



Minutes of the 31st Senate meeting of IIT-D held on 1st December, 2015 at 03.30 PM in the Senate Room, B-wing, R&D Building, Okhla Industrial Estate, Phase-III, New Delhi-110020

Following members were present:

- | | |
|----------------------------|-------------------------------|
| • Prof. Pankaj Jalote | - Chairman |
| • Prof. K.K. Biswas | - External Member |
| • Prof. Dheeraj Sanghi | - Ex-Officio Internal Member |
| • Dr. Astrid Kiehn | - Ex-Officio Internal Member |
| • Prof. G.S. Visweswaran | - Ex-Officio Internal Member |
| • Dr. Vinayak Nayak | - Ex-Officio Internal Member |
| • Dr. Anubha Gupta | - Ex-Officio Internal Member |
| • Dr. Angshul Majumdar | - Internal Member |
| • Mohd. S. Hashmi | - Internal Member |
| • Dr. Sriram K. | - Internal Member |
| • Dr. Sujay Deb | - Internal Member |
| • Mr. Ashwani Kumar Kansal | - Secretary |
| • Ms. Shreya Singh | - UG Students' Representative |

Following member attended via telecon:

- | | |
|-----------------------|-------------------|
| • Prof. Anshul Kumar | - External Member |
| • Mr. L V Subramaniam | - External Member |

Special Invitees:

- | | |
|------------------------|----------------------|
| • Dr. Pushpendra Singh | - Faculty-IITD |
| • Mr. K.P. Singh | - Incharge, Academic |
| • Ms. Sheetu Ahuja | - AM -Academics |
| • Mr. Ashutosh Brahma | - JM (Academic) |
| • Ms. Anshu Dureja | - JM (Academic) |
| • Ms. Priti Patel | - JM (Academic) |

THITYY FIRST (31ST) MEETING OF SENATE OF IIT-DELHI
(held on 1st December, 2015)

MINUTES OF THE MEETING

General

31.1 Opening remarks of the Chairman.

The Chairman welcomed all to the meeting. Thereafter, agenda items were taken up for discussions.

31.2 Confirmation of minutes of the 30th meeting of the Senate held on 18.8.2015

Since there were no comments, the minutes of the 30th meeting of the Senate held on 18.8.2015 were confirmed.

31.3 Approval of Academic Calendar for Winter Semester 2016

The Senate approved the Academic Calendar for Winter Semester 2016 placed at **Appendix-I**. The Academic Section in its working calendar will earmark schedule for TA allocation (e.g., 1st December for starting the process and 15th December for initial allocation. Similarly 1st July and 15th July could be the dates for the Monsoon semester).

31.4 Approval from AICTE

The Senate noted with satisfaction the approval given by AICTE for change of site, two additional PG programs, i.e., M.Tech. in CSE (Mobile Computing) and M.Tech. in ECE (VLSI) from AY 2014-15 and extension of approval for the Academic year 2015-16.

31.5 Approval for NBA Accreditation and proposed action for implementation.

The Senate noted with satisfaction the approval received for NBA Accreditation of the B.Tech. (CSE) program for 5 years. The Senate desired to take follow up action as per suggestions of the NBA team. Help of the faculty teaching communication skill course may also be taken to procure good tools for the language laboratory.

FACULTY MATTERS

31.6 To consider formation of Panel for selection committees for CSE, ECE, CB, and Math.:

Chairman presented the background of the proposal and the list of experts in different areas belonging to various institutions/universities/organizations. During the course of discussions some more names were suggested by the members. After detailed discussions the Senate approved the names of experts listed in **Appendix-II**, for inclusion in the panel for Selection committees. The Senate also accorded post-facto approval for inclusion of the following experts on the Selection Committees:

Prof. Basabi Bhaumik, IIT-Delhi
Prof. Ajit Chaturvedi, Professor IIT-Kanpur
Prof. Varsa Apte, Professor IIT Mumbai
Dr. Kaushik Saha, Samsung R&D
Prof. Somenath Biswas, Director, IIIT-Allahabad

The Senate further authorized the Director (Chairman, Senate) to add more names of experts in future, if and when required.

