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Indian Institute of Technology Jodhpur

External Peer Review Report 29-30 June to 1 July 2014

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Preamble

The review of IIT Jodhpur was conducted during 29-30 June to 1 July 2014. The committee members were:

1. Professor K. A. Padmanabhan, University Chair Professor, Central University of Hyderabad;
2. Professor Surendra Prasad, Department of Electrical Engineering, IIT Delhi;
3. Mr. Ravi Pisharody, Executive Director, Commercial Vehicles, TATA Motors Limited;
4. Dr. Soumya Kanti Ghosh, Chief Economic Advisor & General Manager, State Bank of India; and
5. Professor Manindra Agrawal, Department of Computer Science and Engineering, IIT Kanpur.

Over a period of three days, the committee visited the labs and the upcoming campus, interacted with faculty, and was given a presentation by the Director on the current status and future plans for the institute. The committee was also provided detailed data about the institute as well as reports on the peer review of each of the four centers of the institute.

The observations and recommendations of the committee are based on all these inputs. These are divided into sections below.

1. Academics
2. Administration
3. Research
4. Faculty
5. Infrastructure

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Academics

1.1 Current Status

The institute is organized around four centers: Center for Energy, Center for Information and Communication Technology (ICT), Center for System Sciences (SS), and Center for Biologically Inspired System Sciences (BISS). These four centers together offer undergraduate programs in five streams: Computer Science, Electrical Engineering, Mechanical Engineering, System Sciences, and Biologically Inspired System Sciences. The first two are handled by Center for ICT, the third one by Center for Energy and the remaining two by the similarly named centers. Besides, each center offers M.Tech. and Ph.D. programs in streams named after the centers.

1.2 Observations of the Committee

During our discussions, the following points emerged:

UG Programs

- (a) Curriculum for B.Tech. programs in System Sciences and Biologically Inspired System Sciences does not have sufficient courses in the respective streams (five in one case, seven in the other).
- (b) There does not appear to be any detailed documentation on the rationale behind starting these two streams at undergraduate level. The programs were approved by the Board but the minutes do not have appropriate supporting and detailed documents like a report of the Academic Senate etc. The faculty also does not have a clear idea about the kind of training to be imparted in these two streams and the employability of the graduates. Apparently, some expert committees did recommend these programs. However, no documents are available which may throw light on the rationale.
- (c) There does not appear to be any other major university in the world that offers undergraduate programs in these two streams. University of Waterloo started a B.Tech. program in System Sciences but has now replaced it with B.Tech. in Mechatronics, perhaps because the former program was not successful.
- (d) The peer review committees for both the centers have strongly recommended discontinuing the two undergraduate programs.
- (e) The entire UG curriculum has undergone a major overhaul recently. Several new innovative features have been introduced of which the idea of a Blended B.Tech. Program stands out. This feature envisages students

spending three summers at one company to work on a long-term project. If successful, it will produce students trained to solve industrial problems in a significantly better way.

PG Programs

- (a) Many of the faculty wanted Ph.D. and M.Tech. programs in their own areas of expertise, e.g., Mathematics, Chemistry, Computer Science etc.

1.3 Recommendations of the Committee

The committee has the following recommendations regarding academic programs:

- (a) The B.Tech. programs in System Sciences and Biologically Inspired System Sciences should be discontinued. Without a clear set of objectives and the ability to deliver these, these are likely to do more harm than good to potential graduates of these programs. Moreover, prescribing seven or less number of courses as core subjects for a B Tech program suggests that academically also these programs are not well thought out.
- (b) In place of BISS, B.Tech. in Biosciences and Bioengineering may be considered. However, proper due diligence is necessary before starting the program including looking at the experience of similar existing programs in the country and getting industry feedback.
- (c) Blended B.Tech. program is a truly innovative idea, and should be strongly pursued by the institute. It also has the potential of increasing faculty-industry interactions.
- (d) The four streams in M.Tech. and Ph.D. may be continued. In addition, postgraduate programs in Computer Science, Electrical Engineering, Mechanical Engineering, Mathematics, Chemistry, Physics, Biology, Humanities and Social Sciences may be started depending on the requirements and number of faculty available in these areas. Expansion in these directions should be paced suitably, guided by infrastructure capacity like hostels, labs etc.
- (e) New Master Level courses in Sciences and Humanities may be considered. However, there should be proper due diligence, by looking at the course structures of other institutes, like ISI, JNU DSE etc. before arriving at a formal decision.

