CHOICE BASED CREDIT SYSTEM REGULATIONS FOR UNDERGRADUATE (UG) DEGREE PROGRAMS IN UNIVERSITY DEPARTMENTS, RAJASTHAN TECHNICAL UNIVERSITY, KOTA

ABBREVIATION

B. Tech.	-	Bachelor of Technology
BOM	-	Board of Management
BOS	-	Board of Studies
CBCSUG	-	Choice Based Credit System UG Regulation
CGPA	-	Cumulative Grade Point Average
CWS	-	Class Work Sessionals
DC	-	Departmental Core
DE	-	Departmental Elective
DECA	-	Discipline & Extra-Curricular Activities
ETE	-	End Term Examination
HOD	-	Head of the Department
IC	-	Institute Core Courses
MCM	-	Merit Cum Means
MTE	-	Mid Term Examination
NG	-	Non Graded Core
OC	-	Open Category Elective
PRE	-	Practical Examination
PS	-	Practical Sessionals
RTU	-	Rajasthan Technical University
SDC	-	Student Disciplinary Committee

SGPA	-	Semester Grade Point Average
TPC	-	Training and Placement Cell
UD	-	University Departments
UDAC	-	University Department Academic Council
UDBOS	-	University Department Board of Studies
UGDAC	-	Under Graduate Department Academic Committee

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1. INTRODUCTION

Preamble

The University Departments (UD) offers eleven B. Tech. programs of four years duration, twelve M. Tech. programs of two years durations, one MBA programs of two years duration and PhD programs in Engineering disciplines.

The Academic Departments offer courses to the students of various disciplines. Academic curricula are so devised that a student of one discipline can take some courses of other disciplines, offering choice based credit system. Such flexibility helps a student to develop his core competence together with the interdisciplinary skills in the area of his/ her interest.

The main aim of education at UD, RTU is to enable students to face the wide-ranging changes taking place in the fields of technology, environment and management with confidence. This includes undertaking design, development, construction, production, and managerial and entrepreneurial activities, and higher studies in their chosen or allied interdisciplinary fields of study.

The UD, RTU lays great emphasis on assisting students in the development of character and self-confidence with management traits. To achieve these goals the curriculum lays more stress on learning and less on teaching. Efforts are made to encourage self-learning, creative thinking, critical evaluation, spirit of inquiry and imbibing the culture of lifelong learning.

1.1 Short Title & Commencement

- These regulations shall be called the Choice Based Credit System UG Regulations 2020 (CBCSUG-2020) of B. Tech. Degree course for the UD of RTU.

- These regulations shall come into force with effect from the date of adoption by the UDAC.

1.2 Undergraduate Programs

1. The UD may offer such undergraduate programs leading to Bachelor of Technology i.e. B. Tech. degree (s) as may be approved by the UDAC and the BOM.

2. The list of currently offered UG programs is given in Table-1.1. The structure of the program may be amended/ modified in accordance with the decision of the UDAC/ BOM.

Table-1.1

S.No.	Academic Program	Code	Duration (Years)	Department
1.	B. Tech. (Civil Engineering)	CE	4	Civil Engineering
2.	B. Tech. (Petroleum Engg)	PE	4	Petroleum & Petrochemical Engineering
3.	B. Tech. (Petro Chemical Engg)	PC	4	
4.	B. Tech. (Computer Science and Engineering)	CS	4	Computer Science and Engineering
5.	B. Tech. (Information Technology)	IT	4	
6	B. Tech. (Electrical Engineering)	EE	4	Electrical Engineering
7.	B. Tech. (Electronics & Communication Engineering)	EC	4	Electronics and Communication Engineering
8.	B. Tech. (Electronics Instrumentation & Control)	EI	4	Electronics and Communication Engineering
9.	B. Tech. (Mechanical Engineering)	ME	4	Mechanical Engineering
10.	B. Tech. (Production &Industrial Engineering)	PI	4	
11.	B. Tech. (Aeronautical Engg.)	AE	4	Aeronautical Engineering

1.3 Governance of Academic Autonomy

1. University Teaching Departments will have the following committees to ensure academic autonomy.
   a. UD Academic Council (UDAC)
   b. UD Board of Studies (UDBOS)
2. The composition and functions of UDAC and UDBOS shall be as specified in following paragraphs.

COMPOSITION OF THE UNIVERSITY TECHING DEPARTMENT ACADEMIC COUNCIL

Composition:

I. Dean UD (Ex-Officio Chairman of Academic Council).

II. All the Heads of Department of University Teaching Departments

III. Four teachers of the UD, RTU representing different categories of teaching staff by rotation, nominated by HVC on the recommendation of Dean UD.

IV. Not less than four experts from outside UD, RTU, representing such areas as Industry, Management, Engineering etc. to be nominated by the Vice-Chancellor.

V. Student as a member nominated by Dean, UD, RTU in consultation with Chief Proctor.

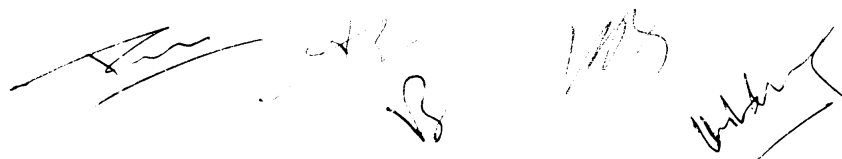VI. Chairman, Academic Cell (Member Secretary).

Terms of Members:

The term of the nominated members shall be two years.

Meetings:

The Chairman shall convene a meeting of the Academic Council at least once in a semester.
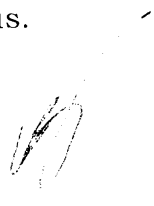
Functions:

Without prejudice to the general functions mentioned, the Academic Council will have powers to:

- Scrutinize and approve the proposal with or without modification of the Boards of Studies with regard to courses of study, academic regulations, curricula, syllabi and modification thereof, industrial and evaluation arrangements, methods, procedures relevant thereto etc. paper setting and evaluation, provided that where the Academic Council differs on any proposal, it will have the right to return the matter for reconsideration to the Board of Studies concerned or reject, it after giving reasons for doing so.