UG ISSUES

31.7 To consider a proposal to allow a BTech student to do “extra credits”.

Prof. Dheeraj Sanghi, Dean of Academic Affairs presented the background of the proposal to allow B.Tech. students to do “extra credits” beyond 152 credits required for completion of B.Tech. requirement, and for N extra credits done, allow worst grades in N credits, with a maximum limit of 8 credits, to be not counted towards CGPA computation. The impact of this decision will be reviewed after two batches have graduated with this option. The UGC was requested to work out the details for implementation.

31.8 To report attendance in the UG Core Courses

Chairman apprised the members of the earlier decisions of the Senate regarding taking of attendance in core courses vide its 26th meeting held on 25th June, 2014 and 30th meeting held on 18.8.2015. A summary of attendance in the core Courses run during Monsoon 2015 semester was presented. He also apprised the members of the views expressed by some of the Coordinators. After detailed deliberations the Senate decided as under:

- i) Attendance in core courses of 1st year students shall continue to be taken regularly

- ii) Attendance to be shared with Instructors and the students periodically (preferably once a month)
- iii) For this semester, letters to be sent to the parents of the students who have attendance less than 50% in any course and the corresponding grade falling below 'B-'.
- iv) Senate further suggested that from the next semester, faculty can have different strategies for students having low attendance such as grade reduction, having a weight for attendance in the grade, sending letters, not allowing to appear for the end-semester exam etc. This is same as what instructors are allowed to do in courses other than core courses already.
- v) It was also agreed that one approach for core courses will be to send a warning letter after midsem to all those students whose attendance is less than 75% and who are performing poorly – students under this warning will have to attend all lectures after the mid sem, failing which they may be put under academic probation, and letters sent to their parents. Similarly, at the end of semester time if the attendance is poor and the grade is below B-, a warning letter may be sent to the students and parents, and the student may be placed under academic probation for next semester.

31.9 Recommendation / Report by UGC

(i) To consider the recommendation for reconstitution of UGC

The Senate agreed to the recommendation of the UGC after making some minor changes and reconstituted the UG Committee as under:

1. Chair, UGC - Chairperson
2. DOAA
3. Past UGC Chair
4. PGC Chair
5. UG - CSE Coordinator
6. UG- ECE Coordinator
7. Non –CSE/ECE member (currently Prof. Samaresh Chatterji)
8. Students' Representative (UG-CSE)
9. Students' Representative (UG-ECE)

Ms. Sheetu Ahuja- Standing Special Invitee
Ms. Anshu Dureja- Secretary

(ii) To consider recommendation of UGC for discontinuation of streams in UG programs

Chair, UGC, Dr. Anubha Gupta presented the recommendation related to streams in the UG programs made at the 3rd meeting of the UGC held on 7.10.2015. After detailed deliberations the Senate decided that streams in the UG programs be discontinued. However, the students may be guided about the courses belonging to a certain area during the course counseling session conducted at the beginning of the semester. Guidance on streams should also be put on the website for information of the students.

(iii) To consider guidelines for registration and evaluation of IP/UR/IS

The Senate noted the recommendation of the UGC made at its 4th meeting held on 18.11.2015 regarding registration and evaluation of IP/UR/IS.

31.10 Bonus Marks for BTech Admissions in 2016

The Senate considered the proposal for awarding bonus marks as per details placed at **Appendix-III**. After detailed deliberations the Senate in principle agreed to the proposal with the following observations:

- i. To do comparison with NTSE, KVPY and INSPIRE to allot bonus marks to the proposed additional categories
- ii. Get data for the last three years
- iii. Get data from our students who participated in various categories in the past.

The Chairman, Senate was authorized to take a final decision for inclusion of additional categories and allocation of appropriate bonus marks to them.

M.TECH. ISSUES

31.11 To consider modification of the M.Tech.(CB) regulation

Chairman, Senate apprised the members of the earlier decision of the Senate made at its 29th meeting held on 21st April 2015 and the subsequent review of M.Tech. program by the experts from academia and industries. Dr. Sriram K who was present at the meeting also presented the salient features of the program. The Senate discussed the matter in detail and after making a few minor changes ratified/approved the revised M.Tech. (CB) program and the revised M.Tech.(CB) regulation placed at **Appendix-IV** and **Appendix-V** respectively. Any compulsory course may be added to the M.Tech. (CB) program only with the prior approval of the PGC.

