



## **ACADEMIC REQUIREMENT FOR B TECH (HONOURS) IN ICT WITH MINOR IN COMPUTATIONAL SCIENCE PROGRAM**

*(Effective from Autumn 2021-22)*

The Rules governing the B Tech (Bachelor of Technology) program of DA-IICT, which is a four-year undergraduate program, are defined in a document referred to as “Academic Requirement for B Tech (ICT) Program.” This document contains specific rules governing the four-year undergraduate B Tech (Honours) in ICT with minor in Computational Science program. All other rules apply uniformly to all B Tech (ICT) programs as mentioned in a document referred to as ‘Academic Requirement for B Tech (ICT) Program,’ whereas B Tech (Honours) in ICT with minor in Computational Science program specific rules are defined in related sections in this document.

These Rules deal only with the post-admission academic activities of the program. Eligibility criteria for admission, admission procedures, etc., are outside the purview of this document. They are subject to amendments from time to time as per the needs and requirements. Dean (Academic Programs)/Registrar may, from time to time, issue such instructions or directions as may be necessary to give effect to and carry out the provisions of these rules. Director, as chairman of the Academic Council, may relax/exempt provision(s) of the rules in exceptional situations and all such cases shall be reported to the Academic Council in its immediate meeting. Important terms/expressions used in the document have been defined in the GLOSSARY at the end of this document.

(Regulations 1 and 2 are as applicable to B Tech (ICT) program)

### **3. COURSE LOAD**

#### **3.1 Regular Semesters:**

##### **3.1.1 B Tech (Honours) in ICT with minor in Computational Science program**

A student is permitted to register for additional courses over the prescribed courses in the curriculum for a regular semester provided the total number of courses does not exceed 7 (excluding Co-Curricular Activities) and the total credits does not exceed 30. However, rural internship is not considered for the purpose of this limit. A student is permitted to under-load her/his prescribed academic load in a regular semester by dropping one or more courses provided the number of courses is at least 4 and the registered credits are not less than 12. However, after completion of her/his seventh regular semester, a student will be permitted to register for less than four courses.

(Regulations 3.2 to 8 are as applicable to B Tech (ICT) program)

## **9.AWARD OF DEGREE**

### **9.1 B Tech (Honours) in ICT with minor in Computational Science**

The Degree will be conferred on a student after she/he has fulfilled the following requirements:

- (a) The student should have taken for credit and passed all the foundation and elective courses including internships and BTP/ITP prescribed in the curriculum for the program.
- (b) The minimum total number of course credits is 147, of which 90 correspond to foundational courses, 18 from Honours/Minor in Computational Science designated courses; the remaining 39 credits must be obtained through elective courses in the form of
  - (i) ICT electives (minimum three courses, at least one with Computational Science feature),
  - (ii) Technical electives (minimum four courses, at least one with Computational Science feature),
  - (iii) Science electives (minimum two courses, at least one with Computational Science feature)
  - (iv) Humanities and Social Science electives (minimum one), and
  - (v) Open electives (minimum two courses).
- (vi) The minimum credits to be earned for Internships and BTP/ITP are 19.
- (c) The minimum number of grade points required from course work for graduation is 735 (147 x 5.0). For this requirement, internships and BTP/ITP credits 19 are not considered. In case the student has earned the minimum number of credits, but does not have the minimum number of grade points, then she/he must take additional elective courses (up to the maximum specified for each category) in order to fulfill the requirement.
- (d) The student must have obtained a minimum Final CPI of 6.5 (see Section 9.2 below for rules governing calculation of CPI). A student who does not have a final CPI of 6.5 but has completed the requirements for the B Tech (ICT) Degree will be awarded the B Tech (ICT) Degree.
- (e) The student should have registered for at least eight regular semesters (i.e. excluding summer semester) as a regular student and should have paid all the institute dues.
- (f) The student should have no case of indiscipline pending against her/him.

### **9.2 Final CPI and Class:**

- (a) For the purposes of computing the CPI at the end of the program, the student's CPI will be computed on the basis of the best CPI obtainable from the courses taken subject to the program-specific requirements as indicated in Section 9.1.

