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:

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	Introduction to Engineering	Design Processes	Fundamentals of Database	Technical communication +

Management	Design	& Perspectives	Management Systems	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 System Management	Communication Skills
Semester 2	Data Structures and Algorithms Design Drawing and Visualization Probability and Statistics Introduction to Engineering Design	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.

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. UGC 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), if done in last four semesters will count towards this requirement.

7. **A B.Tech. Project (BTP) is compulsory for this program.** A BTP, may be of a total of 8 to 12 credits spread over minimum 2 semesters, with no more than 8 credits in a semester.

8. 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. Only students with satisfactory CGPA (at least 7.5) or with a strong interest in some area (the faculty advisor to determine this) and CGPA of at least 7.0 can take these courses.

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

10. A student can take maximum 2, 2xx level courses in 3rd and 4th year.

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 (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**

  (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