  - Make regulations regarding the admission of students to different program of study in the UD.

  - Make regulations for sports, extra-curricular activities, and proper maintenance and functioning of the playgrounds and hostels.

  - Recommend the proposals for new program of study in UD to BOM.

  - Recommend scholarship, studentships, fellowship, prizes and medals to the BOM and to frame regulations for the award of the same.

  - Advise/ suggest Academic reforms required in UD from time to time to the BOM.

  - Perform other such functions as may be assigned by the BOM.

COMPOSITION OF THE BOARD OF STUDIES AND ITS FUNCTIONS IN UNIVERSITY TEACHING DEPARTMENT

Composition:

I. Head of the Department concerned (Chairman).

II. The faculty members representing different specialization (maximum four members).

III. Two experts in the subject from outside UD.

IV. Two representatives from industry/ allied area relating to placement.

V. One postgraduate meritorious alumnus.

VI. The Chairman, Board of Studies, with the approval of the Dean UD may co-opt the following:

    a. Experts from outside the college whenever special courses of studies are to be formulated.

    b. Other members of staff of the same faculty.

(ii to v shall be nominated by the Dean UD from the panel recommended by Chairman and shall be put up before the UDAC for approval)

Term

The terms of the nominated members shall be of two years.

Meetings

The BOS Convener shall draw the schedule for meeting of the Board of Studies. The meeting may be scheduled as and when necessary, but at least once in a semester.

Functions:

The Board of Studies of departments in the UD shall:

- Prepare <u>scheme</u> <u>and</u> syllabi (with Course Outcome) for various courses keeping in view the objectives, vision and mission of the UD, interest of the stakeholders and national requirement for consideration and approval of the Academic Council:

- Suggest methodologies for innovative teaching and evaluation techniques.

- Coordinate research, teaching, extension and other academic activities in the departments/ UD.

- Suggest equivalence of different schemes running in the department in case of re-admission and any other situation.

In case of differences of opinion between the nominee of University and the Academic Council, the matter shall be referred to the Vice- Chancellor of RTU.

3. Other committees required for governance of autonomy will also be constituted by Dean UD in consultation with HoDs, if not defined elsewhere in this document.

1.4 Authorities in Autonomy

1. For smooth functioning of autonomy, Dean UD shall be the Administrative Head of the UD and will be assisted by the following cells:
    a. Admission and Student Activity Cell: headed by Chief Proctor
    b. Examination Cell: headed by Chairman Exams.
    c. Academic Cell: headed by Chairman, Academic Cell (UD)
    d. Training and Placement Cell: headed by Chairman, Training and Placement Cell (TPC)
    e. Hostel Coordination Cell: headed by Chief Warden
    f. Sports cell: headed by Chairman Sports
    g. Library cell: headed by Chairman library
2. Admission & Student Activity cell will be responsible for admission, enrollment, scholarship, identity cards, concession, discipline and all other student related activities.
3. Examination Cell will be responsible for coordinating all examination related activities and keeping all the related records.
4. Academic Cell will keep records of syllabus; conduct meeting of UDAC, UDBOS, UGDAC and all related activities.
5. TPC will look-after the training, soft skill development, placements, corporate and alumni relations, start up, entrepreneurship, and related activities.
6. Hostel Coordination cell will be responsible for hostel related activities including allotment, discipline, messing, campus canteen etc.
7. Sports Cell will be responsible for all activities related to games and sports.
8. Library Cell will be responsible for all activities related to library.

1.5 Starting a New Program

1. The BOM may approve the starting of a new program or a modified program in lieu of the old phased-out program on the recommendation of the UDBOS and UDAC.

2. A new program may be considered and recommended by the UDBOS and UDAC to the BOM for its consideration and approval.

1.6 Phasing out of a Program

The phasing out of any UG program may be considered by the BOM on the recommendation of the UDBOS and UDAC

1.7 Semester System

1. The academic programs in the University teaching department shall be based on semester system i.e. Odd and Even semesters in a year with semester breaks / summer semester in between.

2. A number of courses shall be offered as per scheme in each semester. Each course shall have a certain number of credits assigned to it, depending upon the academic load of the course assessed on the basis of weekly contact hours of lecture, tutorial and laboratory classes, assignments or field study etc.

3. The courses offered in a semester shall be continually assessed and evaluated to judge the performance of a student.

1.8 Under Graduate Department Academic Committee (UGDAC)

UGDAC is convened by the Head of Department. One Professor other than HoD, Two Associate Professors and two Assistant Professor of the department will be the members of the UGDAC. The members will be nominated by the Dean UD. The term of the members will be 2 years.
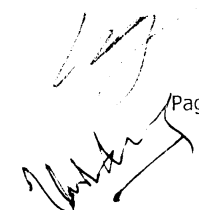
UGDAC will perform the following functions:

1. It will ensure the smooth, proper and timely execution of all academic activities as per the academic calendar issued by the Academic Cell of University Departments.
2. It will ensure the timely registration of all UG students.
3. It will ensure to send the list of MOOC courses, Open elective courses, Minor / interdisciplinary and departmental specialization elective courses to the Examination Cell and Academic Cell before 15 days of the start of registration of courses.
4. It will advise the students in selection of open elective courses so that student can opt for right Capacity Link Opportunities.

1.9 Remuneration

All remunerations related to academic activities would be as per the RTU norms, unless and otherwise specified.