31.12 To consider allocation of seats for admission to M.Tech. programs in the Academic Year 2016-17.

Chairman, Senate informed the members that at present 98 GATE fellowships are sanctioned by the AICTE in the two disciplines (CSE & ECE). For the new M.Tech. (CB) program fellowship is expected to come from DBT. After detailed discussions, the Senate approved the allocation of seats for admission to M.Tech. programs as follow with a provision for an increase up to 10% in each specialization to take care of the drop outs:

Program	No. of seats for 2016-17
M.Tech. (CSE)	80
M.Tech. (ECE)	60

M.Tech. (CB)	24
Total	164

31.13 Recommendation / Report by PGC:

Dr. Vinayak Naik, Chair, PGC presented the recommendations of the PGC made at its 10th PGC meeting held on 30.9.2015 regarding undertaking of Industrial Project, replacement of courses and completion of at least 32 credits of course work in one's own discipline by the students doing Industrial project. The Senate approved the recommendations.

Ph.D Issues

31.14 To report the status of Rolling PhD Admissions

Rolling PhD admissions:

The Senate noted admission under the rolling PhD admission program, and emphasized that date of enrollment in the PhD program will be considered as the start of semester only. In case any faculty member wants the scholar to join early, such a scholar may be hired as an RA and payment may be made from project funds.

31.15 Starting of a 2 credit course titled Scientific Communication

Chairman, Senate apprised the members of the proposal for starting a 2 credit compulsory course titled “Scientific Communication” in 2015-16 Winter Semester for M.Tech. students. This course will be similar to the OOPD course started in the 2015-16 Monsoon Semester. Though this course is compulsory, the grade (normal grade) and the credits obtained in this course will not count towards CGPA and graduation requirements. After detailed deliberations the Senate approved the proposal.

ACADEMIC CALENDAR																																																			
(Winter Semester 2016 w.e.f. 30th December 2015)																																																			
Week 0 (Dec-January)						Week 1 (January)						Week 2 (January)						Week 3 (January)																																	
Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat																												
	29	30	31	1	2	4	5	6	7	8	9	11	12	13	14	15	16	18	19	20	21	22	23																												
		Semester Begins		New Year Day		1st Day of Class		Last day for Late Registr.		Last day for course Add/Drop							H												Cadence																						
Week 4 (January)						Week 5 (February)						Week 6 (February)						Week 7 (February)																																	
Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat																												
25	26	27	28	29	30	1	2	3	4	5	6	8	9	10	11	12	13	15	16	17	18	19	20																												
	Republic Day																																																		
	H				H						H						H						H						H																						
Week 8 (February-March)						Week 9 (February-March)						Week 10 (March)						Week 11 (March)																																	
Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat																												
22	23	24	25	26	27	29	1	2	3	4	5	7	8	9	10	11	12	14	15	16	17	18	19																												
Mid-Sem Examinations Week																	Last day for Late Drop						Research Showcase																												
																													H																						
Week 12 (March)- Mid Recess*						Week 13 (March-April)						Week 14 (April)						Week 15 (April)																																	
Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat																												
21	22	23	24	25	26	28	29	30	31	1	2	4	5	6	7	8	9	11	12	13	14	15	16																												
			HOLI	Good Friday																			Ram Navmi				Pre-reg starts																								
			H	H							H						H						H				H																								
Week 16 (April)						Week 17 (April-May)						Week 18 (May)						Week 19 (May)						TT : Adjusted Days																											
Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	Mon	Tue	Wed	Thur	Fri	Sat	18th April(Mon)-FRIDAY's Time Table																					
18	19	20	21	22	23	25	26	27	28	29	30	2	3	4	5	6	7	9	10																																
	TT-FRI	Last Day of Classes	Mahavir Jayanti							BTP Presentation				Pre-Registration ends	Moderation Meeting	Summer Vacation starts*						Announcement of Grades (tentative)																													
		BTP Submission	H	End-Sem Examinations/Demos/Project																																															
GH: Gazetted Holidays																																																			
25 Mar (Fri) Good Friday												26 Jan (Tue) Republic Day						24 Mar (Thurs) Holi																																	
												15 Apr (Fri) Ram Navmi						20 Apr (Wed) Mahavir Jayanti																																	
Summer Vacation : 5th May 2016 onwards																																																			

TimeTable-Adjustment	H: This includes Saturdays/Sundays and GH	*Mid Recess & Summer Vacation- For UG Students only
Important Events	Registration dates	Research Showcase- 18th March- Classes will be held as per Friday's Time Table

Panels for Faculty Selection Committees

Names of experts in different areas are listed below. Any of these experts can be included in the panel for selection committee. If needed, other full Professors from IITK, IITD, IITB, IISc, and IITM may be empaneled – in such case the selection committee should be approved by the Chairman, Board of Governors.

