AGENDA

Tenth (10th) Meeting of SENATE of

Indraprastha Institute of Information Technology, Delhi

Date: 14th April 2010

Day: Wednesday

Time: 3.00 PM

Venue: Conference Room
3rd Floor, Library Bldg
NSIT Campus
Dwarka, Sector - 3
New Delhi

TENTH (10TH) MEETING OF SENATE OF IIIT-DELHI

INDEX

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AGENDA

10.0 Opening remarks of Chairman

10.1 Confirmation of minutes of the 9th Senate meeting. *(Also confirmed through circulation by majority)* ***(Annexure 1)***

10.2 Changes in B Tech Program ***(Annexure 2)***

10.3 Minor Changes in the UG and the PG Manuals ***(Annexure 3)***

10.4 Any other matter with the permission of Chair

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Minutes of the 9th Senate Meeting of IIIT-D held on January 29th 2010, at 3.00 PM in Conference Room, Library Building, IIIT Delhi.

Following members were present:

- Prof. Pankaj Jalote,   -   Chairman
- Dr. Astrid Kiehn   -   Member
- Mr. Anuj Kumar Tiwari   -   Student Representative
- Dr. Debajyoti Bera   -   Member
- Dr. K. K. Biswas   -   Member
- Dr. Mayank Vatsa   -   Member
- Dr. Ponnurangam Kumaraguru   -   Member
- Dr. Pushpendra Singh   -   Member
- Dr. Richa Singh   -   Member
- Dr. Somitra Sanadhya   -   Member
- Dr. Vikram Goyal   -   Member
- Dr. Veena Bansal   -   Member

Members present through Audio Conferencing:

- Dr. C. Anantram   -   Member

9.0   Opening remarks of Chairman

The Chairman extended a warm welcome to all those who were present in person as also to those on audio-conferencing.

9.1   Confirmation of minutes of the 8th Senate meeting.

As there were no comments, the minutes were confirmed.

9.2   M. Tech Program in Computer Science

The proposed MTech program was discussed in detail. The following observations were made.

The number of thesis units be increased to 28 for with-thesis option, while the number of units for scholarly paper should be reduced to 8. It was felt that units for these are really notional; hence it is best to reflect the spirit of non-thesis and thesis options. However, this makes the total number of units different in the two options. The senate authorized the Chairman to explore the suitability of this. One option that the senate felt that can always be used is to mention "with thesis" in the degree itself, thereby creating a differentiation among the two options, which then justifies the different number of units.

It was clarified that students with Assistantship cannot change to non-thesis option. How to deal with those students who wish to make this change is an administrative issue for which suitable policies will have to be made later.

Regarding when the option has to be exercised by the student, it was felt that the option may be taken by the student at entry time itself, but which can be changed later by informing the PG committee.

In Core courses, the PG Committee was authorized to add the courses into the three different core streams, as new courses become available.

Regarding minor project, it was felt that the course should be there, but it should be optional. Similarly, communication skills course should also be optional.

9.3   Courses in Security Program

The broad list of courses was approved. Any new courses will follow the regular process of starting a new course.

9.4   Any other matter with the permission of Chair

It was noted that the PG manual states 16 units as the "full load". It was felt that this is a mistake/oversight as world over at least 5 courses are always allowed to a full time student. Hence, it was approved that PG manual be changed to state that the full load is 20 units.

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Structure of the "BTech in IT" Program

1. Objectives

IIIT Delhi aims to encourage research and innovation in IT and some of its domain areas. The objective of the BTech program is to prepare students to undertake careers involving innovation and problem solving using IT, or to undertake advanced studies for research careers in IT or the domain areas.

2. Background

While Computer Science focuses on the foundations of computing, IT as a discipline focuses on satisfying computing technology needs of organizations. So, in a continuum between principles and application, IT is more towards application, with the goal being to apply knowledge of computing and mathematics for solving problems.