2. COURSE STRUCTURE AND CREDIT SYSTEM

2.1 Course Numbering Scheme

Normally every course at University Departments, RTU, Kota runs for the full length of the semester. Only exception is for V-type courses which may run for part of the semester. A student registers in advance for courses that he/she wants to study and at the end of the semester a grade is awarded. On obtaining a pass grade, the student earns all the credits associated with the course while a fail grade does not get any credit. Partial credits are not awarded.

Each course is denoted by a unique code consisting of three alphabets followed by three numerals:

ELL100

Programme prefix for the academic unit offering the course. See Table 2.1 for all prefixes.

Unique identification number for each course

Nature of the course. Please see details in Table 2.

Level of the course as determined by pre-requisite courses or number of earned credits.
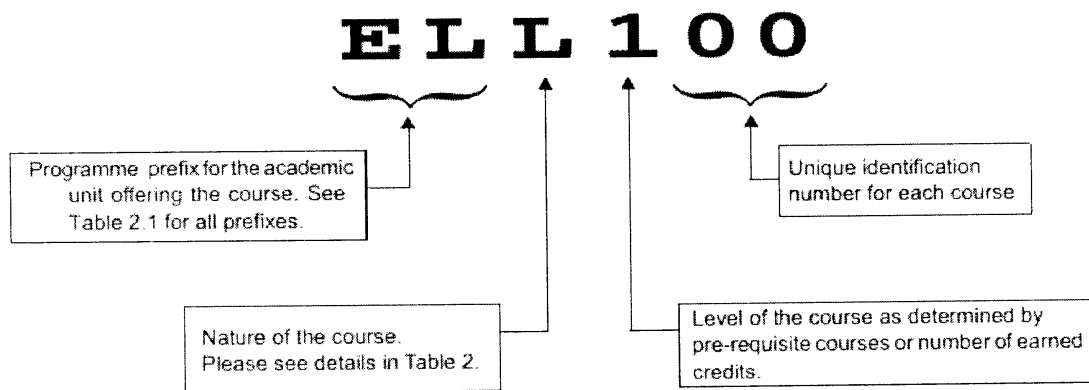
(a) **Programme prefix**

Table-2.1: *Programme* Prefix

Programme Prefix	Programme offered	Department
AE	Aeronautical Engineering	Department of Mechanical Engineering,
CE	Civil Engineering	Department of Civil Engineering
CS	Computer Science and Engineering	Department of Computer Science and Engineering
EE	Electrical Engineering,	Department of Electrical Engineering
EC	Electronics and Communication	Department of Electronics and Communication
EI	Electronics, Instrumentation and Control	Department of Electronics and Communication
IT	Information Technology	Department of Computer Science and Engineering
ME	Mechanical Engineering,	Department of Mechanical Engineering

PE	Petroleum Engineering	Petroleum Engineering
PC	Petro-Chemical Engineering	Petro-Chemical Engineering
RE	Renewal Energy	Centre for Renewal Energy
HU	Humanities and Social Sciences, Department of	Department of Humanities and Social Sciences
MG	Management Studies	Department of Mechanical Engineering
SC	Basic Science Courses	Department of Humanities and Social Sciences
TP	-	Training and Placement Cell
SA		Student Activity Cell (Proctor Section)

(b) Codes for the nature of the course

Table 2.2 : Codes for the nature of courses

Code	Description
D	Project based courses (e.g. Major, Minor, Mini Projects)
L	Lecture courses (other than lecture hours, these courses can have Tutorial and Practical hours, e.g. L-T-P structures 3-0-0, 3-1-2, 3-0-2, 2-0-0, etc.)
N	Non-graded core component
P	Practical / Practice based courses (where performance is evaluated primarily on the basis of practice, practical or laboratory work with LTP structures such as 0-0-3, 0-0-4, 1-0-3, 0-1-3, etc.)
R	Professional Practices
S	Independent Study
T	Practical Training
V	Lecture Courses on Special Topics (1 or 2 credits)

(c) Level of the course

The first digit of the numeric part of the course code indicates level of the course as determined by pre-requisite course(s) and/or by the maturity required for registering for the course. The latter requirement is enforced through a requirement of minimum number of earned credits. In general,

100 – 400 level   :   Core and elective courses for UG programmes.

courses

(d) Code of Non-Credit Courses

Table 2.3 : Codes *of Non-Credit Courses*

S. No.	Components	Course Code	Semester	Units
1.	Introduction to Engineering (Induction Programme)	SAN101	I	0.5
2.	Club Activities	TPN101	II	0.5
3.	Communication Skills (Language and Writing Skills)	HUN102	I or II	3
4.	Soft Skill Development	TPN102, TPN103	III and IV	2
5.	Human Values and Professional Ethics	HUN101	I or II	3
6.	Seminar (Presentation and Report Writing Skills)	XXN201, XXN202	V and VI	2
	Total			**11**

Education at the Institute is organized around the semester-based credit system of study. A student is allowed to attend classes in a course and earn credit for it, only if he/she has registered for that course. Prominent features of the credit system are a process of continuous evaluation of a student's performance/progress and flexibility to allow a student to progress at an optimum pace suited to his/her ability or convenience, subject to fulfilling minimum requirements for continuation and within the maximum allowable period for completion of a degree.

A student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grades obtained by the student, grade point average is calculated. A minimum grade point average is required to be maintained for satisfactory progress and continuation in the programme. Also, a minimum number of earned credits, minimum non-graded unit and a minimum grade point average should be acquired in order to qualify for the degree. All programmes are defined by the total credit requirement and a pattern of credit distribution over courses of different categories as defined in sections for UG programmes.

2.2 Assignment of Credits to Courses

Each course has a certain number of credit(s) or non-graded unit(s) assigned to it depending upon its lecture, tutorial and laboratory/practical contact hours in a week. This weightage is also indicative of the academic

expectation that includes in-class contact and self-study outside class hours.

