

**DHIRUBHAI AMBANI  
INSTITUTE OF INFORMATION AND COMMUNICATION TECHNOLOGY  
GANDHINAGAR**

**Academic requirement for B. Tech. (honours) in ICT  
with minor in computational science program**

**(To be effective from autumn 2014-2015 for 2014 batch and onwards)**

The Rules governing the B Tech (Bachelor of Technology) program of DA-ICT, 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.

### **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 and the total credits do not exceed **28.5**. However, rural internship is not considered for the purpose of this limit. A student is permitted to under-load his/her 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 his/her seventh regular semester, a student will be permitted to register for less than four courses.

### **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 he/she has fulfilled the following requirements:

- (a) The student should pass all the foundation and elective courses prescribed in the curriculum for the program to earn credit. They have to take a minimum of 161 course credits of which 120 correspond to foundation courses, the remaining credits must be

obtained through elective courses. Eighteen credits in the foundation courses should come from Computational Science core courses. The elective courses may be group electives, technical electives, science electives or open electives subject to the minimum number and maximum number of electives of each type as specified in the approved curriculum. Furthermore, the electives should be chosen in such a way that at least 2 science electives, 2 group electives and 3 technical electives are from the pool of computational science electives. The minimum number of grade points required from course work for graduation is 805 (161 x 5.0). For this requirement, Pass/Fail courses, internships and B Tech Project 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 he/she must take additional elective courses (up to the maximum specified for each category) in order to fulfil the requirement.

- (b) The student must have obtained a 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.
- (c) The student should have passed all the foundation Pass/Fail courses prescribed in the curriculum, including all prescribed internships.
- (d) The student should have obtained a passing grade for the B Tech Project, as prescribed in the curriculum.
- (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 him/her.

### **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 9.3 (a) and from the B Tech Project.
- (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 and B Tech (Honours) programs

### 10.1 Continuation in B Tech (Honours) 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 program to B Tech (Honours) program:

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*

*May 6, 2013*

*Revised on: August 17, 2015*

## Course structure of B.Tech (Hons.) in ICT with minor in Computational Science (2014 batch onwards)

The semester wise breakup for computational Science program is shown below: (*Bold represents ICT core courses, bold + underline represents CSc core courses, shaded represents electives for CSc*)

Semester I: **Total Credit 19**

<b>Basic Electronic Circuits</b>	<b>3-0-3-4.5</b>
<b>Approaches to Indian Society</b>	<b>3-0-0-3</b>
<b>Intro to Programming</b>	<b>3-0-3-4.5</b>
<b>Communication Skills*</b>	<b>2-0-0-2</b>
<b>ICT for freshers (P/F)*</b>	<b>1-0-0-1</b>
<b>Calculus</b>	<b>3-1-0-4</b>

Semester II: **Total Credits 20.5**

<b>Introduction to Communication Systems</b>	<b>3-0-3-4.5</b>
<b>Digital Logic Design</b>	<b>3-0-3-4.5</b>
<b>Object Oriented Programming</b>	<b>3-0-3-4.5</b>
<b>Principles of Economics</b>	<b>3-0-0-3</b>
<b>Discrete Maths</b>	<b>3-1-0-4</b>

Semester III : **Total credits: 24**

<b>Signals and Systems</b>	<b>3-1-0-4</b>
<b>Data Structures</b>	<b>3-0-3-4.5</b>
<b>Computer organization</b>	<b>3-0-3-4.5</b>
<b>Science, Technology Society</b>	<b>3-0-0-3</b>
<b>Algebraic Structures</b>	<b>3-1-0-4</b>
<b>EMT</b>	<b>3-1-0-4</b>

Semester IV: **Total credits 28**

<b>Analog and Digital Communication</b>	<b>3-0-3-4.5</b>
<b>Analog Circuits</b>	<b>3-0-3-4.5</b>
<b>Introduction to Business and Finance</b>	<b>3-0-0-3</b>
<b>Systems Software</b>	<b>3-0-3-4.5</b>
<b>Environmental Studies</b>	<b>3-0-0-3</b>
<b>Probability And Statistics</b>	<b>3-1-0-4</b>
<b><u>Introductory Computational Physics</u></b>	<b>3-0-3-4.5</b>

Semester V: **Total Credits: 26.5**

<b>Computer Networks</b>	<b>3-0-3-4.5</b>
<b>Embedded Hardware Design</b>	<b>3-0-3-4.5</b>
<b>Database System Management</b>	<b>3-0-3-4.5</b>
<b><u>Numerical and Computational Methods</u></b>	<b>3-0-3-4.5</b>
<b><u>High Performance Computing (HPC)</u></b>	<b>3-0-3-4.5</b>
Introduction to Algorithms (Group Elective CSc)	<b>3-0-2-4</b>

Semester VI: **Total Credit: 21.5-23.5**

<b>Software Engineering</b>	<b>3-0-3-4.5</b>
<b><u>Modelling and Simulation</u></b>	<b>3-0-3-4.5</b>
Parallel Programming (Group Elective CSc)	<b>3-0-2-4</b>
Science Elective -1 (CSc)	<b>3-0-0/2-3/4</b>
Technical Elective -1(CSc)	<b>3-0-0/2-3/4</b>
Open Elective-1	<b>3-0-0-3</b>

Semester VII: **Total credits: 19-24**

Data Analysis and Visualization (Group Elective CSc)	<b>3-0-2-4</b>
Technical Elective -2 (CSc)	<b>3-0-0/2-3/4</b>
Technical Elective -3 (CSc)	<b>3-0-0/2-3/4</b>
Technical Elective -4	<b>3-0-0/2-3/4</b>
Science Elective -2 (CSc)	<b>3-0-0/2-3/4</b>
Technical Elective -5/ BTP-I	<b>3-0-0/2-3/4</b> <b>0-0-6-3</b>

Semester VIII: **Total Credits: 24-26**

BTP I / Technical Elective-5	0-0-6-3 3-0-0/2-3/4
BTP II	0-0-24-12

## **Course structure :**

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 -V)
4. Modelling and Simulation (core, 4.5 credits, Semester -VI)

### **Group Electives:**

1. Introduction to Algorithms (Sem-V, 4 credits)
2. Parallel Programming (Sem-VI, 4 credits)
3. Data Analysis and Visualization (Sem VII, 4 credits)

## **Proposed List of Science and Technical Electives**

### **Science Electives:**

1. Nonlinear Science
2. Optimization
3. Computational Electromagnetics
4. Synthetic Biology
5. Computational Drug Discovery

### **Technical Electives:**

1. Computational Finance
2. Introduction to Complex Networks
3. Computational and Systems Biology
4. Introduction to Bioinformatics and Computational Biology
5. Stochastic Processes and Simulation
6. Computational Coding Theory
7. Natural Computing
8. Computational Advertisement
9. Advanced Numerical Methods

*Some of the above electives (Science and Technical) will be explicitly offered to only B. TECH. (HONOURS IN ICT WITH MINOR IN COMPUTATIONAL SCIENCE) students.*