- (b) All other courses taken by the student will be categorized as extra credits and not considered for calculating the final CPI.
- (c) The CPI would be computed inclusive of the grade points earned from course work, as described in 9.2 (a) and from the BTP. ITP has not impact on CPI since it is a Pass/Fail course.
- (d) The requirement of earned course credits and grade points is subject to change, with the approval of the Director, in case credit structure of a program or course is modified.
- (e) The Transcript will indicate 'Distinction' if the student obtains a CPI of 9.0 or above and 'First Class' if the student obtains a CPI of 6.5 or above but less than 9.0.

### **9.3 Certificate of Academic Accomplishment:**

A student who is unable to complete the Degree requirements within the stipulated maximum period (refer Clause 8.5 of 'Academic Requirement for B Tech (ICT) Program' document) would be eligible to receive a 'Certificate of Academic Accomplishment' by applying for it. The eligibility criteria and procedure for issue of the Certificate would be as laid down by the Institute from time to time.

## **10. Transfer between B Tech (ICT) and B Tech (Honours) in ICT with minor in Computational Science**

### **10.1 Continuation in B Tech (Honours) in ICT with minor in Computational Science programs:**

A student admitted to the B Tech (Honours) Program must obtain a minimum CPI of 6.5 after completion of Semester III to continue in the program failing which she/he will be moved to the B Tech (ICT) Program subject to her/his meeting the academic requirements stipulated therein.

### **10.2 Transfer from B Tech (ICT) to B Tech (Honours) in ICT with minor in Computational Science:**

A student admitted to the B Tech (ICT) Program who has obtained a CPI of 7.5 and above may apply to the Dean (Academic Programs) at the end of the third Semester for transfer to the B Tech. (Honours) Program. The transfer will be granted subject to availability of seats and in descending order from the highest CPI obtained.

## **11.GLOSSARY**

**Backlog Course:** A course prescribed in the curriculum which has either not been registered or failed by a student.

**Course Credit:** Weighted sum of number of Lecture hours (L), Tutorial hours (T) and Practical hours (P) associated with the course. The weight for L and T is 1.0, and the weight for P is 0.5.

**Grade Points:** Product of the credits and points of a letter grade awarded to the course.

**Semester:** An academic year consists of two regular semesters of approximately 16 weeks duration each, the first (Autumn Semester) extending from July to December and the second (Winter Semester) from January to May. The summer semester is not a regular but a special semester of approximately eight weeks usually between May and July.

**Semester Grade Report:** Official record of the grades obtained in all the courses registered by a student in a semester.

**Transcript:** Official record of the grades obtained in all the courses registered by a student and is issued after the completion of the degree requirements.

**Under-Graduate Committee (UG Committee):** Committee of the Institute responsible for Policy Guidelines & Implementation Strategies covering the Undergraduate Program.

**DA-IICT, Gandhinagar  
October 2022**



## B Tech (Honours) in ICT with minor in Computational Science Curriculum (Effective from B Tech 2021-22 batch)

**1. Introduction:** The Academic Council has approved the B Tech Curriculum Review Committee Final Report, and directed that the revised curriculum contained therein should be followed with effect from the 2021 batch and onwards. The document contains the official description of the course structure for the B Tech 2021 batch onwards.

**2. Course Structure for B Tech (Honours) in ICT with minor CS Program with effect from 2021 Batch is indicated in Table 1:**

Table 1

Semester-1	L-T-P-C	Semester-2	L-T-P-C
Introduction to ICT	1-0-2-2	Approaches to Indian Society	3-0-0-3
Language and Literature	3-0-0-3	Discrete Mathematics	3-1-0-4
Calculus	3-1-0-4	Digital Logic and Computer Organization	3-0-2-4
Introduction to Programming	3-0-0-3	Data Structures	3-0-0-3
Programming Lab	0-0-2-1	Data Structures Lab using OOP	1-0-2-2
Basic Electronic Circuits	3-0-2-4	Electromagnetic Theory	3-1-0-4
		Exploration Project	0-1-0-1
Co-Curricular Activities 1	0-0-2-1	Co-Curricular Activities 2	0-0-2-1
<b>TOTAL</b>	18	<b>TOTAL</b>	22