Lectures and Tutorials : One lecture or tutorial hour per week is assigned one credit.

Practical/Practice :One laboratory / practice hour per week is assigned half credit.

A few courses are without credit and are counted under non-graded (NG) courses.

Example : Course *ELL100 Fundamentals of Electrical Engineering*, 4 credits (3-0-2)

The credits indicated for this course are computed as follows:

3 hours/week lectures   = 3 credits

0 hours/week tutorial   = 0 credit   Total = 3 + 0 + 1 = 4 credits

2 hours/week practicals   = 2 × 0.5 = 1   credit

Total contact hours for the course = (**3** h Lectures + **0** h Tutorial + **2** h Practical) per week

= **5** contact hours per week for 14 weeks.

2.3 Earning Credits

At the end of every semester, a letter grade is awarded in each course for which a student had registered. On obtaining a pass grade, the student accumulates the course credits as earned credits. An undergraduate student has the option of auditing some courses within the credit requirements for graduation. Grades obtained in audit courses are not counted for computation of grade point average. However, a pass grade is essential for earning credits from an audit course. Section 2.9 defines the letter grades awarded at UD, RTU, Kota and specifies the minimum grade for passing a course.

2.4 Pre-requisites

Each course, other than 100 level courses, may have specified pre-requisite(s) which may be other course(s), or a minimum number of earned credits, or both. A student who has not obtained a pass grade in the pre-requisite(s) specified or has not earned requisite number of credits will not be eligible to register for that course. For example:

MEL372 Power Plant Technology

2 credits (2-0-0)

Pre-requisites: MEL221 / MEL222 and MEL231 / MEL232 and EC50

A student who has obtained a pass grade in TXL221 or TXL222, and in TXL231 or TXL232 and has <u>also</u> earned 50 credits will be eligible to register for this course.

2.5 Overlapping/Equivalent Courses

Wherever applicable, overlapping and equivalent courses have been identified for each course. A student is not permitted to earn credits by registering for more than one course in a set of overlapping / equivalent courses. Departments / Centres / Schools may use these overlapping/equivalent courses for meeting degree / pre-requisite requirements in special circumstances. For example:

> **CEL113 Numerical Methods in Civil Engineering**
>
> 4 Credits (3-0-2)
>
> overlaps with: MTL107, MTP290, MTL445, CVL734, CoL726
>
> A student who has earned a pass grade in CEL113 will not be eligible to register for MTL107, MTP290, MTL445, CVL734 or CoL726. An overlapping course cannot serve as a substitute for a core course of his / her programme. In the above example, if MTL107 is a core course for a student, he / she is not allowed to register for CEL113 as a substitute for this core course.
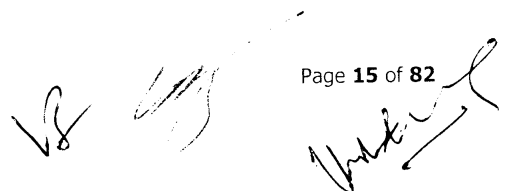
2.6 Course Coordinator

Every course is usually coordinated by a member of the teaching staff of a Department / Centre / School in a given semester. This faculty member is designated as the Course Coordinator. He / she has the full responsibility for conducting the course, coordinating the work of other members of the faculty and teaching assistants involved in that course, administering assignments, conducting the tests as well as awarding the grades. For any difficulty related to a course, the student is expected to approach the
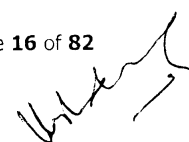
respective course coordinator for advice and clarification. The distribution of the weightage for tests, quizzes, assignments, laboratory work, workshop and drawing assignment, term paper, etc. that will be the basis for award of grade in a course will be decided by the course coordinator of that course, in consultation with other teachers involved, and announced at the beginning of the semester.

2.7 Enrolment Number

The entry number of a student consists of eleven alpha-numerals. It is provided by RTU, Kota.

2.8 Course Examination and Evaluation
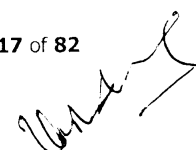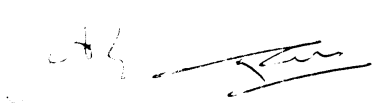
1. A student shall be evaluated for his/ her academic performance in a course through tutorials, practical, assignments, term papers, field work/ industrial training, seminars, group activities, quizzes, Class Work Sessionals (CWS) and Practical Sessionals (PS) Mid Term Examination (MTE), End Term Examination (ETE) and Practical Examination (PRE) as applicable according to the guidelines formulated by the UDAC.

2. Answer sheets of the test(s) and examination(s) cannot be written in Pencil. Also, Evaluation of Answer sheets(s) should not be in pencil.

3. The course coordinator is responsible for setting the question paper and maintaining its secrecy, conducting the examination of a course, evaluating answer sheets and awarding the grades. In case of exigency/ emergency, HOD will decide the examiner for the evaluation of answer books. Complete transparency shall be maintained in the evaluation system.

4. For setting the question paper /solution and evaluating answer sheets, the remuneration shall be as per prevailing RTU norms.

5. The Course Coordinator/ Instructor will ensure the coverage of all the contents of a course taught during the semester. The end semester examination question paper shall cover all the sections of the course. The Course Coordinator/ Instructor will prepare

the complete course file having following documents.

- Course Objectives and course outcomes
- Lecture wise breakup of syllabus covered during semester (course plan)
- Attendance record
- Tutorial sheets/ Assignment sheets (with model answer sheet)
- Question papers of Mid Term/ End Term Exams/ quizzes (with model answer sheet)
- Continuous assessment of Practical's / projects
- Complete details of marks with final grades

6. The graded scripts of quizzes, surprise tests/ periodical tests will be shown to the students within one week. The answer books of Mid-Term as well as End-term examinations will also be shown to the students after evaluation within seven days and discrepancies, if any, as may be pointed out by any student may be rectified by the course coordinator and thereafter the result may be finalized.