ECE Experts

1. IITD: Ranjan Bose, Arun Kumar, Santanu Chaudhury, Basabi Bhaumik, M. Balakrishnan
2. IITB: Abhay Karandikar, Vikram Gadre, Dinesh Sharma,
3. IISc: A.CHOCKALINGAM, B. Sunderrajan, K.V.S. Hari,
4. IITM: K. Giridhar, S. Umesh, Amitava Dasgupta, IIT Madras
5. IITK: Animesh Biswas, L.Behara, Baquer Mazhari
6. ISI Kolkata: Susmita Sur-Kolay

From Industry / Labs:

1. Dr. Kaushik Saha, who already has an association with IIT/D:
2. Dr. Sudip Basu, Head, Automotive Electronics division at ST, Greater Noida
3. Dr. Chandra Shekhar , Director CSIR-CEERI, Pilani.
4. Vasantha Erraguntla, Director, Technology Pathfinding at Intel Corporation
5. Jaswinder Ahuja, Corporate Vice President and Managing Director at Cadence Design Systems
6. Alok Jain, Distinguished Engineer, Cadence
7. Rajeev Murgai, VP, Magma Design Automation
8. Shivkumar Kalyanaraman, IRL (smart energy, networks)
9. Satya Gupta, CEO, Concept2Silicon Systems, email: satya.gupta@concept2silicon.com
10. Dasaradha R Gude, Chairman, Soctrionics, email: gd@soctrionics.com
11. Niranjana Pol, Engineering Director, Seagate Technology: niranjana.pol@seagate.com
12. Dr. Nagi Naganathan, Principal, Avagotech: nagi.naganathan@avagotech.com
13. Saurabh Desai, CEO and vice president, einfochips: saurabh.fsl@gmail.com

CSE Experts

1. IITD: Prem Kalra, Subhasis Banerjee, Naveen Garg, Anshul Kumar, Sanjiva Prasad
2. IITB: Sharat Chandran, Varsha Apte, Uday Khedkar, Shiva Kumar, Supratik
3. IITK: TV Prabhakar, RK Ghosh, Sumit Ganguly
4. CMI: Madhavan Mukund (also suitable for Math)
5. IITM: Prof Pandurangan
6. IITM: Prof. Krishna M. Sivalingam
7. IITKgp: Prof. Niloy Ganguly
8. IISc:
9. ISI Kol: Prof Sanghamitra Bandhopadhyay (director ISI Kol). She is a Bhatnagar awardee and works in areas with a lot of overlap with many of our faculties.

From Industry / Labs:

1. Ravi Kothari, IBM IRL
2. Gautam Shroff, TCS
3. Sriram Rajamani, Dy MD, Microsoft Research
4. Chandu Thekkath, MD, Microsoft Research
5. Manish Gupta, MD, Xerox Research
6. Niranjana Thirumale, CTO, EMC India

Computational Biology Experts

1. JNU - Indira Ghosh, and Andrew M. Lynn, Prof. Ram Ramaswamy
2. IIT Delhi: Prof. B. Jayram IIT Delhi, James Gomes, Basabi Bhounik
3. IISc - Nagasuma Chandra, Prof. Manju Bansal
4. IIT B - Supratik Chakraborty (CS), Pramod Wangikar (ChE), K.v. Venkatesh (ChE)
5. IITK/IIT-A: Somenath Biswas (CS), FROM THEIR BIO PROGRAM
6. Georgia Tech: Srinivas Aluru
7. DU: Sanjay Jain

From Industry / Labs:

1. IGIB: Dr. Rajesh Gokhale, Director:
2. Strand: Ramesh Hariharan, Vijay Chandru
3. Rajgopal Srinivasan -- TCS Innovation Labs, Hyderabad
4. Vani Brahmachari, from Ambedkar Center for Biomedical Research