Administration

2.1 Current Status

Administratively also, the institute is divided into four centers as mentioned above. There are no departments, and therefore, all students and faculty belong to one of the four centers. As in all IITs, the academic decisions are taken by the senate and the Board is the highest decision making body of the institute. The institute has around 30 non-teaching staff of which three are officers: an Assistant Registrar, a Deputy Librarian, and an Executive Engineer (Civil).

2.2 Observations of the Committee

- (a) The division of the institute in four centers has its strengths: it leads to stronger interdisciplinary connections by bringing faculty from different streams together. However, in many cases, the division appeared artificial and contrived. For example, several HSS faculty are in BISS center and have little to do with its charter. This has led to many faculty members being unsure of what is expected of them or trying to change their area of work completely. As a result, their productivity has declined significantly. Besides, many potential faculty shy away from joining the institute as they do not find a natural fit with the centers.
- (b) Senate meetings have been infrequent in the past: until 2013 there were none! In the past nine months, since the new director took charge, two meetings have taken place.
- (c) The institute has severe shortage of officers.

2.3 Recommendations of the Committee

The committee has the following recommendations regarding administrative structure of the institute:

- (a) In order to provide every faculty a natural home, the institute should have departments as per the expertise of the faculty. These departments should include (with appropriate naming): Computer Science and Engineering, Electrical Engineering, Mechanical Engineering, Mathematics, Chemistry, Biology, Humanities and Social Sciences. Every faculty member should be associated with one of the departments.
- (b) Senate meetings should take place regularly to speed up the academic decision-making. Ideally, there may be at least one Senate meetings per

quarter and this may made mandatory as the institute rules. Appropriate mechanisms should also be put in place for greater faculty participation in academic decision making.

- (c) The institute needs to actively seek for officers to manage the administration including a registrar.

3. Research

3.1 Current Status

As already discussed above, the institute has four research centers.

3.2 Observations of the Committee

- (a) Some of the centers have forged strong collaborations in specific research areas, e.g., on solar energy.
- (b) The aim of encouraging interdisciplinary collaborations through the centers is commendable.
- (c) Activities of BISS center do not fit well with the name of the center.

3.3 Recommendations of the Committee

The committee has the following recommendations regarding research at the institute:

- (a) The committee is aware that its recommendation of creating traditional departments may lead to weakening of the interdisciplinary nature of work through the centers. In order to preserve it, every faculty member must be required to participate in at least one center. This will encourage them to talk to faculty of different areas and work together. Better, every centre may initiate a few impact-driven projects, and each faculty member may be expected to partially align his/her work with one or more of these, in addition to individual research.
- (b) The names of centers should be changed to better reflect the expertise of the faculty or its real activities. If required, more centers may be started.

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4. Faculty

4.1 Current Status

The institute, at present, has 53 faculty members of whom 18 are in engineering and 35 in sciences and humanities.

4.2 Observations of the Committee

- (a) The number of faculty is very low, considering that the institute has 700+ students and is running a large number of programs.
- (b) The number of engineering faculty is particularly small.
- (c) Nearly all the faculty are young, and most are full of energy and excitement to do new things.