Semester-3	L-T-P-C	Semester-4	L-T-P-C
Science, Technology, Society	3-0-0-3	Principles of Economics	3-0-0-3
Linear Algebra	3-1-0-4	Probability and Statistics	3-1-0-4
Design and Analysis of Algorithms	3-1-0-4	Database Management System	3-0-2-4
Computer Systems Programming	3-0-2-4	Embedded Hardware Design	3-0-2-4
Signal and Systems	3-0-2-4	Introduction to Communication Systems	3-0-2-4
Exploration Project	0-0-2-1	<b>Introduction to Computational Physics</b>	<b>3-0-3-4.5</b>
Co-Curricular Activities 3	0-0-2-1	Co-Curricular Activities 4	0-0-2-1
<b>TOTAL</b>	21	<b>TOTAL</b>	24.5

Semester-5	L-T-P-C	Semester-6	L-T-P-C
Software Engineering	3-0-2-4	Environmental Science	3-0-0-3
Digital Communications	3-0-2-4	SE-1	3-0-0-3
Computer Networks	3-0-2-4	ICTE-2	3-0-2-4
ICTE-1	3-0-2-4	TE-2	3-0-0-3
TE-1	3-0-0-3	TE-3	3-0-0-3
<b>Numerical and Computational Methods</b>	<b>3-0-3-4.5</b>	<b>Modelling &amp; Simulation</b>	<b>3-0-3-4.5</b>
		<b>High Performance Computing</b>	<b>3-0-3-4.5</b>
Overload Slot		Overload Slot	
<b>TOTAL</b>	<b>23.5</b>	<b>TOTAL</b>	<b>25</b>

Semester-7	L-T-P-C	Semester-8	L-T-P-C
BTP-1	0-1-4-3	BTP-2/ BTP-1 & BTP-2/ ITP	0-2-14-9/ 0-3-18-12/ 0-0-24-12
ICTE-3	3-0-2-4	OE-1	3-0-0-3
TE-4	3-0-0-3	OE-2	3-0-0-3
HASSE-1	3-0-0-3		
SE-2	3-0-0-3		
Overload Slot		Overload Slot	
<b>TOTAL</b>	<b>16</b>	<b>TOTAL</b>	<b>6+9/12/12</b>

### Course category and Credits

Type	Credits	Type	Credits
Core	90	<b>Course Total</b>	<b>147</b>
CS Core	18	<b>Internships</b>	<b>7</b>
TE	12	<b>BTP/ITP</b>	<b>12</b>
ICTE	12	<b>CoCurr</b>	<b>4</b>
HASSE	3	<b>Exp. Project</b>	<b>2</b>
SE	6	<b>TOTAL</b>	<b>166+6</b>
OE	6		
Rural Intern	3		
Res. Intern	4		
BTP/ITP	12		
Exp Proj	2		
CoCurr	4		

The list of the mandatory four **Core Courses (worth 18 credits)** are given below:

1. Introductory Computational Physics (core, 4.5 credits, Semester -IV)
2. Numerical and Computational Methods (core, 4.5 credits, Semester -V)
3. High Performance Computing (core, 4.5 credits, Semester -VI)
4. Modelling and Simulation (core, 4.5 credits, Semester -VI)

**3. Table 2 shows the minimum and maximum number of courses permitted in each category.**

**Table 2: Allowed number of courses in Electives**

Type	Min	Max	Credits	Remarks
<b>ICT Electives</b>	3	-	12	Additional courses taken in this category will be treated as Technical electives
<b>Technical Electives</b>	4	6	12-20	Courses offered as ICT Electives can be taken in place of the courses in this category. However, a course in this category does not qualify to ICT elective.
<b>Science Electives</b>	2	4	6-12	Physics, Mathematics, Life Sciences, and Engineering Sciences.
<b>Humanities and Social Science (HASS) Electives</b>	1	3	3-9	Humanities, Social Sciences, Management and Engineering Arts including Design.
<b>Open Electives</b>	2	-	6	Eligible courses in Open Elective category will be worked out by UGC/Dean (AP).