IT is now becoming a discipline that is distinct from Computer Science, and ACM has a special curriculum now for it. However, foundations of IT are still in Computer Science. Hence, it is desirable and feasible to have a CS-based IT program. Such a program will allow a graduate of the program to choose a career in CS or applied aspects of computing.

IIIT Delhi aims to have such a curriculum which is CS-based, and which will develop in students skills for problem solving using engineering and research approaches, in the field of IT or some domains of IT. As the range of possible domain and specialization areas is large, it plans to have a strong foundational program, which can be built upon for specializing in different areas of IT or IT domains. In IIITD, this foundational program will heavily derive from Computer Science, and will be supplemented with suitable IT oriented courses.

3. The "BTech in IT" Program

Most engineering programs start with general courses in Sciences and Engineering, and then migrate to specialized courses for the disciplines. While these courses are indeed foundational for many engineering disciplines, they are not foundational for IT – rather they can be treated as application domains (as is evidenced from the fact that most sciences and Engineering disciplines heavily use IT now). Hence, the BTech (IT) program starts with computing oriented courses first, and allows the possibility of doing science courses later. Besides being better suited for an IT program, it also enables the possibility of students seeing newer applications and possibilities of relating IT with these subjects.

With this approach, the BTech program can be divided broadly in two halves. The first half will focus on providing the foundations of the computing discipline (as well as some other aspects). This part will be highly structured. The second part is for further developing the skills and knowledge of the students in various topics – computing and non-computing. This part also provides limited specializations, and different students may follow different paths and take different set of courses in it.

3.1 The Foundation Program and Core Courses

The Foundation program provides the basic knowledge about CSE/IT through a set of core courses, which are compulsory for all students. This program consists of four major streams:

- Software
- Hardware
- Theory
- Systems

The desired capability at the end of each of the streams is expressed as the post condition for that stream in the table below.

CSE Stream	Post Condition after the Foundation Program
Software	• **Primary:** Ability to develop an efficient and good quality 1000 line program to solve the target problems • Above ability in at least two programming languages, and at least one modern programming environment. • Ability to develop a complete software solution for a smallish problem using disciplined methodologies and techniques.
Hardware	• **Primary:** Ability to develop a digital circuits of 100 gates/memory elements, and firmware for small systems • Understanding of how instructions are executed using electronic signals • **Desired:** Ability to utilize machine provided features (e.g. cache, bus, etc) for improving program execution
Theory	• Ability to abstract out and manipulate mathematical structures from problems • Ability to formalize computation • Appreciation of the fact that problems are of varying complexity from linear time solvable to undecidable.
Systems	• Ability to effectively use APIs provided by an OS for developing system level programs • Ability to setup and manage a small modern computing setup

The core courses to deliver the post conditions are given in the Table below (for courses that are less than 4 units, their units are given in parenthesis). It should be added that while core courses of the first three semesters generally must be done in these semesters, the courses mentioned in semester 4 (or 5) may be done later during the program. In other words, these core courses have to be done, but the semester mentioned in the table below is indicative only.

	Sem 1	Sem 2	Sem 3	Sem 4	Sem 5
Software Stream	Intro to Prog	DS	Adv Prog	Databases and SQL	SwEngg
Hardware Stream	Digital ckts	Computer organization			
Theory / Maths Stream	Discrete Maths	TOC	Prob and Stats and Stochastic Processes	Algo design and analysis	

Systems stream		Sys setup and mgmt (2)	OS	Computer Networks	

In addition to CSE/IT streams, the program also consists of a stream to build communication skills, which has been recognized world over as the skill in which most engineers are weak. There is a stream of Humanities and Social Sciences courses, meant to increase the breath and understanding of students. These streams are spread over the entire program.

3.2 The Advanced Part and Streams

The second half of the program consists mostly of *streams* in different areas. A stream in an area is a sequence of courses in that area, offered during the last four semesters, and provides a limited specialization in its area. Besides the main computing streams, which will remain, the number and nature of other streams will evolve and may change with time, providing the ability to accommodate the evolving nature of IT in the program.

