INDRAPRASTHA INSTITUTE *of*
INFORMATION TECHNOLOGY DELHI

<u>Regulations for the BTech (CSE) Program</u>

1.   Preamble

IIIT Delhi aims to encourage research and innovation in Information Technology (IT) and allied areas. The objective of the BTech program in Computer Science and Engineering (CSE) is to prepare students to undertake careers involving innovation and problem solving using computational techniques and technologies, or to undertake advanced studies for research careers or to take up Entrepreneurship.

In order to give due importance to applied as well as theoretical aspects of computing, the curriculum for the BTech (CSE) program covers most of the foundational aspects of computing sciences, and also develops in students the engineering skills for problem solving using computing sciences.

Most engineering programs start with general courses in Sciences, and then migrate to specialized courses for the disciplines. While these courses are indeed foundational for many engineering disciplines, they can be treated as application domains (as is evidenced from the fact that most sciences and Engineering disciplines heavily use computing now). Hence, the BTech (CSE) program at IIIT-Delhi starts with computing oriented courses first, and allows the possibility of doing science courses later. Besides being better suited for a CSE program, it also enables the possibility of students seeing newer applications and possibilities of using computing in these subjects.

With this approach, the BTech (CSE) program can be divided broadly in two halves. The first half focuses on building the foundations, and is highly structured. The second part is for developing the skills and knowledge of the students in various topics – computing and application domains. This part also provides limited specializations, and different students may follow different paths and take different set of courses in it. Overall objectives of the B.Tech.(CSE) program are to help develop the following attributes in students:

1. Understanding of theoretical foundations and limits of computing
2. Understanding of computing at different levels of abstraction including circuits and computer architecture, operating systems, algorithms, and applications.
3. Ability to adapt established models, techniques, algorithms, data structures, etc. for efficiently solving new problems
4. Ability to design, implement, and evaluate computer based system or application to meet the desired needs using modern tools and methodologies
5. Ability to function effectively in teams to accomplish a common goal
6. An understanding of professional and ethical responsibility.
7. Ability to communicate effectively with a wide range of audience
8. Ability to self learn and engage in life-long learning

9. Understanding and ability to use advanced techniques and tools in different areas of computing
10. Ability to undertake small research tasks and projects
11. Ability to take an idea and develop into a business plan for an entrepreneurial venture (if desired)
12. An understanding of the impact of solutions in an economic, societal, and environment context.

This document specifies the specific regulations for the BTech (CSE) program – the general regulations for the BTech program are given in a separate document. These regulations are in addition to the regulations of the BTech program.

2. The Foundation Program and Core Courses

1. The Foundation program provides the basic knowledge about CS through a set of core courses, which are compulsory for all students. This program consists of four major streams: software, hardware, theory, and systems. Besides these, there are courses in Maths, communication skills, environment studies also as part of the core program.

2. The set of core courses are shown in the table below (courses mentioned in [ ] are electives and actual courses for these slots are as defined from semester to semester.)

SEMESTER 1	SEMESTER 2	SEMESTER 3	SEMESTER 4	SEMESTER 5	SEMESTER 6
IP	DSA	Adv Prog	DB		
DC	*Basic Electronics*	CO	OS	CN	
Maths I	Maths II	DM	ADA		
SM	IED	*{Engg Sc: Math3, S&S, ELD, ..}*	*{TOC, Math 4, Optimization,..}*		
COM	HSS/Eco	[HSS]	*{Science/Bio/..}*	TCOM + Environment	

3. The semester mentioned for the core courses is indicative and suggested, and they can be done later/earlier also. However, the pre-requisite requirements must be kept in mind by a student, if he/she wishes to do a core course in some other semester.

4. In the Engineering Science/Math course slots in second year, students can take only from the list of courses specified for those slots.

3. The Advanced Part and Streams

1. The rest of the program consists mostly of *elective courses.* An elective course is one which is not compulsory, and a student may have choices from which to select the courses he/she wants to do.

2. Some of the electives may be organized as *streams,* where a stream is a sequence of courses in an area providing a limited specialization in that area.

3. Besides electives and streams for specialized areas, streams and electives from domain areas (e.g. health, life sciences, finance, economics, E-Governance, sciences, etc.) may also be offered.

