



DIRECTOR'S REPORT

8TH CONVOCATION

FRIDAY, 26 MAY 2006

INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

Distinguished Chief Guest Prof. M.G.K. Menon, Chairman, Board of Governors of IIT Guwahati, Shri A. K. Saikia, members of the Board of Governors, members of the Senate, graduating students, colleagues, parents and guardians, ladies and gentlemen – I on behalf of the Institute welcome all of you to the 8th convocation of IIT Guwahati. May I on behalf of the Institute take this opportunity to thank Prof. M.G.K. Menon for accepting our invitation to be the Chief Guest of this Convocation and for kindly giving his consent to deliver the Convocation Address ?

Today, BTech, BDes, MTech, MSc and PhD degrees are going to be awarded to a total number of 379 students. I extend hearty congratulations to all the degree recipients.

I will now present a report on the activities and achievements of the Institute during the past one year.

ACADEMIC ACTIVITIES

The Institute has 11 academic departments, 3 inter-disciplinary academic centres and 4 service centres. These are:

Departments

Biotechnology (BT), Chemical Engineering (CL), Chemistry (CH), Civil Engineering (CE), Computer Science and Engineering (CSE), Design (DD), Electronics and Communication Engineering (ECE), Humanities and Social Sciences (HSS), Mathematics (MA), Mechanical Engineering (ME), and Physics (PH).

Academic Centres

Centre for Energy, Centre for the Environment, Centre for Nanotechnology

Service Centres

Computer and Communication Centre, Central Instruments Facility, Centre for Educational Technology, Centre for Mass Media Communication.

The total number of students on the rolls during the academic year 2005-2006 at the undergraduate, postgraduate and PhD levels were:

Undergraduate Programme

BTech/BDes

4th Year (2002 Batch): 206 (CSE-42, ECE-42, ME-46, CE-26, DD-14, BT-18, CL-18)

3rd Year (2003 Batch): 209 (CSE-43, ECE-42, ME-39, CE-31, DD-16, BT-19, CL-19)

2nd Year (2004 Batch): 234 (CSE-50, ECE-50, ME-48, CE-24, DD-19, BT-22, CL-21)

1st Year (2005 Batch): 245 (CSE-47, ECE-45, ME-51, CE-30, DD-17, BT-26, CL-29)

From earlier batches: 7

Total: 901

Preparatory - 25

MSc

2nd Year (2004 Batch): 51 (PH-20, CH-20, MA-11)

1st Year (2005 Batch): 61 (PH-18, CH-19, MA-17, Int. CH-7)

Total: 112

Postgraduate Programme

MTech

2nd Year (2004 Batch): 157 (CSE-34, ECE-33, ME-42, CE-32, CL-16)

1st Year (2005 Batch): 153 (CSE-37, ECE-36, ME-36, CE-26, CL-18)

From earlier batches: 6

Total: 316

PhD

(CSE-18, ECE-20, ME-26, CE-21, DD-5, PH-19, CH-36, MA-19, HSS-18, BT-16, CL-14, Energy-4, Nano-3, Environment-4)

Total: 223

Total No. of Students: 1577

The number of successful candidates who are to receive their BTech, BDes, MSc, MTech and PhD degrees today are as follows:

BTech/BDes

Biotechnology	16
Chemical Engineering	15
Civil Engineering	25
Computer Science and Engineering	38
Design	16
Electronics and Communication Engineering	39
Mechanical Engineering	41
Total	190

MSc

Physics	22
Chemistry	20
Mathematics and Computing	11
Total	53

MTech

Chemical Engineering	8
Civil Engineering	27
Computer Science and Engineering	21
Electronics and Communication Engineering	35
Mechanical Engineering	36
Total	127

PhD

Chemistry	1
Civil Engineering	1
Electronics and Communication Engineering	1
HSS	2
Mathematics	1
Physics	3
Total	9

Grand Total	379
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RESEARCH AND DEVELOPMENT

Research and Development is an integral component of the Institute's activities. The Institute carries out such activities through sponsored projects, consultancies and short-term courses. There were 91 sponsored projects being carried out during the year. Out of these, 34 were new projects worth about Rs. 8 crores. A total of Rs. 6 crores were received in projects. The majority of the sponsoring agencies were Government agencies and some of these are MHRD, DST, CSIR, DAE, DIT, MNES, among others.