Math Experts

1. Rahul Roy (ISI Delhi), (Probability/statistics)
2. Abhay Bhatt (ISI Delhi), (Probability/statistics)
3. Probal Choudhury (ISI Kolkata), (Probability/Statistics)
4. Tithankar Bandyopadhyay (Calcutta University Statistics dept 15+ years; about 10 years at IIM Ahmedabad) (Statistics).
5. Madhavan Mukund (CMI, Computer science)
6. Vivek Borkar (IITB),
7. Mrinal Ghosh (IISc),
8. Ravi Kannan (MSR),
9. S. Kesavan (IMSc),
10. Abhay Bhatt/Rahul Roy (ISID),
11. Debasis Kundu (IITK)
12. Prof. Jaikumar Radhakrishnan, TIFR.
13. Prof. Dileep Patil, IISc.
14. Prof. Manindra Agarwal, IITK.
15. Prof. Meena Mahajan, IMSc.
16. Prof. V. Arvind, IMSc
17. Prof. Rahul Roy, ISI, Delhi
18. Prof. K.R. Parthasarathy, ISI Delhi
19. Sukumar Das Adhikari, Professor, Harish-Chandra Research Institute Allahabad.
20. Sudhir R. Ghorpade, Professor and Head, Department of Mathematics, IIT Bombay
21. Inder Bir Passi, INSA Senior Scientist and Honorary Professor (Mathematics), IISER Mohali,
22. Professor Emeritus, Center for Advanced Study in Mathematics, Panjab University,

23. R. B. Bapat, Professor, ISI Delhi
24. Rajendra Bhatia, Professor (Mathematics), ISI Delhi
25. Tarlok Nath Shorey, Distinguished Professor, Mathematics, IIT Bombay
26. Dipendra Prasad, Senior Professor, School of Mathematics, TIFR
27. Bimal K. Roy, Professor, Applied Statistics Unit, ISI Kolkata
28. Palash Sarkar, Professor, Applied Statistics Unit, ISI Kolkata.

From Industry/Labs:

- Avinash Dharmadhikari (15 + yrs at Pune University, Statistics dept; last 10 years at Tata Motors, Pune) (Statistics)

Suggestions for Chairman's Nominees:

1. Prof. BN Jain
2. Prof. Narendra Ahuja
3. Prof. Surendra Prasad
4. Prof. M. Balakrishnan
5. Manindra Agrawal
6. Krithi Ramamritham
7. Prof. Y. Narahari (currently, Dean of Engineering at IISc)
8. Prof. A.K. Chaturvedi, IIT Kanpur (he is Deputy Director now)

Last year, we considered students having scholarships/awards in below categories for giving bonus marks upto 10.

- **Olympiads. Indian National Olympiad in Informatics, Maths, Physics, Chemistry, and Biology: (i.e. IOITC, IMOTC, OCSC for Physics, Chemistry, or Biology);**
6 marks, if the student qualified to appear in the National Level Exam for selection for the summer camp (i.e. INOI/INMO/INPhO/INChO/INBO)
- **Procon Junior programming contest**
10 marks for the medal winners; Supporting documents needed: Certificate/letter from organizers certifying this.
6 marks for those who got certificates of Achievement; Supporting documents needed: Certificate/letter from organizers certifying this.
- **National Talent Search scholarship**
6 marks, if a student has won this scholarship. If a student gets this in a specific category, then he/she can only be considered in that category. Supporting documents needed: Certificate/grant letter
- **Kishore Vaigyanik Protsahan Yojana (KVPY)**
6 marks, if a student has qualified for this scholarship. If a student gets this in a category, then he/she can only be considered in that category. Supporting documents needed: Certificate of merit/grant letter
- **Sports: Only sports listed in priority discipline of SGFI are considered**
If a student has represented a state in any sport in "priority discipline" (as per terminology used by SGFI), except Chess (as Chess is dealt with separately), in National School Games organized by a School Games Federation of India, under U19 or U17 category (girls or boys): • 6 marks if the individual has participated in it. Supporting documents needed: Certificate for medal, or Certificate of participation issued by School Games Federation of India.
- **Chess. FIDE rating players:**
10 marks for those whose FIDE rating is above 1800; Supporting documents needed: FIDE ID, Self-attested printout of list of international rated tournaments played as provided by FIDE through their official website. (Later participation certificates for these tournaments will have to be shown)
6 marks for those whose FIDE rating is below 1800. Supporting documents needed: Same as above.
- **Culture: Scholarship to Young Artistes“ given by Ministry of Culture, Government of India, or “Cultural Talent Search Scholarship Scheme” given by Centre for Cultural Resources and Training**
6 marks for those Student who have received “Scholarship to Young Artistes“ given by Ministry of Culture, Government of India, or “Cultural Talent Search Scholarship Scheme” given by Centre for Cultural Resources and Training an autonomous body under the aegis of Ministry of Culture, Government of India. Supporting documents needed: Scholarship sanction letter and certificate issued by Ministry of Culture, Government of India / Centre for Cultural Resources and Training, Government of India.