7. The End term examination will be conducted through Examination Cell of the University Departments.

8. The pattern of End Term examination would be as per approval of the UDAC/ UDBOS. Any discrepancy in question paper shall be reported to the chairman, UDBOS and the recommendation received shall be incorporated in evaluation.

9. **Academic calendar** will be finalized by Dean UD in consultation with HODs. The same will be notified in the beginning of the semester. The same shall be strictly followed.

10. The Industrial/ Field/ Practical training shall be evaluated through the quality of work carried out, the report submissions, contents and presentation(s) in the particular semester. The evaluation and award of grades for /Field/ Practical Training shall be done by the two faculty members from department to be nominated by HOD for every thirty (+/-5) students in addition to the Course Coordinator/s. For successfully completing the training student will

be awarded with grades and credits. The details are given in Sub-section 2.19 of Section 2.

11. The major B. Tech. Project shall be evaluated through quality of work carried out, project report, presentation and the viva-voce examinations. The evaluation and award of final grades for major project shall be done by the committee consisting of at least the followings:

- Project Coordinator(s)
- An External/ internal Examiner nominated by HOD
- Supervisor(s)

2.9 Grading System
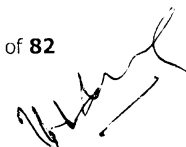
The academic performance of a student shall be graded on a ten point scale as per the guidelines given below. "A teacher is the best judge in awarding the grades". However, he/ she has to be impartial, logical, consistent and maintain complete transparency while awarding grades. At the end of the semester a student is awarded a letter grade in each of his/ her courses taking into account his/ her performance in the various examinations, quizzes, assignments, laboratory work etc., besides regularity of attendance in classes. The institute will follow absolute grading or statistical grading according to the number of the students registered in a particular course. The awards/ grades are submitted in the Dean UD office positively within the prescribed time limit as announced in the academic calendar after the End Term examination.

The result of a candidate will be worked out at the end of each Semester Examination. The absolute marks of a student (p_i) shall be converted into relative marks (x_i) on 100 point scale as below:

$$x_i = \frac{p_i}{p_{max}} q \ ,$$

where,

x_i = Converted relative marks of an individual student in a particular ith subject/course (rounded off to next higher integer number).

p_i = Absolute percentage (%) of marks obtained by an individual student in the ith subject/course.

p_{max} = It should be from range of highest absolute percentage of marks obtained in a subject, as per the following table:

Table: 2.4

Range of highest absolute percentage (%) marks obtained in a subject/ paper exam by the student	p_{max} (%)
90-100	90
80-89	80
70-79	70
60-69	60
50-59	50
40-49	40
30-39	30

q = Highest equivalent relative marks taken for conversion purpose (as given in column 2 of the following table).

Table: 2.5

Absolute highest marks obtained in a subject ($p_{absolute\,max}$)	Highest equivalent relative marks taken for conversation purpose (q) on 100 point scale
Column 1	Column 2
$p_{absolute\,max} \geq 75\%$	100
$60\% \leq p_{absolute\,max} < 75\%$	89
$30\% \leq p_{absolute\,max} < 60\%$	79
$p_{absolute\,max} < 30\%$	Not considered for conversion

The Grade and Grade Point shall be awarded to an individual student as under:

The grades and their equivalent numerical points (referred to as Grade Points) are listed in Table 2.6.

Table 2.6 : Grades and their description

S. No.	Relative Marks (x_i)	Grade	Grade Points
1	$x_i \geq 90$	A++	10
2	$85 \leq x_i < 90$	A+	9.0
3	$80 \leq x_i < 85$	A	8.5
4	$75 \leq x_i < 80$	B+	8.0
5	$70 \leq x_i < 75$	B	7.5
6	$65 \leq x_i < 70$	C+	7.0
7	$60 \leq x_i < 65$	C	6.5
8	$55 \leq x_i < 60$	D+	6.0
9	$50 \leq x_i < 55$	D	5.5
10	$45 \leq x_i < 50$	E+	5.0
11	$40 \leq x_i < 45$	E	4.0
12	$x_i < 40$	F	0

13	Incomplete	I	-
14	Audit pass	NP	-
15	Audit fail	NF	-
16	Withdrawal	W	-
17	Project Continuation	X	-
18	Satisfactory completion of Non grade course	S	-
19	Course continuation of Non grade course	Z	-

Description of grades

A grade

An 'A++' grade stands for outstanding achievement. The minimum marks for award of an 'A' grade is 80 %. However, individual course coordinators may set a higher marks requirement for awarding an 'A' grade.

D grade

The 'D' grade stands for average performance.

E grade

The 'E' grade stands for marginal performance; i.e. it is the minimum passing grade in any course .

'F' Grade

This refers to a 'Fail' grade. The 'F' grades denote poor performance, i.e. failing in course. 'F' grade is also awarded in case of poor attendance.

The course(s) in which a student has earned F grade will be termed as back-log course(s). A student with 'F' grade has to improve by repeating the course(s) during summer term or regular semester when the course is offered. Such student shall be evaluated again in all components. If a student obtains 'F' grade for the elective courses, he/she may have to take the same course or any other course from the same category.
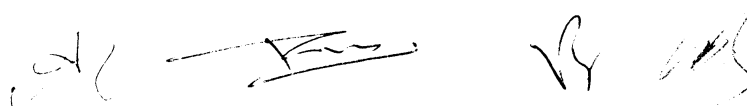
Further, 'F' grade secured in any course stay permanently on the grade card. The weightage of 'F' grades is not counted in the calculation of the CGPA and SGPA.

In case a student is awarded a failing grade in the major project, he/she shall have to repeat the course in the form of a new project. Such a student will have to work full time on the project for a minimum period of one month.

