established Placement Office catering mainly to the B.Tech and M.Tech students. The number of students registered with the Placement office has gone up from about 1150 in 2007-08 to

1500 in 2012-13. About 75% of the registered students get their jobs through the Placement Office. The offers for the period 2012-2013 varied widely: Software/IT (28%), Engineering (28%), Consulting (12%), Analytics (9%), Finance (8%), R&D (6%), PSU/Government (4%) and Education (4%). The approximate average salaries per annum were: B.Tech. Rs.9 lakhs, Dual degree Rs. 9.6 lakhs and M.Tech. Rs. 7 lakhs.

Educational Outreach

IITB has a very active educational outreach programme in India. In order to benefit the industry personnel as well as the teachers of various colleges in the country, a suite of continuing education programs involving tailor made course contents, short term courses and in-house training at industry sites are offered regularly. In addition, IITB offers a large number of web and video courses for NPTEL and distance education. Also, there have been several other faculty driven initiatives to enhance the outreach of IITB in improving both the quality of teaching and the development of course contents.

Student Life

IITB provides various life enrichment programs in the hostel, informal training in student hostels, relationship building with friends, networking opportunities, sports, cultural and extra-curricular activities. Hence IITB encourages different types of

programmes: Student Gymkhana (Cultural and Sports activities), social works, Inter-IIT Sports Meets, Inter-hostel competitions, informal learning and career development, Performing arts festival, Sponsored festivals (Mood Indigo, TechFest, Entrepreneurship-Cell). Participation in international technology challenge competitions, Student.projects (*Pratham*, Biosynth, Baja, iGEM, etc.).

Both Mood Indigo and TechFest, respectively, are possibly the largest student festivals in cultural and technical domains in India with a daily footfall of over 25,000 students from all over India as well as from abroad. TechFest has been very successful in arranging talks by some of the most brilliant scientists of today.

Pratham is an interesting micro-satellite (under 10 Kg) that has been conceptualized, designed and implemented by the students themselves. The satellite meets all the demands of ISRO as regards design, robustness, weight and other specifications.

IV. RESULTS OF PHASE I REVIEW OF ACADEMIC UNITS

The review of various academic units, carried out during the period Feb 1 to April 7, 2014 have been made available to this Committee. 21 academic units which have completed at least 5 years of existence as of Dec 2012 have undergone the detailed review by external experts. Overall, these committees have been very happy with the current state of affairs - the quality of faculty members,

efforts of IITB in recruiting young and high caliber faculty members, quality of publication, quality of students at both undergraduate and graduate levels, curricula, quality of teaching, and infrastructure such as teaching laboratories and research facilities.

There was specific appreciation of the Computer Science and Engineering Department for excellent research work in database and data mining, Centre for Technology Alternatives in Rural Areas for excellent field orientation of students, Electrical Engineering Department for excellent growth in faculty hiring, enhanced enrollment of Ph.D. students and an excellent patenting record, Metallurgical Engineering and Materials Sciences Department for its effort in building up a research group in computational material science and Biosciences and Bioengineering Department for creating an excellent research ambiance and student-faculty interaction. These are just some of the highlights and do not capture the full spectrum of the praiseworthy aspects in the reviews.

Some of the common recommendations across academic units are:

1. There is a severe crunch for space in the academic area. Development of departmental facilities such as faculty offices, research laboratories and student workspace has not kept pace with the increase in student intake and the increase in faculty hiring. IITB must find ways to augment the available space in the academic area.

2. There is a lack of a career development plan for the non-teaching technical staff members. This may have a demotivating effect on them.
3. The low stipend amount for doctoral students prevent any highly qualified but relatively older and married students to return to academics after spending several years in the industry.
4. The virtual absence of post-doctoral fellows is a weakness in any research university. IITB should try to recruit PDFs in large numbers from an international pool of scientists.