At the time of admissions some students and parent recommended certain more awards for consideration. The matter was discussed In Senate and Student Senate was asked to come up with other Scholarships/Awards of repute that may be considered for giving

Bonus Marks to students. After detailed discussion Student Senate recommended below scholarships/awards for inclusion:

- **INSPIRE scholarship:** Offered by Govt. of India to top 1% in every board. Scholarship money valid only for BSc/MSc/MS programs. Therefore, students entering IIT Delhi do not get any money (BTech degree is not valid). However, extra marks can be given from our side. Each eligible candidate gets a certificate- Called SHE (Scholarship for Higher Education)- which can be checked at the time of admission. Link: <http://www.inspire-dst.gov.in/SHE.html>

Students who happen to be among the top 1% in 12th standard at their respective Board Examinations are eligible to apply

For year 2014

No of Applications: 35999

Valid applications: 27467

No. of offers made: 13612

- **INAO (Indian National Olympiad for Astronomy):** Similar to the Math/Phy/Che/Bio, an astronomy Olympiad is also organized where the top team represent India on an international platform. If Bio/Chem Olympiad winners get bonus points, even winners of the astronomy Olympiad should. Link: <http://olympiads.hbcse.tifr.res.in/subjects/astronomy>

Not much information is available on website

- **National Cyber Olympiad and National Science Olympiad:** Organized by the Science Olympiad foundation, it is held annually for each class- Although less prestigious than the INMO/ INPhO/ INChO/ INBO, it is a prestigious academic exam organized at the national level. Perhaps the top 50 rankers in each could be given bonus? Link: <http://www.sofworld.org/>

SOF is a Registered Not-For-Profit Organization Popularising Computer, Science, Mathematics and English Education among school children.

Exam Structure for NCO

Class	Section	No. of Questions	Marks/Question	Total Marks
5 to 12	Logical Reasoning	10	1	10
	Computers & IT	35	1	35
	Achievers Section	5	3	15
	Grand Total	50		60

Exam Structure for NSO

Class	Section	No. of Questions	Marks/question	Total Marks
11 and 12	Physics & Chemistry	25	1	25
	Achievers Section	5	3	15
	Mathematics/Biology	20	1	20
	Grand Total	50		60

During the academic year 2014-15, over 31500 schools from more than 1400 cities registered and millions of students appeared for the four Olympiad exams(NCO,NSO,IEO,IMO). These Olympiads were conducted across 19 countries.

- **Google-Code In:** Similar to Google Summer of code but for school students. Very prestigious international competition for coders at school level. Link: <http://www.google-melange.com/gci/homepage/google/gci2014>

Those who are selected for different Organizations may be considered for awarding bonus marks. Based on how many companies come in for taking students usually 15-20 students are selected each year.

- **Circuitrix:** The Student Senate also recommends top 10 rankers in Circuitrix (Electrical circuits competition- analogous to Procon jr. for computer science). Link: <http://techsonance.co.in/>

Its organized by TECHSONANCE. TECHSONANCE, a 16th National level technical symposium organised by ELECTRICAL ENGINEERING DEPARTMENT, OSMANIA UNIVERSITY, started off in the year 2000 with the aim of providing a platform for students all over India to showcase their technical skills.

- **National Sports Federation:** For the sports listed in National Sports Federation bonus marks may be given. Link: http://www.olympic.ind.in/national_sports_federations.html

Website don't have much clarity

Concept note on MTech in Computational Biology

Motivation

The genomic revolution in biology enables one to answer many questions in medical sciences like personalized medicine, the etiology of diseases like cancer, HIV, SARS etc, etc. However, answers to these questions are impossible without the support of powerful computational and statistical tools that helps to understand and uncover the underlying systems level regulatory mechanisms (such as network design principles) responsible for diseases. With the advent of new biotechnological techniques, massive amounts of genomics data are generated at a rapid pace from the experiments and analysis of these data requires tremendous amount of domain knowledge, solid computational background and good programming skills. This has led to the development of a highly interdisciplinary field of Computational Biology and Bioinformatics which consists of a good amount of understanding of molecular biology, genomics, algorithms, programming, statistical computation, machine learning, stochastic processes, and other mathematical techniques that underlie biological design principles.