'I' grade

This refers to an 'Incomplete' Grade which is required to be converted into a regular letter grade. The guidelines for the award of 'I' grade are as follows.

a. If a student is absent during End Term Examination of a Course due to medical reasons or other special circumstances, he/she may apply for the award of 'I' grade to the Chairman, UDBOS through the Course Coordinator, provided that he/ she has not been disqualified due to shortage of attendance. The Concerned Course coordinator shall have to be convinced about the extraordinary circumstances and shall certify the attendance record before this rarely used option to award 'I' grade is recommended. The Chairman UDBOS may award 'I' grade.

b. The 'I" grade so awarded shall be notified by the Department to which the student belongs and a copy of the notification will be endorsed to the Dean UD and to the concerned Course Coordinator (e.g. the notification for 'I' grade of a Mechanical Engineering student will be notified by the Department of Mechanical Engineering on the recommendation of the concerned Course Coordinator, even if the course pertains to another Department).

c. The 'I' grade shall be converted into a proper letter grade after makeup examination is over and the requirements of the course are completed by the student and shall be sent to the Dean UD by the last date specified in the academic calendar. Any 'I' grade still outstanding two days after the last scheduled date, shall be automatically converted into 'F' grade.

d. In extra ordinary circumstances, the period of conversion of 'I' grade may be extended to the next semester, with the approval of the Dean UD on his own or on the recommendation of the Course Coordinator and the Head of the Departments.

e. An 'I' grade may be given for major project only on medical grounds. 'I' Grade awarded for incomplete Project work will be converted to a regular grade on the completion of the Project work and its evaluation. The student concerned shall have to present his/her work to the Evaluation Committee for the Project latest by 8 weeks or before the

beginning of the next semester. If the department feels that a student has to complete his/her project in another semester, the Chairman, UDBOS shall advise the student to get formally registered in the subsequent semester.

NP and NF grades

These grades are awarded in a course that the student opts to audit. Only elective courses can be audited. Auditing a course is allowed until a date stipulated in the semester schedule. The audit pass (NP) grade is awarded if the student's attendance is above 75% in the class and he / she has obtained at least 'D' grade. The course coordinator can specify a higher criterion, at the beginning of the semester, for audit pass. If the stipulated requirements are not fulfilled, the audit fail (NF) grade is awarded. The grades obtained in an audit course are not considered in the calculation of SGPA, CGPA or DGPA. However, for undergraduate students, the credits will be counted in total earned credits in the respective category, subject to the maximum allowable limit for audit.

W grade

A 'W' grade is awarded in a course from which the student has opted to withdraw. Withdrawal from a course is permitted until the date specified in the Semester Schedule.

X grade

The 'X' grade is awarded for incomplete work in Independent Study, Mini Project, Minor Project, or Major Project Part 1 and Part 2, based on the request of the student. On completion of the work, 'X' grade can be converted to a regular grade within the first week of the next semester. Otherwise, the student will be awarded 'X' grade on a permanent basis and it will appear in his / her grade card. Further, the student will be required to register for the course in the next semester. The credits of the course will be counted towards his / her total load for the semester. In case of Major Project Part 1, the student will not be permitted to register for Major Project Part 2 simultaneously as Major Project Part 1 is a pre-requisite for Major Project Part 2. A regular full-time student can be awarded 'X' grade only

once in a course, other than the summer semester. A part-time M.Tech. student is permitted a maximum of two X-grades in the major project part-2.

S, V, G and Z grades

The 'S' grade denotes satisfactory performance and completion of a non-grade course. The 'V' grade denotes excellent performance and completion of a non- grade course. The 'G' grade denotes good performance and completion of a non- grade course. The 'Z' grade is awarded for non-completion of the non- grade course requirements, and if it is a core course, the student will have to register for the course until he/she obtains the 'S' grade. The specific courses in which 'S', 'V', 'G' or 'Z' grades are awarded for undergraduate students are:

(i)   Introduction to Engineering (Induction Programme)

(ii)   Club Activities

(iii) Communication Skills (Language and Writing Skills)

(iv)   Personality Development

(v)   Human Values and Professional Ethics

(vi)   Seminar (Presentation and Report Writing Skills)

The Letter Grades awarded to a student in all the courses except for the non-graded courses shall be converted into a Semester and cumulative performance index called the semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA), to be calculated by the procedures given below.

Calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

Semester wise SGPA:

$$SGPA = \frac{\sum_{i=1}^{n} c_i \times g_i}{\sum_{i=1}^{n} c_i}$$

where,

c_i = Number of credits of the ith course of a semester for which SGPA is to be calculated.

g_i = Grade points obtained in i^{th} course

i =1,2,...,n represent the number of course in which a student is registered

in the concerned semester.

Overall CGPA:

$$CGPA = \frac{\sum_{i=1}^{m} c_i \times g_i}{\sum_{i=1}^{m} c_i}$$

where,

c_i = Number of credits of the ith course of a semester.

g_i = Grade points obtained in i^{th} course. The Grade, lower than 'E' (i.e. grade point < 4.0) in a course shall not be taken into account.

$i = 1, 2, \ldots, m$ represent the number of courses in which a student was registered and obtained a grade not lower than 'E' up to that semester for which CGPA is to be calculated.

(i) The SGPA/CGPA shall be awarded in each semester.

(ii) SGPA/CGPA shall be rounded off to two decimal digits on higher side.

(iii) Final course merit will be decided on the basis of absolute marks obtained by an individual student considering relevant merit ordinance of the university.

(iv) Conversion of Percentage to CGPA

Equivalent Percentage= 10 x CGPA

(v) Award of Division: The division of the student shall be awarded in the following manner (subject to the passing of all the semester courses):

Table: 2.7

1	CGPA≥7	1st Division with Distinction
2	6≤CGPA<7	1st Division
3	5≤CGPA<6	2nd Division
4	4.75 ≤CGPA Type equation here.	Pass

(vi) The provisional grades shall be awarded by the Course coordinator/ Coordination Committee of the course consisting of all the teachers involved in that course. The course coordinator shall have full responsibility for this purpose.