Some department specific recommendations include the following:

1. Mechanical Engineering Department: modernise workshops and the drawing laboratory.
2. Computer Science Department: improve academic rehabilitation of poorly performing students.
3. Humanities and Social Sciences Department: split Economics, English, Psychology and Philosophy into separate departments for better growth.
4. School of Management: strengthen areas like sustainability, environment and ethics.
5. Department of Physics: offer more Ph.D. level courses.
6. Centre for Studies in Resource Engineering: improve publication record.
7. Electrical Engineering Department: provide better research opportunities for undergraduate students.

8. Earth Sciences Department: strengthen areas like petrophysics and reservoir geoscience.
9. Centre for Environment Science and Engineering: strengthen areas like ecology and air pollution, and offer more elective courses.
10. Chemical Engineering and Metallurgical Engineering & Materials Sciences Departments: initiate megaprojects relevant to the country.
11. Mathematics Department: make Ph.D. program more ambitious and target better journals for publication.
12. Biosciences and Bioengineering Department: collaborate more with industry and needs an animal facility.
13. Centre for Technology Alternatives in Rural Areas: find ways to improve national and international exposure.
14. The committee also noted the action plan prepared by each department in response to the first phase of the review.

V. PHASE II - INSTITUTE REVIEW

Armed with this background information about IITB, the Review Team (RT) visited a few Centre/laboratories, met with students, had a tour of infrastructural facilities, met with Heads of departments and with young faculty. At the end of each visit/meeting we came up with recommendations based on the discussions we had with our hosts.

VI. SUGGESTIONS BASED ON VISIT TO SOME CENTRES / LABORATORIES

First was the visit to SINE and a few centres/laboratories like the Sophisticated Analytical Instrument Facility (SAIF), the Centre for Excellence in Nanoelectronics (CEN), the National Solar Thermal Test Facility (NSTTF), the National Centre for Photovoltaic Research & Education (NCPVRE), the National Steel Research Centre (NSRC) and the Industrial Design Centre (IDC) and spoke to the persons working there. The SINE incubation facility has enthusiastic incubatees ready to share their excitement with visitors. SAIF is a well-maintained facility that caters to researchers not only in IITB but also in the entire region. The CEN, NSTTF, NCPVRE, NSRC and IDC have research students who are really enthusiastic and excited about their work.

- a) SINE is sub-critical in scale. The proposed Research Park should help in scaling up this activity.
- b) Space is clearly a constraint. An expansion of at least 50% seems warranted. Perhaps IITB should stop creating new Centres for a few years and consolidate what has been started.
- c) Heads of some of the new Centres felt that the "struggle for space, logistics, infrastructure severely constrains their ability to grow and realize their full potential".
- d) Laboratory space also needs to be increased.

VII. SUGGESTIONS BASED ON MEETING WITH STUDENTS

The students' representatives were a vocal lot. They were frank and not afraid to express themselves freely even in the presence of some faculty. They clearly valued being on the rolls of an institution such as IITB and had many positive suggestions. We have articulated below those suggestions that we think merit serious consideration.

- a. Excellence in academic performance is not recognized as visibly as that in sports and cultural activities.
- b. A six month internship is desirable to give students real-time industrial exposure and put their UG education in the right perspective.
- c. Credits for the B.Tech project should be increased well beyond the current 6 credits to make it worth the students' while.
- d. Poor knowledge of English affects the performance of a significant fraction of the incoming students. This issue needs a strategic response from IITB to ensure these students can succeed academically and realize their true potential.
- e. For M.Sc/M.Tech students, it is desirable to conduct an "orientation examination" at the beginning of the programme in order to assess their preparedness and prescribe coursework accordingly.
- f. One or two lectures by people from the industry in many courses by way of a "reality check".