The Institute offered consultancy services to the Banking and Insurance sector, various departments of the Government of Assam, Departments of other State Governments, Power Sector Organizations, Construction Houses, Educational Institutions and Pharmaceutical Industries. The total value of the new consultancy projects sanctioned during the year was approximately Rs. 53 lakh, and a total of Rs. 78 lakh was received under this head.

A sample of the sponsored R&D projects started this year are:

Sl. No.	Department	Project Title	Funding Agency	Amount Sanctioned (Rs.)
1.	Biotechnology	Genetic Evaluation and Mass Production of Entomopathogenic Fungi for Development as a Potent Bio-pesticide	DST	7,92,000
		Collection of <i>Pongamia</i> Germplasm from North Guwahati for Identification of Plus Trees and Mass Cultivation in Wasteland	DST	6,72,000
		In Vitro Morphogenesis and Biochemical Analysis of Neem (<i>Azadirachata indica</i> A. Juss)	DST	9,96,000

Sl. No.	Department	Project Title	Funding Agency	Amount Sanctioned (Rs.)
2.	Civil Engineering	GIS Based Inventory of Rivers of the Northeastern Region of India	MoEF	21,08,000
		An Integrated Hydrologic Modelling of the Brahmaputra Valley	DST	7,34,400
		Geocell-Reinforced Sand Foundation on Soft Clay, Behaviour under Cyclic Loading	DST	11,64,000
3.	Centre for Energy	Promotion of Biogas Utilization in the North Eastern Region of India	MNES	18,87,000
		Development of a Multi-Fuel Cooking Stove	DST	12,00,000
4.	Chemistry	Desulphurization and Denitrogenation of Diesel	IOCL	12,34,000
		Synthesis of Novel Conducting Polymers for Application in Organic Light Emitting Diodes	DST	19,83,000
		Polymer Anchored Chiral Catalysts for Asymmetric Synthesis	CSIR	9,76,000
5.	Chemical Engineering	Binary Coalescence of Drops in Viscous Media	DST	10,00,493
		Optimization Studies in Ultrasound- Based Advanced Oxidation Technology (Sonolysis) for Wastewater Treatment	DST	7,20,000
6.	Computer Science and Engineering	Seamless Handover Issues in Next Generation Wireless Network	NICT, Japan	18,20,147

Sl. No.	Department	Project Title	Funding Agency	Amount Sanctioned (Rs.)
7.	Electronics and Communication Engineering	Keyword Spotting in Continuous Speech - Indo Swiss Joint Project	DST	5,16,600
8.	Humanities and Social Sciences	Situation of Internally Displaced Persons in Assam and their Rehabilitation	MAKAIAS	2,00,000
9.	Mechanical Engineering	Optimum Design of Laminated FRP Composite Structures	MHRD	8,00,000
		Study of the Effect of Geometrical Parameters on Mixing and Inclusion Separation for Different Shape of Tundish With and Without the Use of Flow Modifier Devices	DST	6,84,000
10.	Centre for Nanotechnology	Newer Chemical and Physical Methods of Engineering Devices Consisting of Nanoscale Functional Components	DST	92,40,000
11.	Physics	Development of Soft Magnetic Fe-Mn-Zr-B Nanocrystalline Alloys for High Frequency Applications	BRNS	8,55,750
		Dissolution of Waste Disposal Glasses in Aqueous Solutions	BRNS	13,06,500
		Glucose Sensor Based on Evanescent Wave Induced Fluorescence Spectroscopy	BRNS	9,35,250

NATIONAL PROJECTS

GARUDA is a nationwide initiative by the Department of Information Technology (DIT) for the conduct of scientific research using a nation-wide grid of computational nodes. The grid in its first phase will connect institutes across seventeen cities. IIT Guwahati is a participant. A 64-node Cluster is

being procured by the Institute to connect to the grid. A 100 Mbps network link has been installed

The Institute is participating in the national programme on VLSI sponsored by DIT. Under this programme, infrastructure will be created for VLSI teaching and research, a Masters' level programme in VLSI will be started, and research activities will get a fillip. The project has a total value of Rs 2 crores and is to run for five years.