(vii) The grades so awarded shall be moderated by UDBOS/ Grade Moderation committee of the Department.

(viii) For a student to get passing grade, it will be mandatory for him/ her to appear in End Term Examination.

(ix) The procedures for evaluation and award of grades for major project, industrial training and seminar shall be based on evaluation of report followed by presentation.

2.10 Grade Moderation

1. The date of Moderation should be made a part of the Academic Calendar of the University.

2. Two- tier Moderation may be adopted, both for the subject and for the Semester (SGPA, CGPA), Minor adjustment should be possible during moderation, particularly in the marginal cases. Convener, UDBOS should invariably retain a copy of the grades sent to Dean UD, so that CGPAs may be calculated without having to make a reference to the Dean UD for this purpose.

3. The UDBOS will constitute the Grade Moderation Committee for all the Academic Courses under its purview. The Head of the department shall be the Chairman of the committee, and other members shall consist of 2 Professors/Associate Professors of the Department and 2 Assistant Professors of the Department (with one Assistant Professor as Member Secretary). The committee shall be responsible for adherence to the guidelines for the award of grades and shall include the concerned Course Coordinators. The Chairman, Grade Moderation Committee shall be responsible for the display of grades in the department and for forwarding the final grades to the Examination Section. The Chairman, Grade Moderation Committees shall also retain the record-copies of the marks and the grades along with the statistical parameters for all the courses moderated. One copy of distribution of marks and the question paper will be sent to the examination section along with grades by the Department.

4. The Grade Moderation Committee for the common courses offered to first year shall consist of all course Coordinators of the courses offered

to the First year students in a semester with the Dean UD as the Chairman. The Chairman, Grade Moderation Committee shall be responsible for the display of grades and for forwarding the final grades to the Examination Section. The Chairman, Grade Moderation Committee shall also retain the record copy of marks and grades along with the statistical parameters for all the courses moderated by the committee.
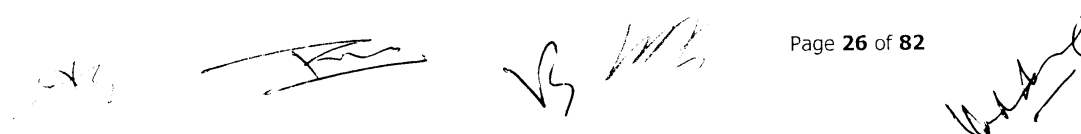
5. All concerned Faculty Members should invariably be present for the moderation committee meeting. In case, a faculty member is going out of University, he/ she will hand over his/her inputs for moderation with a colleague, who should present it in the meeting.

2.11 Scrutiny of Grades, Tabulation and Declaration of Results

A student may apply for scrutiny of grades to the Convener UDBOS, within three days from the scheduled date of display of grades. A committee consisting of the Dean UD (the Chairman of the Grade Moderation Committee), Chairman of the concerned UDBOS, the concerned course Coordinator and chairman (UD, academic cell) as the Member Secretary, may check the entry of the weights from different components of evaluation and their addition. The results of scrutiny may lead to either a change in grade due to mistake(s) in any of the aspects scrutinized by the committee or the grade may remain unchanged. The results will be intimated to the Chairman Exam Cell within three days from the last date of receiving the application in the Department as per Academic Calendar. For the first year Common Course, the Chairman of the Grade Moderation Committee, the UDBOS of the concern course and the concerned Course Coordinator shall constitute the Scrutiny Committee.

2.12 Make-up Examination on Medical/Extra Ordinary Ground

1. Students who have missed the mid-term examination for valid reasons may become eligible for a make-up examination subject to the

permission given by the Dean UD on the clear cut recommendations of Convener BOS considering the merit of the case. It may be given to the deserving students. The student should make an application to the Dean, UD, through Convener UGDAC, within ten working days from the date of the examination missed, explaining the reasons for their absence. Applications received after this period will not be entertained. Further, there will be no makeup of the makeup examination.

2. If a student is absent during End Term Examination of a course due to medical reasons or other special circumstances, he /she may apply for the award of 'I' grade to the Convener BOS of the concerned Department offering the course, through the Course Coordinator, make-up-examination will be allowed only if a student has not been disqualified earlier, due to shortage of attendance. The Convener BOS may forward this request to Dean UD. Make-up examination shall normally be held along with the supplementary examination or End Term Examination to convert 'I' grade to proper letter grade.

2.13 Summer Semester
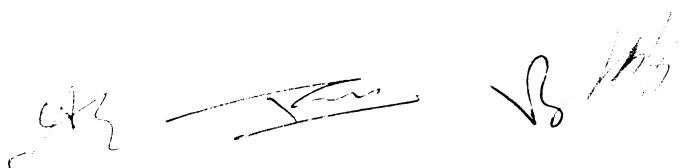
The students, who have not passed the course in regular end term examinations, are required to register for the course in summer semester held as notified and announced by Dean UD.

The classes for the courses running in summer semester may be held online / Offline as per the convenience of the Course Coordinator.

The examination for these courses will be carried out as Supplementary Examination.

2.14 Supplementary Examination

1. Supplementary Examination in any Course(s) shall be permissible only in the semester(s) in which the course(s) is/are run. Supplementary examination will be held as notified and announced by Dean UD.

2. A student will carry the marks obtained by him/her in the Mid Term Examination, Practical examination and Sessional.

3. Supplementary examination will be allowed only if a student has not been disqualified earlier, either due to shortage of attendance or use of unfair means.

4. For Supplementary Examination, the grading may be calculated along with the previous main exam. However, the grading of the students (awarded already) will remain unaffected.