4.3 Recommendations of the Committee

The committee has the following recommendations regarding faculty of the institute:

- (a) The institute should actively seek out good young faculty from India and outside. Besides, since the institute is new, it would be very useful to get some senior faculty (e.g., retired faculty from older IITs) to help with the administration. The situation does look critical because the Director is not able to leave station even for a couple of days to attend to important meetings / assignments. Therefore, a few senior level recruitments through one mechanism or the other is critically important.
- (b) A number of faculty has requirements related to spouse employment and day care for their children. The institute can use eligible and qualified many spouses for research and administrative purposes, which will result in a win-win situation. The institute should also provide help in setting up a day care center.
- (c) The institute should encourage the faculty to focus on teaching and R&D work. In order to keep the motivation levels high, the institute should regularly get the performance of faculty evaluated by an independent set of experts and find ways to reward high-performing faculty.
- (d) Another worrying feature is that the equipment grant has been used up to a major extent and this is likely to pose severe constraints in starting additional academic programs in some important engineering subjects and the existing faculty, who have not so far applied for grants to buy equipment, are also facing difficulties. While it is true that a more careful

control on expenditure could / should have been exercised in the past, the present administration should not be allowed to be handicapped by past mistakes.

5. Infrastructure

5.1 Current Status

The institute is currently located in a temporary campus loaned from MBM Engineering College. The students and faculty live in another campus loaned from CPWD a few kilometers away from MBM College. The main campus of the institute has 800+ acres of land of which around 650+ acres is planned as academic and residential area and the remaining land is planned for solar research activities and a research park. The tendering process for Phase I construction is underway and the construction is expected to start by September.

5.2 Observations of the Committee

- (a) The construction activity is well-planned and the design of the buildings has unique features like a wall to block the sand storms.
- (b) A number of green features are being incorporated in the construction, which will lead to a low footprint in terms of requirements of natural resources.
- (c) At the same time, the construction will be a major drain on time and efforts of the institute administrators.
- (d) The funds allocated for construction appear inadequate. As a result, many buildings like sports complex and auditorium for the students have been dropped from Phase I.

5.3 Recommendations of the Committee

- (a) The institute should actively look to hire experienced persons in construction activities. They may be from the government or the private sector. Their help will be crucial in keeping the director free to focus on academic matters.
- (b) The committee requests the ministry to release sufficient funds for Phase II of the construction so that all the planned buildings may be built.
- (c) The committee understands that the Institute is working on a tight deadline of constructing the new campus. A system of adequate checks and balances may be considered such that the project construction deadline is met.

- (d) The committee will independently look into the revenue and expenditure models of the Institute so as to critically understand the future fund position of the institute.

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Annexure I: Brief Profiles of External Peer Review Panellists

Professor K. A. Padmanabhan

Former Director, Indian Institute of Technology Kanpur

Professor Padmanabhan was the former Director of IIT Kanpur and Dean of Academic Research at IIT Madras. He has over 35 years of research & development, consulting and teaching experience in materials science and engineering. Eight technologies developed by him and his colleagues are used in Indian industries. He holds five patents. He has authored two expert level books on “Superplasticity” (1980) and “Superplastic Flow: Phenomenology and Mechanics” (2001). He has authored more than 200 research papers in refereed international journals. He is the first Indian engineer to be conferred the Sc. D. by the University of Cambridge, U.K., and the first Indian to be awarded the ‘Forschungspreis’ (career research award – commonly referred to as Lifetime Research Award) of the Alexander von Humboldt Foundation, Germany.

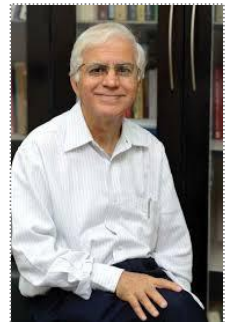


Professor Padmanabhan is the Professor of Eminence, Anna University, Chennai. Prior to that, he was the Jawaharlal Nehru Chair Professor at University of Hyderabad, where he continues to be a Visiting Professor till date. He has also been a Visiting Professor at the Universities of Aachen, Darmstadt and Karlsruhe Institute of Technology, Germany.

Professor Surendra Prasad

Former Director, Indian Institute of Technology Delhi

Professor Prasad has held many responsible positions in his illustrious career at IIT Delhi. He has adorned the positions of Director, Deputy Director, and Dean of Undergraduate Studies there. He was a Visiting Research fellow at the Loughborough University of Technology, Loughborough, UK from 1976 to 1977 and was a visiting faculty at the Pennsylvania State University, USA. Dr. Prasad has received numerous awards and honors during his career, namely, the Vikram Sarabhai Research Award in 1987 and the Shanti Swarup Bhatnagar Prize for Engineering Sciences in 1988. He is a Fellow, Indian National Sciences Academy of Engineering; Fellow, Indian National Science Academy, and Fellow, Indian Academy of Sciences, Bangalore.