The Institute is also participating in the DIT programme on Computer Security. With aims similar to the VLSI programme, the duration of the project is five years and the total value is Rs. 2 crores.

NATIONAL AND INTERNATIONAL CONFERENCES AND WORKSHOPS

The faculty members of the institute organized a number of important national and international conferences/seminars/workshops, short term courses and capacity building programmes. A few are:

1. Summer School on Stochastic Processes and Applications' (SSSPA-2005) sponsored by NBHM, CSIR, INSA, 11-23 July 2005.
2. Students Chemical Engineering Congress (SCHEMCON 2005), 7-9 December 2005.
3. First International Conference on Ergonomics titled 'Humanizing Work and Work Environment' in collaboration with the Indian Society of Ergonomics, 10-12 December 2005.
4. 12th National Conference on Machines and Mechanisms (NaCoMM 2005), 16-17 December 2005.
5. 18th National and 7th ISHMT/ASME Heat and Mass Transfer Conference, 4-6 January 2006. (also held: International Workshop on Treatment of Thermal Radiation in Heat Transfer Problems, 2-3 January 2006) .
6. A course on 'Theory After Derrida' in collaboration with the Forum on Contemporary Theory, Baroda, sponsored by the Ford Foundation, 20 June – 16 July 2005

SHORT TERM COURSES

The Institute organised the following short-term courses sponsored by various agencies during the year.

1. Advanced Reactor Simulation
2. Signal Processing Applications in Communication Engineering

3. Fundamentals of Numerical Computing
4. Semiconducting Organics as Future Generation Electro-Optical Materials
5. Cryogenic Engineering and Cryogenic Materials
6. Integrating Humanities and Social Sciences in Technical Education
7. Advanced Chemical Process Design
8. Fuel and Combustion Technology
9. Computer Aided Design and Manufacturing
10. Finite Element Analysis & Signal Processing in Rotating Machineries
11. Advanced Experimental Techniques
12. Human Interface in Design and Engineering
13. Seismic Retrofitting of Building: Conventional and Structural Control Based Approaches
14. Fuel Cell Components and Systems

CAPACITY BUILDING PROGRAMMES

- Theoretical and Numerical Aspects of Ordinary Differential Equations, sponsored by National Board for Higher Mathematics, DST, CSIR, and INSA for college and university teachers. (15-24 December 2005).
- Earthquake Engineering (Second Batch) under National Programme for Capacity Building of Engineers in Earthquake Risk Management (16 May 2005 – 4 June 2005; 20 June 2005 – 9 July 2005)
- A course on 'Disaster Management for Northeast India, sponsored by DST, (6–8 May 2005).
- Computer Aided Seismic Resistant Design of RCC Structures' for PWD Engineers at Aizwal, Mizoram (18–23 July 2005).

FACULTY AND STAFF

The faculty strength at the end of March 2006 was 165. This is an increase of 11 from 154 last year. This is disappointing, as we had added 30 faculty last year. One of the reasons was that, although we added 20 faculty, 9 left the Institute. The non-faculty staff strength has remained almost stagnant at 253 (being 250 at the end of March 2005). Here too, 9 employees left during the year. We have not been able to recruit staff as a proposal for sanctioning of posts is pending approval.

HONOURS AND AWARDS

Prof. J.B.Baruah received the Bronze Medal 2005, from Chemical Research Society of India, Bangalore in recognition of his contributions to Chemistry.

Dr. B. Mandal received BOYSCAST award of DST for the year 2005-2006.

Dr. D. Maity received the George Oomen Memorial Prize for the best paper published in Civil Engineering Division in journal of The Institution of Engineers.

Dr. A. Perumal received the DAE Young Scientist Research Award 2005, BRNS, DAE, and also the INSA Young Scientist Award in Physical Sciences.