One of the objectives of IIIT Delhi is to have teaching and R&D in some domain areas like health, life sciences, finance, economics, E-Governance, etc. To provide this training in domain areas, streams from domains will also be offered.

A stream consists of elective courses. An elective course is one which is not compulsory, and a student may or may not chose to do it. (Some elective courses are also available in the first half of the program.) Though most electives will be organized as streams of courses, there also would be elective courses that are not part of any stream.
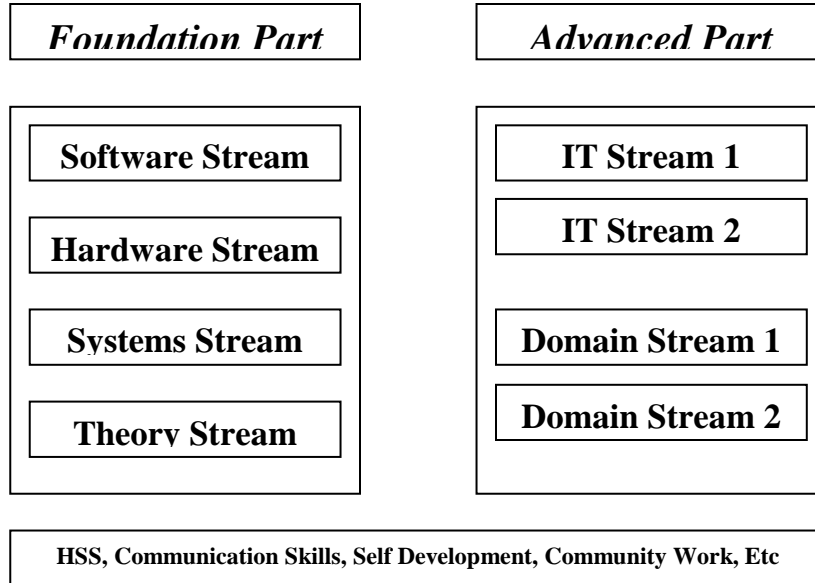
3.3 Requirements for Graduation

For graduating, a student is expected to pass in courses totaling 144 units (equivalent to 9 full courses a year). In addition a student must satisfy the following requirements.

- All the core courses must be completed.

- At least 12 units of humanities and social sciences courses must be done.

- 4 units of Community work / Self Development must be done. (Committed students may be allowed to do more.)

- In each semester, the student must do at least two courses from CS/IT streams

- A Btech project (BTP) is treated as an elective courses and is not compulsory. A student opting for BTP, may take a total of 12 to 16 units of BTP. In a semester, the student can normally register for at most 8 units of BTP.

- A student may take "Project" or "Independent study" courses for 1, 2, or 4 units. No more than 8 units of these courses may be taken in the entire program. Only students with satisfactory CGPA (at least 7.5) or with a strong interest in some area (UG advisor to determine this based on interaction with the student) can take these courses.

3.4 Overall Program

In the first half, a student mostly does the core courses, plus some HSS and general education courses. In the later semesters, the student can pick courses from many different streams. In the table below, the courses in [ ] are electives, and are only representative. The actual courses, and the actual streams, will get defined later.