Dr. Soumya Kanti Ghosh

Chief Economic Advisor, Economic Research Department, State Bank of India



Dr. Ghosh has over 19 years of experience in risk management, economic/econometric analysis, developing macro-econometric models and working on Indian economy, in tracking financial markets (fixed income, foreign exchange and stock) and specific Indian industries. He is also a guest faculty to IIT Kanpur and IIM Rohtak on areas of risk management and was a

member of various Committees of the Government of India. He has been involved in key leadership roles with reputed MNCs in domain of economics and risk management.

Dr. Ghosh has adorned different illustrious roles like Senior Fellow at Indian Council for Research on International Economic Relations (ICRIER), Director-Economics & Research at Federation of Indian Chambers of Commerce and Industry (FICCI), Assistant Vice President-Enterprise Risk Management at TATA-AIG, Director at American Express, to name a few. He has a Ph.D. in Economics from Jawaharlal Nehru University, New delhi and a Masters in Economics from Delhi School of Economics.

Mr. Ravindra Pisharody

Executive Director (Commercial Vehicles), Tata Motors Limited



Mr. Ravindra Pisharody is the Executive Director (Commercial Vehicles) since June 21, 2012 having joined Tata Motors as Vice President Commercial Vehicles (Sales & Marketing), in 2007. He is also on the board of various Tata Motors Group Companies. Before joining Tata Motors, he worked with Castrol Ltd., a subsidiary of BP, and with Philips India, a subsidiary of the Dutch company in various roles. Mr. Pisharody is an alumnus of IIT, Kharagpur and IIM, Kolkata.

Professor Manindra K. Agrawal
Professor and Dean (Faculty Affairs), Indian Institute of Technology Kanpur

Professor Agrawal obtained a B.Tech. from IIT Kanpur and a Ph.D. from the same institute. He then did a three-year stint at the Chennai Mathematical Institute in Madras before bagging the prestigious Humboldt fellowship at the University of Ulm in Germany. He returned to IIT Kanpur as a member of the faculty in the Department of Computer Science and Engineering in 1996.



He co-created the AKS primality test with his doctoral students, for which he and his co-authors won the 2002 Clay Research Award, the 2006 Fulkerson Prize, and the 2006 Gödel Prize. He was also the recipient of the first Infosys Prize for Mathematics, and the Shanti Swarup Bhatnagar Award in Mathematical Sciences in 2003. In September 2008, Professor Agrawal was chosen for the first Infosys Mathematics Prize for outstanding contributions in the broad field of mathematics. He has been honored with Padma Shri in 2013 and was also conferred with the Distinguished Alumnus Award of IIT Kanpur for his outstanding contributions in Complexity Theory and by developing a Polynomial Time Algorithm for Primality Testing.

Annexure II: Schedule of External Peer Review Panel

Program for EXTERNAL PEER REVIEW of IIT Jodhpur, 29-30 June and 1 July 2014

	Time	Activity
29 June 2014	13.30	Lunch
	15.00-16:30	Visit to Laboratories and Facilities
	16:30-18:30	Visit to Residential Areas 1. BSNL 2. GPRA
	20:00	Dinner at <i>Bal Samand Lake Palace</i>
30 June 2014	09:30	Visit to <i>Mehrangarh Fort</i>
	11:00	Visit to <i>Umaid Bhawan Palace Museum</i>
	13:00	Lunch at <i>Bal Samand Lake Palace</i>
	15:15	Presentation of Institute Report :: Director (All Faculty Members, and Assistant Registrar)
	16:15	Tea
	16:30	Discussion with PEER REVIEW Committee :: Director, all Coordinators and Chairman (Council of Wardens)
1 July 2014	20.00	Dinner at <i>Bal Samand Lake Palace</i>
	09:00	Visit to Permanent Campus
	10.30	Meeting with Director
	12.00	Lunch



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