For developing skilled manpower for this field, an interdisciplinary program is needed which combine suitable aspects of biology, statistics, algorithms and mathematical models to analyze large-scale genomic and biological data in one program in a focused and strategic manner.

Currently few Institutions have strength and capability to offer interdisciplinary education in this area. IIT-Delhi, with its strong focus on research, and with a good faculty in various CS and EE as well as Computational Biology, is well suited to offer such an interdisciplinary program of computing and biology. The proposed MTech program aims to train students in the key aspects of computing, bio informatics, and analysis of biological systems through the use of modeling and analytics.

Where the Graduates of this Program will be placed

This program fills a vacuum by creating manpower that can solve biology problems using computational techniques and data. Such manpower is needed in companies in life sciences, as they are generating large amounts of data and need manpower that understands the data and can apply computational techniques to analyze it and answer questions.

Types of plausible Bio companies that may require students with CB background are Nucleome Informatics Pvt Ltd. <http://www.nucleomeinfo.com> (provide bioinformatics solutions to academic and industrial customers), Cellworks: <http://cellworksgroup.com> (systems biology approach to diseases and therapy), and Xerox research india etc.

As student is building strength in computer science, as well as mathematical modeling through the biology courses, they can also find opportunities in IT companies that provide services and solutions to companies working Life Science, Medicine, etc. These can include: TCS Life Sciences, Strand Genomics, and persistent systems. Already we are in the process of engaging scientists working in Strand Genomics to take part in lectures, and thesis/internship guidance.

An important career option for graduates of this program will be in Research – pursuing a PhD and then going for a research career. This is one of the most exciting possibilities, as R&D in

Computational Biology and Life Sciences in general has great potential. Graduates of this program should be sought after by many computational and systems biology research groups across the world, including India. (To facilitate this option, the Institute will write to top departments in India and across the world and inform them about the strength of our program.)

Structure of the Program

The program will focus on strengthening key computer science capabilities needed for solving biology problems, and in developing skills in bio-informatics, techniques for modeling biological systems, analysis approaches for biological data, etc.

As this is an interdisciplinary program, it will have some modules to build the basic foundations in the two disciplines. These modules will be compulsory but will not count towards the credit requirement. Current modules are mentioned here. The PGC can modify these modules, or add/delete them.

- One intensive refresher course on Programming and Data Structures, and one refresher modules on Cell Biology and Biochemistry. (These are to be done during the summer before the start of the first semester).

Refresher module on Advanced Programming and Technical Communication, to be done during the first two semesters.

In the MTech program, the student will do 32 credits of courses (in addition to the courses mentioned above), and a Thesis. For courses, up to 12 credits can be from CSE courses from a list of courses approved by the PG Committee. Some of them may be compulsory. Currently the list of approved courses is:

- a) **Graduate Algorithms (or equivalent) - Compulsory**
- b) **HipC**
- c) **Machine learning**
- d) **Bigdata analytics**
- e) **Probabilistic Graph models**

The student will have to do a minimum of 20 credits of course work in Computational Biology – a few will be compulsory as defined by PG Committee, others will be electives. A sample of list of courses is given below – this list will evolve over time.

- a. **Foundations of Modern biology**
- b. **Practical Bioinformatics**
- c. **Systems and Synthetic Biology**
- d. **Introduction to mathematical biology**
- e. **Stochastic Simulations in Systems Biology and Biophysics**
- f. **Molecular mechanics and Biological physics**
- g. **Computational Neuroscience**
- h. **Biostatistics**
- i. **Function Genomics and Data mining**

Thesis: Student will be required to do a thesis in Computational Biology – there is no scholarly paper option.

Note: A subset of these courses will be used for Minor in CB for BTech students.