Foundation Part	*Advanced Part*
Software Stream	**IT Stream 1**
Hardware Stream	**IT Stream 2**
Systems Stream	**Domain Stream 1**
Theory Stream	**Domain Stream 2**

HSS, Communication Skills, Self Development, Community Work, Etc

	Sem 1	Sem 2	Sem 3	Sem 4	Sem 5	Sem 6	Sem 7	Sem 8
Software Stream	Intro to Programming	DS+Algo	Adv Prog	Databases and SQL	Software Engineering	[Web programming and systems] / …	[Adv Software Engineering] / ..	[Programming Languages] / [WS + SOA]
Hardware Stream	Digital circuits	Computer org			[Computer Architecture]	[VLSI Design]	[ ]	[Embedded Systems] or [Synthesis]
Theory and Maths Stream	Discrete Maths	TOC	Probability and statistics	Algo design and analysis	[Linear Algebra and Calculus]	[Logic]	[Advanced Algorithms]	[ ]
Systems stream		Sys setup and mgmt (2)	Operating Systems	Computer networks	[Sys mgmt II] (2)	[Compilers]		
HSS		HSS-1		HSS-2		HSS-3		HSS-4
Communication Skills	Basics Commn Skills		[Critical Reading (2)]		Technical Commn (2)		[Interview skills (0.5)]	
General/ Science Education			[Engg Science]	[Digital Communications]	[Biology] / [..]	[Eco + Finance]	[Adv Physics] / [Adv Chem]	[Adv Physics] / [Adv Chem]
IT Stream					[Course 1]	[Course 2]		[Course 3]
Domain Stream					[Course 1]	[Course 2]		[Course 3]

3.5 Streams and Elective Courses

The list of streams and elective courses cannot be exhaustive, as it is dynamic. Currently, streams are being planned in the following areas:

- Software Engineering
- Biometrics
- Data management
- Distributed computing
- Computational finance/economics
- Sciences

A representative sample of elective courses that may be offered is:.

- Web-based programming (4)
- Compilers (4)
- Programming languages (4)
- Computer architecture (4)
- Algebra (4)
- Machine learning
- Digital communications
- Artificial intelligence
- System management II (2)
- Biometrics
- Distributed systems
- Security
- Distributed databases
- Logic (4)
- Computer vision
- Robotics
- VLSI design
- Embedded systems
- Graphics
- Multimedia
- Btech project
- Independent study (1, 2, or 4)
- Minor project (1, 2, or 4)
- Btech project (BTP)
- Community work/self development
- Etc.

4. Honors Program

Any program is designed such that an average student admitted into the program can complete it successfully. To challenge the brighter and more ambitious students, there is an Honors option. So a student in the BTech program can graduate with a BTech, or a BTech with Honors. The program therefore allows students of different capabilities to remain challenged at a level appropriate for them.

The requirements for BTech with honors are:

- Only students with a CGPA of 8.0 or more are eligible for the Honors program.
- The student must complete an additional 12 units (i.e. a total of 156 units)
- The student must do a BTP
- At graduation time, the student must have a CGPA of 8.0 or more

Changes Proposed in the BTech(IT) Curriculum

Background

The UG curriculum was designed in 2008. While the UG program will be thoroughly reviewed once every five years or so, there is a need to make some "corrections" in the existing program. The proposed changes are not meant as a "new" program, merely to make some corrections.

One of the assumptions while designing the UG curriculum was that low to moderate academic load will help students study the courses being offered in more depth and more rigorously. Keeping this in mind, we had proposed a load of 9 courses per year. However, experience has shown that the low load has not achieved its objective – students continue to take studies largely "for exam" (and faculty convert this goal into a learning methodology). Indeed, it seems that in the initial years, a higher load might motivate students to apply themselves more to academics and take studies more seriously.

In addition, it has been found that 2 unit courses are not working well for the first two years – these courses are not taken seriously. Also, making rules for continuing in the program, or for repeating the first year, becomes hard with these courses.

The corrections proposed are mostly addressing these issues.

Changes Proposed

The load for the first two years be increased to 10 courses per year (5 per semester), while for the last 2 years, it can remain as 9 courses per year. This will add some more load in the first 2 years and will help build better discipline, but will still allow students to devote more time to projects in the last two years, when they are more likely to do projects.

If the full load is defined as 5 courses per semester (i.e. above this will be an "overload"), then this model also provides a student to clear up to two backlogs in the last two years without needing to take an overload (which weak students are not allowed). This will be very beneficial to students who do not do well in the early semesters.