**4. Additional Elements of the Curriculum: The provisions governing electives are indicated below.**

**4.1 ICT Electives:** The ICT electives are technical courses in the areas of ICT with components of Electronics, Signal Processing, Communication, Information Technology, Computer Science and multi-disciplinary domains as well. The ICT electives category would be technical courses which have breadth/components in two or more of these three emerging fields Computer Systems, Communication Technology, and Electronics Engineering. These electives may also be in the nature of mathematical foundation courses that may be required by the ICT electives. Every student is required to take a minimum of 3 courses (12 credits) from the set of ICT electives. If a student passes more than 3 courses from the ICT electives category, then she/he can consider the additional course(s) as Technical electives. Appendix 2 lists the representative courses of ICT electives.

**4.2 Technical Electives:** The Technical electives fall in one of the groups of Electronics, Signal Processing and Communication, Information Technology and Computer Science, and Interdisciplinary. Every student is required to take a minimum of 4 Technical elective courses (12 credits) and up to a maximum of 6 courses (20 credits). Any ICT elective course can be taken in

place of a Technical elective. In other words, a student taking more than 3 ICT elective subjects may treat the additional ICT elective(s) as Technical elective(s), but the reverse is not applicable.

**4.3 Science Electives:** Science Electives are courses offered in the areas of Physics, Mathematics, Life Sciences, and Engineering Sciences. Every student must take a minimum of 2 courses (6 credits) and is permitted to take up to a maximum of 4 courses (12 credits) from this category.

**4.4 Humanities and Social Science (HASS) Electives:** HASS electives are elective courses offered in the areas of Humanities, Social Sciences, Management and Engineering Arts including Design, which are not covered in the Technical electives. Every student must take one course (3 credits) and is permitted to take up to a maximum of 3 courses (9 credits) from this category.

**4.5 Open Electives:** There are two open elective slots (6 credits) available to students. Electives from any of the mentioned category qualify as an open elective.

**4.6 Introduction of New Electives:** The curriculum structure provides flexibility to the faculty to update the course contents, particularly for the elective courses, to keep pace with the latest technologies used in industry. Faculty members are encouraged to propose new electives in the ICT, Technical, Science, and HASS categories. The proposer of a new elective course is required to submit her/his course plan to Dean (Academic Programs). Then, the Undergraduate Committee conducts the review process of the course proposal with the help of internal and external faculty/experts. A new course proposal is reviewed by at least two reviewers and after the review process, the review comments are forwarded to the course proposer for incorporation in the course proposal. Once the proposer incorporates the review comments in the new course, the course proposal is approved by the Dean (Academic Programs) and added into the program.

**4.7 Internships:** All students must undertake and pass Rural Internship of 3 credits (normally offered in the Semester Break between Semesters III and IV) and Research Internship of 4 credits (normally offered in Summer Semester after Semester VI).

**4.8 B Tech/Industrial Training Project:** The students must undertake and pass B Tech or Industrial Training Project (12 credits). The B Tech project can be taken on two parts; Part 1 (3 credits) and Part 2 (9 credits); either Part 1 may be taken in Semester VII and Part 2 in Semester VIII or both parts may be taken in Semester VIII.

**4.9 Industrial Training Project (ITP):** A student has option to do an Industrial Training Project (ITP) in the 8th semester in the off-campus mode. ITP is to be done at an approved industry site with a designated industry mentor and a well specified project. This option is suitable for those students who want to gain an early industry experience to better prepare them as an industry professional. This option may also be suitable for students who wish to gain this experience before heading out for higher studies. ITP is proposed to be graded on Pass/Fail basis. Industry mentor will assess the performance of the student and submit the grade to the ITP coordinator.

**Graduation Requirement — B Tech (Honours) in ICT with minor in CS**

1. Total credits – 172 (included 4 Co-Curricular and 2 Exploratory Project credits)
2. Course credits – 147
3. Internships and BTP/ITP credits – 19
4. Minimum Final CPI – 6.5

**NB: The course outlines will be notified separately.**