4. The number and nature of streams and electives will evolve and may change with time, providing the ability to accommodate the evolving nature of computing and its applications in the program. Some of the current streams are in these areas:

- o Image Processing and Machine Intelligence
- o Data Analytics
- o Mobile Computing
- o Security and Privacy
- o Hardware
- o Theory
- o Finance
- o Environment
- o Economics
- o Sciences (Physics, Biology)

5. There will also be a set of Humanities and Social Sciences (HSS) courses offered.

6. List of courses, and further information about the courses is available on the website: http://www.iiitd.ac.in/courses.php

4. Requirements for Graduation

For a BTech (CSE) degree, a student must satisfy all the following requirements:

1. Earn a total of 152 credits (equivalent to 38 full courses – 20 courses in the first two years, and 18 courses in the last two years.)

2. Successfully complete all the core courses.

3. Do at least 12 credits of Humanities and Social Sciences Courses.

4. Do 2 credits of Community Work and Self Growth each. These are pass/fail credits, which are required to be completed, but do not count for fulfilling the credit requirement (i.e. these are in addition to the requirements mentioned above)

5. In the last four semesters, do at least 32 credits of CSE courses. BTP/Independent project/Independent study/Undergraduate Research cannot count for this requirement. UGC may approve some other relevant courses (e.g. from Math, ECE, Computational Biology, etc.) to be counted as CSE courses for this purpose.

6. A BTech Project (BTP) is optional. A student opting for BTP, may take a total of 8 to 12 credits of BTP.

7. A student may take "Independent Project" or "Independent Study" or "Undergraduate Research" courses for 1, 2, or 4 credits. No more than 8 of these credits can count towards satisfying the credit requirements of the degree. Only students with satisfactory CGPA (at least 7.5) or with a strong interest in some area (the faculty advisor to determine this) can take these courses.

8. Credits of a BTP which is not completed will be treated as IP/IS/UR credits.

5.   Honors Program

The BTech (CSE) program has the Honors option, requirements for which are same as specified in the regulations for the BTech program. Namely;

1. The student must earn an additional 12 credits (i.e. must complete at least 164 credits)
2. The student's program must include a BTech Project
3. At graduation time, the student must have a CGPA of 8.0 or more

Change History

- Version 2.0 (Dec 2010). Main changes: Graduation requirements enhanced to 152 (8 more); system management, critical reading, and technical communication were made full 4 unit courses (and the 2 unit course in 4th year on interview skills was removed), and an additional Maths course (4 unit) was added in the second year.
- Version 2.1 (April 2012): This is now stated as requirements for CSE. Math 1 has been made a core course, and TOC has been made an elective. A design course introduced as core course in 2nd semester. The elective slots in 2nd year has been marked as Engineering Science/Maths and it has been clarified that in these slots, students can take only from the list of courses specified for them. Clarified that 2 credits of SG and 2 credits of CW must be done. Clarified that only 4 credits of BTP/IP/IS/UR can be counted for meeting the 8 credit CSE/Math per semester requirement. Clarification that total credits is 20 courses in first 2 years, and 18 in last two. BTP credit range changed to 8 to 16 credits.

- **July 2013 Release**
  Preamble modified
  Critical reading and Software Engineering removed from core
  In 2nd year, it is indicated that TCOM can be done

Math 1 and Math 2 explained

Intro to Engg Design added in 2nd sem as sequel to System Management

Added the regulation for BTP External

Changed the 8 CSE credits per semester to 32 CSE credits in last four semesters. No IP/IS/BTP credits to count towards this requirement

July, 2014 release: Only a few minor changes done

November, 2014 release: Program Objectives added

July,2015 release:

(i) B.Tech. (CSE) program revised w.e.f. Academic year 2015-16 *
(ii) BTP External discontinued
(iii) BTP credits towards fulfilment of degree requirements reduced to 12.

*For students of 2014 and earlier batches the set of core courses are shown in the table below (courses mentioned in [ ] are electives and actual courses for these slots are as defined from semester to semester.)

	Sem 1	**Sem 2**	**Sem 3**	**Sem 4**
Software Stream	Intro to Programming	Data Structures and Algorithms	Advanced Programming	Databases and SQL
Hardware Stream	Digital circuits	Computer organization		
Theory Stream			Discrete Math	Algorithm Design and Analysis
Systems stream	System Management		Operating Systems	Computer Networks
Maths	Math 1 (Linear Algebra)	Math 2 (Probability and Statistics)		
Communic ations/HSS	Communicatio n Skills	[HSS-1]	[[HSS-2]	Technical Communication (2 credits)
Other Courses			[Engineering Science/Math]	Environment studies (2 credits) [Engineering Science/Math]