PUBLICATIONS

The faculty of the Institute has been actively publishing research papers in international and national journals as well as in conference proceedings. The publications during the past one year include:

- **Journal Papers: 194**
- **Conference Papers: 215**

Compared to the previous year there has been an increase in the number of papers in journals (from 141 to 194), and in case of Conference Papers (201 to 215) too, there is an increase.

CONSTRUCTION AND CAMPUS DEVELOPMENT

This year, the campus has seen considerable progress in construction activities. The following are some of the details:

Academic Complex

The 74,000 sq. metre complex is almost complete. Air-conditioning work, and partitioning work is nearing completion. All academic activities except for the Central Workshop, has shifted to the Complex.

Library and Computer Centre Building

This building was completed this year and both the Computer Centre and the Central Library have shifted to the building.

Hospital

The 19 bedded Hospital Building with an area of 1,917 sqm has also been completed. Indoor facilities will start in a few months' time with nursing, pharmacy and other such activities being out-sourced.

Commercial Complex

This complex, with an area of 2062 sqm, is also complete. The process of letting out the premises to different vendors is currently going on.

Main Approach Road to the Campus

A few days ago, the Chairman of the Board of IIT Guwahati inaugurated the IITG over- bridge which has opened the main approach to the institute from NH 51 reducing distance from the city by about 8 km.

Hostel Buildings

240 rooms of the 5th Boys' hostel (named Kameng) were occupied in July 2005. The rest of the 260 rooms are almost ready and they will be occupied in July. The hostel has an area of 14,640 sqm and it has 500 rooms along with a dining and recreational area.

The construction of the 6th Boys' Hostel has begun. 300 rooms will be occupied by July 2007 and the entire building is expected to be ready by December 2007.

Work on a married scholars' hostel with 108 flat-lets is under progress. We are expecting 36 flats to be available by July 2006. The entire hostel is expected to be completed by March 2007.

Residential Quarters

6 F type quarters are almost ready for occupation. Contracts were awarded for the construction of 48 D type and 36 E type units in 2004. Unfortunately, rocky structures were encountered and this required blasting. Work has got delayed and currently 30 D type and 30 E Type quarters are under construction. About 24 units will be ready soon.

Lecture Hall Complex

The lecture hall complex comprising 4 lecture halls of 250 capacity each is expected to be ready by March 2007. Two halls are scheduled for completion by December 2006.

Auditorium Building

The Auditorium Building with a 1500 seating capacity is expected to be ready by April 2007.

Sports Complex

Various components of the Sports Complex are being made ready for the forthcoming Inter-IIT Sports Meet.

Kendriya Vidyalaya

The schedule of completion of the Kendriya Vidyalaya building has got delayed a little due to encountering of poor soil. This has necessitated piling and it is expected that the building will be ready by July 2007, three months behind schedule.

Community Halls

Construction of two community halls for organizing social functions and student activities is in progress and are expected to complete by March 2007.

Water Supply

The Institute water supply scheme involves drawing water from the river Brahmaputra using a barge, and a filtration plant to filter the water. The Plant and the barge are almost ready. There is a minor problem of right of way for water pipelines to the river. We expect the issues to be resolved and the system to be fully functional by August 2006.

Sewage Treatment Plant

A sewage treatment plant along with a network of sewage pipes has been completed. Testing is going on and the system will become operational soon.

The Institute will witness construction activities in the coming year. New constructions being taken up are, the 7th Boys' Hostel, Workshop building, and a Conference Centre.

STUDENTS' ACTIVITIES

The Statutes of the Students' Affairs Council were revised this year. Some of the highlights of the new provisions in the Statutes are:

1. Emphasis on increasing student participation and responsibilities by creating a Students' Senate.
2. Formation of a Welfare Board with a Counselling Cell forming an important component. With high expectations from our students, pressure on them also increases, and the need for counselling to help overcome difficulties, is being increasingly felt. The creation of formal structures, it is hoped, will provide the required support.

Alcheringa 2006

Alcheringa, the Annual cultural festival of IIT Guwahati was organized during 3–5 February 2006. Apart from the usual participants from Guwahati, there were teams from all over the country – Kolkata, Allahabad, Ranchi, Shillong, and several other places. The competitive events included many innovative cultural themes and dramatics events, which have become a hallmark of Alcheringa. The offstage events were the biggest hit among the youth. *Rock o Phoenix*, the rock competition, saw unprecedented participation this year, as bands from all parts of Eastern India came to participate in the event.