- g. Many complained about the lack of space in the hostels and the inability of the Estate section to attend to repairs, leaks and maintenance in a timely and transparent manner.
- h. Need more one-on-one interaction between faculty and students and more committed Faculty Advisers.
- i. Research scholars felt that the availability of sophisticated equipment was not handled in a transparent manner
- j. "Make academics more engaging and glamorous"! UG students felt that many courses had no assignments and were not challenging enough to keep them engaged. They said that on an average they had to spend only 4 hours a week outside the class room on their studies!
- k. Can students be allowed to "build their own Minor stream" subject to approval of a faculty advisor?
- l. Explore collaboration with IDC students on projects in terms of design, fabrication and finishing to convert a technical prototype into a commercial product.
- m. An Inter-IIT Exchange programme will help to promote academic and cultural interactions.
- n. Give a research stipend as a token appreciation of UG research project work.
- o. Conduct a separate seminar series for freshmen and sophomores. Departmental seminars are presently well "above their heads".

- p. Apart from projects through CTARA which are well-appreciated, can more urban-related projects of local relevance be undertaken jointly with Government agencies?
- q. Of serious concern is the lack of quick and effective punishment of students for breach of ethical behavior in some departments. Students who get away with copying and thereby get better grades than they deserve are, in effect, "rewarded for their lack of ethics".

VIII. SUGGESTIONS BASED ON THE MEETING WITH HEADS OF DEPARTMENTS

Considering the complexity of the system and the desire to nurture the change of vision from a predominantly UG to a predominantly research institution, some changes in the administrative set up are needed. Many Heads felt that, as a result of the lack of appropriate linkages, they "work very hard without proportionate output".

- a. Metrics of faculty performance should place a large emphasis on a thorough and extensive peer review. Number of publications as a key performance metric can lead to lowering of quality of publications. Incentives should be strictly performance-based.
- b. Heads of department need not be Professors but should necessarily bear good research and teaching credentials.
- c. It is a good idea to hire professionals (in place of Professors

taking on additional responsibility) in the administration - computer center, telephone exchange, infrastructure planning and so on. These individuals with relevant experience should be offered contract positions with good salaries, clearly articulated goals and with requisite powers to excel. Renewal should not be automatic and must be based on their performance.

- d. Offices of the Deans and the Heads of Centres must be periodically evaluated in order to improve the administrative machinery and make them more effective in serving the institute and the campus community at large.
- e. A 4 to 5 year tenure system for faculty as in the US is desirable to develop a good faculty working culture.
- f. Students and faculty appear to live and work in less-than-satisfactory living conditions. Other than quality, this requires overcoming problems of "shortage", "waiting lists" and "inadequacy" in basic matters like housing, seating-space, etc. by serious and careful planning to determine the exact steady-state capacity, followed by a massive and continuous renovation and upgradation effort. This should be accompanied by long-lasting administrative reforms to ensure that this infrastructure remains world-class. In all our discussions with different segments of the campus community, the inadequacy of the Estate Section and its lack of will to serve in a transparent manner came across loud and clear.

g. There seems to be a fair degree of disenchantment with students, 'the cream of the cream'. Some faculty feel that the students' indifference to academics stems from a dismal attendance in classes but 'novel' ways of implementing attendance have reportedly done little to cure this malaise. On the other hand IITB should look at ideas like revamping the curriculum, offering challenging course content, cutting down on the sheer number of courses, offering shorter in-depth

modules rather than semester-long courses and moving to an assignment based course evaluation system.

h. While there has been a surge in the numbers of doctoral students and in the record of publishing in reputed journals, there is concern that the reckless pursuit of numbers alone would dilute the quality of the papers and the graduating doctoral students.

IX. SUGGESTIONS BASED ON MEETING WITH YOUNG FACULTY

- a. Many young faculty felt the need for mentoring.
- b. The teaching load on young faculty is often so much that they can't devote crucial time for research. This seems to vary from department to department.
- c. Many felt there was lack of communication between groups on campus. Given the ICT infrastructure, this can be made

relevant, up-to-date and transparent. For example, the web site welcoming young faculty was not up to date.

