Regulations for B.Tech. in Computer Science and Design (CSD) Program

1. Preamble

With internet expanding in all spheres of life, and most industries increasing their web presence and interactivity with their stakeholders and customers, demand for incorporating good design using rich media is increasing in all businesses. With increasing focus on user experience, the importance of Interaction Design and Design Methods is also increasing rapidly in IT products and services.

The B.Tech. in Computer Science and Design (CSD) aims to develop graduates that are not only well versed with computing approaches, tools, and technologies, but are also experienced with Design approaches. The program has a small set of core courses in Computer Science (CS) and in Design disciplines, followed by electives from CS as well as Design disciplines. This enables the students to build a program most suitable for them. The program will prepare students to work in the IT industry as well as digital design & media industry like gaming, animation, virtual/augmented reality, user interfaces etc., as well as allow students to take up higher studies in CS or in Design.

This document specifies the specific regulations for the B.Tech. (CSD) program – the general regulations for the B.Tech. program are given in a separate document.

Program Objectives:

The program aims to develop capabilities in CS as well as Design. At the end of the program, a student will have:

1. Understanding of foundations, limits, and capabilities of computing.
2. Ability to design and implement efficient software solutions using suitable algorithms, data structures, and other computing techniques.
3. Understanding of design principles and techniques and ability to apply these for developing solutions to human/societal problems.
4. Ability to independently investigate a problem which can be solved by an HCI design process and then design an end-to-end solution to it (i.e., from user need identification to UI design to technical coding and evaluation).

5. Ability to effectively use suitable tools and platforms, as well as enhance them, to develop applications/products using for new media design in areas like animation, gaming, virtual reality, etc.

In addition, the graduate of this program should also have the following general skills that are common with other B.Tech. programs:

6. Ability to function effectively in teams to accomplish a common goal.
7. An understanding of professional and ethical responsibility.
8. Ability to communicate effectively with a wide range of audience.
9. Ability to self-learn and engage in lifelong learning.
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 environmental context.

2. Program Structure

The B.Tech. program at IIIT-D follows a philosophy of having a small set of core-courses followed by electives, allowing students significant flexibility in designing their curriculum and specialization..

A. In the first few semesters mostly core courses are done. The structure for first few semesters is:

For students of 2020 batch and onwards

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5
Introduction to Programming	Data structures and Algorithms	Operating Systems	Algorithm Design and Analysis/Algorithm Design and Analysis(B)*	Computer Networks
Digital Circuits	Design Drawing & Visualization	Research Methods in Social Science and Design	[Prototyping Interactive Systems	
Maths I (Linear Algebra)	Maths II (Probability & Statistics)	Advanced Programming	Design of Interactive systems	
Introduction to HCI	Computer	Design Processes &	Fundamentals of Database Management	Technical communication +

	Organization	Perspectives	Systems	Environmental Sciences
Communication Skills	Visual Design & Communication	[Maths III (Multivariate Calculus)/ (Discrete Structures/Discrete Mathematics]	[SSH / Maths IV-ODE/PDE/Theory of Computation]	

*Students who will do Discrete Mathematics/Discrete Structures in Semester 3 will be allowed to do ADA. Also, ADA and ADA(B) are anti-requisites.

For students of 2019 batch and onwards

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5
Introduction to Programming	Data structures and Algorithms	Operating Systems	Algorithm Design and Analysis/Algorithm Design and Analysis (B)*	Computer Networks
Digital Circuits	Design Drawing & Visualization	Visual Design & Communication	Human Computer Interaction	
Maths I (Linear Algebra)	Maths II (Probability & Statistics)	Advanced Programming	Design of Interactive systems	Research Methods in Social Science and Design
Prototyping Interactive Systems	Computer Organization	Design Processes & Perspectives	Fundamentals of Database Management Systems	Technical communication + Environmental Sciences
Communication Skills	[SSH]	[Maths III (Multivariate Calculus)/Discrete Mathematics]	[SSH / Maths IV-ODE/PDE/Theory of Computation]	[Elective]

*Only the students who will do Discrete Mathematics in Semester 3 will be allowed to do ADA. Also, ADA and ADA(B) will be anti-requisites.

For students of 2018 and previous batches

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5
Introduction to Programming	Data structures and Algorithms	Computer Organization	Algorithm Design (B)	Computer Networks
Digital Circuits	Design Drawing & Visualization	Visual Design & Communication	Human Computer Interaction	Design of Interactive systems
Maths I (Linear Algebra)	Maths II (Probability & Statistics)	Advanced Programming	Operating Systems	Research Methods in Social Science and Design
Systems Management	Introduction to Engineering Design	Design Processes & Perspectives	Fundamentals of Database Management Systems	Technical communication + Environmental Sciences
Communication Skills	[SSH]	[Maths III (Multivariate Calculus)]	[SSH / Maths IV-ODE/PDE]	[Elective]

Note: The courses mentioned in [ ] are electives. 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.

B.   List of Technical and Non-technical courses of first year

Semester	Technical Courses	Non-Technical Courses
Semester 1	Introduction to Programming Digital Circuits Math I Prototyping Interactive Systems	Communication Skills

Semester 2	Data Structures and Algorithms Design Drawing and Visualization Probability and Statistics Computer Organization	SSH Elective

C.   Rest of the program consists mostly of elective courses and certain number from specified areas (e.g., SSH). 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. A student has to do certain number of electives from the discipline.

D.   Besides electives courses from domain areas (e.g. health, life sciences, finance, economics, E-Governance, sciences, etc.) may also be offered as open electives.