Techniche 2005

The seventh edition of Techniche saw participation from over 75 colleges and over 5000 students. Dr. R. Chidambaram was the chief guest. Other prominent speakers were Prof. K. Kannan, Mr. Sachin Dabir from Red Hat, Mr. Sumanta Deb and Dr. Anirban Chakrabarti from Infosys SETLABS, Prof. N.K. Sharma from IIT Kanpur and Mr. S.K. Malhotra from the Department of Atomic Energy.

Other regular events

- Manthan – the intra hostel cultural competition
- Spirit – the inter-college invitation sports competition
- Technotsav – the invited technical lecture series

ENTREPRENEURIAL DEVELOPMENT CELL

The Entrepreneurial Development Cell (EDC), a special interest group under the IIT Guwahati Gymkhana, was setup in October 2005. The EDC is responsible for activities which promote the spirit of entrepreneurship among the IIT Guwahati community. The EDC has organised a number of talks, a workshop on Six Sigma, and it has released two e-newsletters.

TRAINING AND PLACEMENT

The year 2005-2006 has witnessed very good campus placement. A total of 68 companies and Government Organizations considered all the 372 students [BT 192 + MT 133 + MSc 47] who had registered with the Placement Cell. In BTech, placement for three branches has been 100%, for the rest of the branches also the percentage of placement has been very high. In BTech, 262 jobs were available for 192 students. In MTech programmes, the percentage of placement for all the branches has been high with 100% placement for CSE branch. The highest package offered to

BTech students was Rs. 24.41 lakh per annum with an average package of Rs. 4.83 lakh per annum. Highest package offered to MTech students was Rs. 8.8 lakh per annum with an average package of Rs. 3.8 lakh per annum.

Placement data (branch wise) with percentage of student getting placed:

Department	UG		PG (M. Tech.)		% UG	%PG
	No. of Students	No. of jobs	No. of Students	No. of jobs		
CSE	35	48	30	38	100	100
ECE	41	66	28	37	100	93
ME	45	61	35	30	96	80
CE	26	34	25	16	96	60
CL	18	20	15	13	89	67
BT	13	14	--	--	92	--
DD	14	19	--	--	100	--
PH (MSc)	18	8	--	--	44	--
CH (MSc)	19	6	--	--	32	--
MA (MSc)	10	8	--	--	80	--

Overall Engg. Undergraduate (BTech + BDes)	: 186/192 = 97%
Overall M.Tech.	: 109/133 = 82%
Overall MSc.	: 21/47 = 45%
Overall (BTech + MTech)	: 91%

STUDENT ACHIEVEMENTS

- A team of four students from the Department of Computer Science and Engineering presented their work entitled SapienNet at the finals of the Windows Embedded Students Challenge WESC-2005 sponsored by Microsoft Inc. & held at Redmond, USA.
- Two MTech students of the Department of Computer Science and Engineering developed *Chakshu*, a freeware for the Visually Challenged, as part of their MTech project. The project was co-supervised by Dr. S.B. Nair, Dr. P.K. Das and Dr. J.K. Deka. The visually challenged students were given a hands-on training to facilitate its use. The software was also demonstrated and supplied to an NGO based in Guwahati and to other schools and colleges across the country.
- Two BTech Students of the Department of Electronics and Communication Engineering won the All India Agilent Technologies Best BTech Project Award for the year 2005.

- A team from IIT Guwahati won the International Parliamentary Debate competition organized at IIT Delhi defeating teams from as many as 22 colleges.
- A team of 5 students from the Department of Design won the first prize in a students' Design competition organized by Kyosera communication Technologies (a company in the business of Mobile Telephony). The competition was open to all leading Design Institutes in the country.
- Mr. G. Anoop stood first in the IIM entrance examination, CAT.