- d. Some wanted an inclusive Vision to be arrived at by collective effort and shared among all the faculty, and also a mission and a well-articulated executable plan.
- e. Many were unhappy with housing, maintenance of houses and space allocation for research.
- f. Lack of transparency in sharing of central research facilities. Present web-interface was neither efficient nor up to date. Indefinite wait for use of such facilities makes planning Ph.D work difficult and frustrating.
- g. Strategic planning required before creation of new Centres.

Meeting with Board of governors

The Review Committee met with the members of the BoG. A summary of the above observations was communicated to them orally.

Internal meeting of the review committee

The Committee was very impressed with the quality of the faculty and the students of IITB. They decided to write down what, in the course of their short visit, appeared to them to be points that need attention of the governing body. The Committee was of the uniform opinion that it should point out areas for improvement but should strictly let IITB decide on the course of action required.

X. OVERARCHING RECOMMENDATIONS

The Review Committee considered and analyzed the information and feedback received through the various reports and meetings described above. Various observations and recommendations in the context of stakeholder subgroups have been delineated above. The Review Committee would like to conclude this report with a set of Overarching Recommendations. They represent the final synthesis of Committee's deliberations and provide holistic Institute-level recommendations to address the charge given by Dr. Kakodkar at the beginning of the review.

1. IITB needs to develop a shared vision for the Institute for global excellence combined with national relevance together with a clearly articulated executable plan. This vision should be developed through extensive engagement, be broadly shared by various stakeholders and should be widely communicated.
2. There should be a clear strategic academic/research/resource plan in place before new Centres are created. IITB should consider slowing down the creation of new Centres for a few years and consolidate what has been started. It may also be useful to think about criteria for sun-setting Centres. This will become more urgent as resource constraints become even tighter.

3. There is an urgent need to put a system in place to attend to infrastructure issues across the campus, for the creation of new infrastructure of excellent quality with stakeholder involvement at all stages and for the maintenance of existing infrastructure. This should be accompanied by long-lasting administrative reforms to ensure that this infrastructure remains world-class. Also, it is vitally important to effectively communicate administration's efforts to deal with these issues with students, faculty, and staff.
4. IITB should consider hiring professionals (in place of Professors taking on additional responsibility) in the administration - computer center, telephone exchange, infrastructure planning and so on.

At the core of an Institute of global excellence are the young faculty and students. While IITB has done an excellent job of recruiting excellent faculty and attracting the best students, there are significant grievances that need urgent attention:

- a) The responsibility of teaching large UG classes should rest with the senior faculty. Young faculty, in the first 5 years, should be asked to handle small classes in their areas of specialization.
- b) Satisfactory office and laboratory space should be identified and ear-marked for the faculty prior to their appointment,

notwithstanding the fact that the IITs have been subjected to an unreasonable pace of expansion in recent years.

- c) Satisfactory housing on or near the campus should be provided to young faculty on a priority basis.
- d) A system should be in place to ensure that excellence in academic performance is recognized as visibly as that in sports and cultural activities.
- e) A sustained and urgent effort is required to ensure ethical behavior in all activities. Of particular concern are widespread instances of copying both in assignments and in examinations. Serious attention has to be paid to this matter lest it jeopardise the hard-earned reputation of IITB.
- f) Poor knowledge of English affects the performance of a significant fraction of the incoming students. This issue needs a strategic response from IITB to ensure these students can succeed academically and realize their true potential.

XI. CONCLUDING REMARKS

In conclusion the members of the Review Committee, individually and collectively, feel honoured to have been invited to review IITB which has a formidable global reputation. The Committee wishes to place on record its heartfelt thanks for the warmth with which it was welcomed, the transparency with which all facts were placed before it, the patience with which its endless questions were responded to and

the palpable desire of all sections of the institute to receive suggestions for taking IITB to greater heights of achievement.

This last sentiment augurs very well for the future of IITB and we wish the Institute a glorious well-earned future in its efforts to achieve "global excellence with national relevance".

Indira Samrasikera

Prashant

Prasad Khajanchi

Prashant