E.   List of courses, and further information about the courses is available on the website: https://www.iiitd.ac.in/academics/courses

F.   Other requirements as specified later.

3.   Requirements for Graduation

For a B.Tech. (CSD) degree, a student must satisfy all the following requirements:

1.   Earn a total of 156 (inclusive of 2 credits each of SG/CW credits) credits (equivalent to 39 full courses of 4 credits).

2.   Successfully complete all the core courses, and either Maths III or Maths IV or Discrete Mathematics or Theory of Computation.

3.   Complete at least 12 credits of Social Science and Humanities (SSH) Courses.

4.   Do 2 credits of Community Work and Self Growth each. These are pass/fail credits, which are required to be completed, and will count for fulfilling the credit requirement.

5.   A student may take Online Courses. No more than 8 of these credits can count towards satisfying the credit requirements of the degree.

6.   A student must do at least 32 credits of discipline electives from (CSE & DES), which should include at least 12 credits of CSE electives and 12 credits of Design electives. B.Tech. Project/Independent Project/Independent Study/Undergraduate Research will not

count towards this requirement. These 32 credits should come from 3xx or above level courses and should be different from the core courses. AAC may approve other relevant courses in other discipline to be counted as Computer Science/Design electives for this purpose. Online courses of the respective discipline (i.e. online courses with CSE/DES course code).

7. A student may take "Independent Project" or "Independent Study" or "Undergraduate Research" courses for 1, 2, or 4 credits in a semester. No more than 8 of these credits can count towards satisfying the credit requirements of the degree.

8. Rest of the credits are considered as "open electives" and the student can choose any courses for these (including discipline electives).

9. A student can take maximum 2, 2xx level courses in 3rd and 4th year. The 2xx level core courses listed in Semester 5 or later will not count towards this clause.

10. A B.Tech. Project (BTP) is optional and can be started any time after the 2nd Year. A student opting for BTP, may take a total of 8 to 12 credits of BTP spread over minimum 2 semesters, with no more than 8 credits in a semester. A student not completing BTP credits will have to forgo the partial BTP credits earned earlier and it will not be counted towards the credit requirement of 156 credits.

Note: A BTP has to spanned at least over 2 regular consecutive semesters (i.e., Monsoon and Winter) and can spanned at most 3 consecutive semesters. However, in the case of a gap due to semester leave, the student will be allowed to continue the BTP with the consent of the advisor.

A detailed document on the guidelines and processes to complete the BTP is available on [this link](#).

4. Honors Program

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

1. The student must earn an additional 12 discipline credits from in-class courses (i.e. must complete at least 168 credits).
2. The student's program must include a B.Tech. Project.
3. At graduation time, the student must have a CGPA of 8.0 or more.

Appendix: Tentative List of Elective Courses

Computer Science Electives (CSE Electives):

Student will do CS electives from a set of courses which will include courses relevant to this program including relating to images, vision, graphics, multimedia, etc. A tentative list of electives that may be available is:

1. Computer graphics
2. Virtual Reality
3. Data visualization
4. Digital Image processing/ Image Analysis
5. Spatial computing
6. Mobile computing
7. Information retrieval
8. Computer vision
9. Machine learning
10. GPU Computing
11. Multimedia technologies (including authoring tools)
12. Software engineering

Design and Media Electives (DES Electives):

Student will do Design electives from a set of courses which will include courses relevant to this program. In most of these courses, students will also use a platform widely used for that, and build their project on it. They may also develop some add-ons for the platform. A tentative list of courses that may be offered are:

1. Aesthetics and art
2. Usability studies and evaluation
3. Visualization
4. Game design and development
5. Animation & Graphics
6. Special effects
7. Photography
8. Non Linear Editing
9. Digital audio design and synthesis
10. Wearable Applications, Research, Design, and Interactions (WARDI)
11. User Interface Software and Technology (UIST)

Change History

- **July 2017 release** – Version 1

- **July 2019 release – Version 2**

  (i)   Counting of SG, CW credits in total credits. Applicable from 2017 batch onwards.
  (ii) Total credits requirement for graduation and credit requirement for Honors students. Applicable from 2017 batch onwards.
  (iii) Courses for Honors students. Applicable from 2017 batch onwards.
  (iv) Technical Courses
  (v)   2xx level courses

- **August 2019 release – Version 3**

  (i) Program Structure Pnt 2(A).
  (ii) List of technical and non-technical courses in the first year, pnt 2(B). For students of 2018 and previous batches

Semester	Technical Courses	Non-Technical Courses
Semester 1	Introduction to Programming Digital Circuits Math I System Management	Communication Skills
Semester 2	Data Structures and Algorithms Design Drawing and Visualization Probability and Statistics Introduction to Engineering Design	SSH Elective

  (iii) 2 new courses added in Pnt 3.2. Applicable from 2019 Batch onwards.

- **January 2021 release – Version 4**

  (i)   BTP has been made optional from 2018 batch.
  (ii) Updated program structure from 2020 batch onwards (Pnt 2(A))
  (iii) Addition of ADA course in Semester 4.
  (iv) Clarification regarding 32 credits requirements – counting of 3xx level courses. Applicable from 2019 batch. (Pnt 3.6)
  (v)   Clarification regarding counting of 2xx level courses. (Pnt 3.9)

- **May 2024 Release (Version 5)**

(i) Point No. 8, CGPA bar has been removed for doing IP/IS/UR credits. (Ref: 53rd Senate Senate)

(ii) DM and DS courses will be considered as one course. (Ref: 56th Senate Decision).

(iii) 3.6 has been updated with (i) 3xx or higher should be different from the core courses which will be applicable from 2022 admitted batch and (ii) replaced the phrase "3xx or above in the last four-semester" with "3xx or above" which will be applicable from ongoing batch. (Ref: 61st Senate)

(iv) Clarification added for BTP in line with guidelines