In addition, it is clarified (which the current batches have also been clarified) that the CW/SG units, while necessary for graduation, are over and above graduation requirements.

Implementing these Corrective Changes

- Make SM a 4-unit course by also adding hardware skills (there are many things that can be added to this course). I.e. make this essentially a lab course to build skills. Do this course in the first semester.

- In the second semester, add a course in Mathematics – perhaps on "advanced calculus". It has been observed that the students are not well prepared in maths, and such a course can help them for many other courses.
- Increase the "critical reading" course weight to 4 units. Add reading of some classic game changing books, and organize the course better so it achieves its twin objectives of improving communication, and exposing the students to the "world of ideas".
- In the 3rd year, make "technical communication" a full 4 unit course. Let there be two parts in it – first part is to read technical papers, and then make a presentation on them and write a report. (Or it could be – take a problem, do complete background research on it, write a report summarizing the problem and proposed solutions, and giving a presentation.) The second part will be to do "technology forecasting" – predict how technology will evolve. The forecasting part will align well with our "entrepreneurship" goal of education, and can feed well for projects in the last two years. The first part can be done in groups of 2 or 1, while the second part can be done in groups of 4 or 5 also.
- In the last year the "interview skills" course can be made as a non-course, i.e. we organize this as a non-credit workshop over some weekends, and request some companies to organize them.

It should be noted that we have two courses each in first and second semesters that can be done in either semester. These are SM and Comm101, and HSS and Maths. This can be exploited, if the SM/Com101 classes need to be split in two to manage large enrollments. Might also be useful if we recruit one faculty member to do Com – then we would like to distribute the load.

Similarly, in sem 3 and 4, there will be two courses each that can be swapped. Critical Reading and Engg Science, and Digital Comm. and HSS.

Rules for First Year

- A student who passes all courses in first year will earn 40 units. A student can move to 2nd year standing if he/she passes 7 courses (i.e. earns 28 units) or more.
- If a student passes 5 courses or more, but passes less than 7 courses (i.e. passes 5 or passes 6 courses), then he/she will have to repeat the first year.
- If a student passes less than 5 courses, he/she has to leave the Institute.

Clarifications on the UG Manual
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1. Define what is an overload.
2. When is overload granted, does it depend on CGPA Eg 8.5?
3. Add/drop clarification: it applies to elective courses, only.
4. Will there be a late drop of a course (after mid sem) without add? In general, or for elective courses, only? (Might be used as "drop is better than fail", but one could restrict the drop to one week after the mid sem).
5. How to clear backlogs (normal load requires 9 courses, overload is more than 10, so one course can be added without an overload)
6. The 4 credits for community work/self growth course do not contribute to the 144 credits to be earned.
7. Do students have to do one community work and oneself growth each, or may they clear the requirements by only doing community work or self growth?
8. In 3.1.3 "In each semester, the students must do at least two courses from CS/IT stream." The two courses could also be from electives which are not part of a stream.
9. In the grade table, the explanations for the I grade is given in the S grade row.
10. Will we change the attendance rule?

Clarifications on Streams

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1. Who defines/declares a stream/domain stream and when? They will officially be announced at the beginning of the third year (or the end of second year)?
2. What are the requirements for students? (3 courses per stream/2 per domain stream?)
3. Somewhere it should be said that it is not mandatory to take up a streams.
4. Domain stream courses are in the 3rd year only? (according to yesterday's discussion: no, but I remember this from somewhere, also a student asked me about it)
5. Stream courses may have inter-dependencies; students are requested to decide for streams as early as possible.
6. Projects contribute to stream requirements? (i.e. 2 courses + 1 project = stream)
7. Chosen streams show up in the transcript, only, not in the diploma (?)

Clarifications on the PG Manual
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1. There won't be tutorials?
2. Is there a requirement for attendance?