Intake of students for MTech (CB) program

Intake in interdisciplinary program is always a challenge. Often an interdisciplinary program can benefit from taking students from different backgrounds. As the program focuses on CB, but will build sufficient CS background for graduates to use CS tools and techniques for CB problems, it will require some background in these areas. It will be best if the incoming students have: (i) decent programming knowledge and (ii) good math background

With this, the eligibility criteria for input to this program is proposed as:

(1) B.Tech/BE in CS/IT/Math-and-Computing

Or

(2) B.Tech/BE in any other discipline and must have done in their programme:

- at least one computer programming course, and
- at least two mathematics courses

All applicant must have a valid GATE score (2014/2015). They must have a CGPA of at least 6.5 out of 10 or 65% in B.Tech/BE and 60% in all previous degree including 10+2.

IIT-Delhi provides relaxation to SC, ST, OBC, PwD and CW category candidates. Specially, candidates under these categories must have CGPA of at least 6.0 out of 10 or 60% in B.Tech/BE and 55% in all previous degree including 10+2.

Fee Waiver and Scholarships

The institute will reduce the overall MTech fee by half for students in the first batch. The Institute hopes to find scholarships for students through DBT.



Regulations for MTech in Computational Biology (CB)

Preamble

The genomic revolution in biology enables one to answer many questions in medical sciences like personalized medicine, the etiology of diseases like cancer, HIV, SARS etc, etc. However, answers to these questions are impossible without the support of powerful computational and statistical tools that helps to understand and uncover the underlying systems level regulatory mechanisms (such as network design principles) responsible for diseases. With the advent of new biotechnological techniques, massive amounts of genomics data are generated at a rapid pace from the experiments and analysis of these data requires tremendous amount of domain knowledge, solid computational background and good programming skills. This has led to the development of a highly interdisciplinary field of Computational Biology and Bioinformatics which consists of a good amount of understanding of molecular biology, genomics, algorithms, programming, statistical computation, machine learning, stochastic processes, and other mathematical techniques that underlie biological design principles.

For developing skilled manpower for this field, an interdisciplinary program is needed which combine suitable aspects of biology, statistics, algorithms and mathematical models to analyze large-scale genomic and biological data in one program in a focused and strategic manner.

Currently few Institutions have strength and capability to offer interdisciplinary education in this area. IIIT-Delhi, with its strong focus on research, and with a good faculty in various CS and EE as well as Computational Biology, is well suited to offer such an interdisciplinary program of computing and biology. The proposed MTech program aims to train students in the key aspects of computing, bio informatics, and analysis of biological systems through the use of modeling and analytics.

Structure of the Program

The program will focus on strengthening key computer science capabilities needed for solving biology problems, and in developing skills in bio-informatics, techniques for modeling biological systems, analysis approaches for biological data, etc.

As this is an interdisciplinary program, it will have some modules to build the basic foundations in the two disciplines. These modules will be compulsory but will not count towards the credit requirement. Current modules are mentioned here. The PGC can modify these modules, or add/delete them.

- One intensive refresher course on Programming and Data Structures, and one refresher modules on Cell Biology and Biochemistry. (These are to be done during the summer before the start of the first semester).

Refresher module on Advanced Programming and Technical Communication, to be done during the first two semesters.

In the MTech program, the student will do 32 credits of courses (in addition to the courses mentioned above), and 16 credits for a Thesis, for a total of 48 credits. For courses, up to 12 credits can be from CSE courses from a list of courses approved by the PG Committee. Some of them may be compulsory. Currently the list of approved courses is:

- a. **Graduate Algorithms (or equivalent) - Compulsory**
- b. **HipC**
- c. **Machine learning**
- d. **Bigdata analytics**
- e. **Probabilistic Graph models**

The student will have to do a minimum of 20 credits of course work in Computational Biology – a few will be compulsory as defined by PG Committee, others will be electives. A sample of list of courses is given below – this list will evolve over time.

- a. **Foundations of Modern biology**
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- e. **Stochastic Simulations in Systems Biology and Biophysics**
- f. **Molecular mechanics and Biological physics**
- g. **Computational Neuroscience**
- h. **Biostatistics**
- i. **Function Genomics and Data mining**

Thesis: Student will be required to do a thesis in Computational Biology – there is no scholarly paper option.

For the thesis credits, though the student has to register, he/she need not be physically present and can do the work while being outside the Institute

Note: A subset of these courses will be used for Minor in CB for BTech students.

Fee Waiver and Scholarships:

The institute will reduce the overall MTech fee by half for students in the first batch. The Institute hopes to find scholarships for students through DBT.

Change history:

July,2014 release

December,2015