MEMORANDA OF UNDERSTANDING

1. Memorandum of Understanding was signed between IIT Guwahati and the National Institute of Information and Communications Technology of Japan, Republic of Japan for comprehensive research collaboration in the field of Information and Communication Research.
2. Philips Research Laboratories, Bangalore has instituted MTech and Doctoral Fellowships for MTech and PhD students of Computer Science and Engineering department. Two MTech students and one PhD student are availing this opportunity now.
3. Memorandum of Collaboration was signed between IIT Guwahati and Indian Oil Corporation (R&D Centre) for joint research work on the development of novel oxy-desulphurisation processes to produce ultra low sulphur diesel.
4. An MOU between IIT Guwahati and NIT Silchar was signed to foster academic ties and linkages for the PhD programme.
5. An Academic cooperation agreement was signed between ENST Bretagne and IIT Guwahati for exchange of students and faculty and for development of collaborative research projects.
6. An MOU between IIT Guwahati and CESAR, Brazil was signed for development of joint educational and research projects.
7. An agreement of cooperation between IIT Guwahati and University of Naples was signed for providing research grant to a research student for working in the area of web and multimedia technologies in the University of Naples.

PURCHASE OF MAJOR EQUIPMENT

A number of equipment and sophisticated instruments were purchased to be used for teaching and for research. Equipment worth more than Rs. 14 crore were procured during the year. Some of the major equipment purchased were:

Equipment	Value of Equipment (Rs.)	Department/Centre
Glove Box Workstation	18,01,376	Chemistry
Modular Precision Sound Analyzer with Sound Intensity Software	14,91,763	Mechanical Engineering
Machinery fault Simulator	11,55,708	Mechanical Engineering
Fermentor	31,04,963	Bio-technology
High Pressure Liquid Chromatography Unit	16,14,573	Bio-technology
Binary Gradient Solvent Delivery Pump Module	14,20,979	Environment
Microprocessor Based Auto System gas Chromatograph	10,92,797	Environment
Advance Fully Automatic Powder X-Ray Diffractometer System	56,61,488	Nanotechnology
Dynamic Light Scattering Particle Size Distribution Analyzer	16,04,721	Nanotechnology
ESR Spectrophotometer System	60,73,481	Central Instruments Facility
Advanced Confocal Laser Scanning Microscope	1,03,10,832	Central Instruments Facility

Besides the above, two major instruments have been ordered and delivery is expected shortly. They are, a Transmission Electron Microscope (Rs. 3.81 crore), and an Atomic Force Microscope (Rs. 54 lakh).

CONCLUSION

Ladies and Gentlemen, this year has seen major improvements in the Institute's infrastructure. The expenditure under the Plan Head is the highest in a year since the Institute was established. With the Institute adding about 300 students every year, much more infrastructure will need to be built. As part of our eleventh five year plan, which will begin next year, we have projected a student strength of 3800 by the end of 2011-2012. From a strength of 1800 in July next, we have to add 2000 students in 5

and a half years. The experience and expertise gained by our Works Section in the preceding years, makes us confident that we will be able to build the infrastructure as per requirements, and as per schedule. Increasing the number of students is not a problem as you all are well aware (although there are challenges in getting students for some of the PhD programmes). The biggest challenge, and this lament has become a standard of the Director's Convocation speech every year, is getting faculty. As I have already mentioned, 20 new faculty joined this Institute till March 2006, and a few more have joined since. But 9 faculty left, leaving us with an increase of only 11. Most of the faculty that have left have joined other IITs. This points to the challenges that all the IITs - nay all the Engineering Institutes of the country - are facing together. The very success of the country in the IT and other sectors has made research and teaching a less attractive career option.

Our students are doing very well. Thanks partly due to a booming economy, placement on campus has been excellent, as I have already pointed out. Many of our students have got admission to top Institutions such as other IITs, IIMs, Berkeley, MIT, Stanford, etc. I have noticed that this year more students have opted to do a PhD. This is very heartening, as this is the only way we can add to our faculty strength. I only hope that our students will return to India to tackle the research problems that the country has to offer.

Once again, I congratulate all the graduates. My best wishes go with you. Please do remember the Institute in the days to come and do help us out in any way you can.

Jai Hind.

Gautam Barua

Director

Indian Institute of Technology Guwahati