2.15 Improvement of Grades
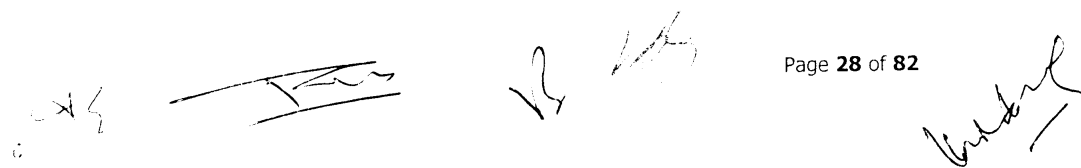
A student shall be allowed to re-appear for a maximum of two courses of a semester examination in order to improve the grades and hence the grades already obtained would be subject to the following conditions:

a. The student shall be permitted to improve the grades along with the next available chance only.

b. The grades obtained by the student for each course in the improvement chance, he has appeared for, or the already existing grades, whichever is better will be reckoned as the grades secured.

c. A student shall be allowed to repeat the courses in one or more semesters in order to improve the grades obtained already,

d. This provision is allowed only once for a semester and that too at the earliest opportunity offered to him/her, along with the immediate succeeding batch.

e. A student shall be allowed to withdraw from the whole examination of a semester in accordance with the existing rules of the University.

2.16 Unfair Means

The Unfair Means Rules shall be as per RTU Examination Regulation.

1. Dean UD shall constitute Unfair Means Redressal Committee, Grievance Redressal Committee and Result Declaration Committee.

2. For Project, Class Work Submission, Mid Term Examination etc., the Course Coordination Committee may report the matter to the UGDAC. The UGDAC may after considering the matter reported to it and after giving an opportunity to the concerned student(s) to explain his/ her

conduct impose appropriate penalty, including the award of grade in the concerned course(s) on the concerned students(s).

2.17 Minimum Credits and Minimum CGPA for the award of Degree

1. The credits for the courses in which a student has obtained 'E' (minimum passing grade for a course) grade or higher shall be counted as Credit earned by him/her.

2. The minimum credits required to obtain UG degree is 164 credits and 11 Non – graded units. For the students admitted through lateral entry, the minimum credits required to obtain UG degree is 129 credits and 04 Non – graded units. A student who has a minimum CGPA of 4.75 and appeared/ completed in the required number of credits as specified in the UG curriculum he/ she is registered for, is eligible for the award of the respective degree. The student shall not be allowed to drop credit of any departmental core subject for eligibility to award of degree.

3. A student, who has earned the minimum credits required for a degree but fails to obtain the minimum specified CGPA for this purpose, shall be allowed to register in course(s) till the minimum CGPA is attained within the maximum time limit for different programs.

2.18 B. Tech. Project

a) This course will be offered in the Final Year of the B. Tech. Program and its total duration will be two semesters. Project will be carried out in two parts. Project part 1 and part 2 will carry 4 credits each and will be carried out in VII and VIII semester respectively.

b) Head of the department shall appoint a Project Coordinator amongst the faculty members of the Department.

c) The Project can be carried out by the student either individually or in a group. However, the number of students in a group will generally

not exceed ten. HOD may permit more number of students in a group if required.

(d) The Project Coordinator/s (nominated by HOD) will invite proposals from the Faculty Members and students and finalize the project problems allotted to various groups before the last working day of 7th semester.

e) The evaluation will be based upon Mid–Term Examinations (MTE) and an End Term Examination (ETE).

f) Mid Term Examination will be held in the mid of 7th and 8th semester for Project part 1 and part 2 respectively. The Mid-Term Examination will involve preliminary report submission, presentation and oral viva-voce. The evaluation will be done by the committee (consisting of minimum three members including project mentor) to be constituted by the HOD. The committees will award marks to individual student and forward them to the project coordinator who will maintain these record.

h) The End Term Project Examination will be carried out at the end of 7th and 8th semester within 10 days from the last Theory Paper. For this purpose, a Project Examination Committees (consisting of Coordinator, Mentor and External Member) will be appointed by the HOD in consultation with the Project Coordinator, with at least one External Examiner. In case an examiner from outside the University is not available, faculty member of the University from outside the Department may be appointed as an external examiner after taking his/her consents.

i) The students will be required to submit a Final Project report to the Project Coordinator, at least 3 days before the date of final project examination.

j) The final examination may be in the form of presentation/ demonstration in the laboratory and viva-voce or only viva-voce depending upon the nature of the project.
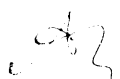
k) The Examination Committee will award marks to individual students and forward them to Project Coordinator who will compute grades in accordance with the prescribed procedures.

l) The Grade Moderation Committee for the B. Tech Project will be the same as that for other courses of the class.

m) In case a student is awarded a failing grade in the major project, he/she shall have to repeat the course in the form of a new project. Such a student will have to work full time on the project for a minimum period of one month.

n) A student can opt project work in industry/ research lab/ any such organization outside the University.

o) Normal attendance regulations will not apply to this course.

2.19 Industrial Trainings

The objective of this component is to give opportunities to students to learn in an informal setting. This mode of learning, is often more effective than conventional lectures / laboratory work. Second and even more important objective of this component is to inculcate workplace environment and design thinking among students and facilitate them to gain some design immersion experience. This component can promote learning by doing, which does two important things: Firstly, it allows students to immerse themselves in the environment in which work is to be done, so that they can understand the values and expectations of the target beneficiaries. Secondly it enables a fresh look at problems, not only at the ways of defining them, but also at the ways to solve those including skill-sets that are required to address them.

As a part of this requirement, every student is expected to earn a minimum of five non-graded units to complete the degree requirements. To earn these units, a student is expected to undergo industrial training of 45 days and 60 days after IV and VI semester respectively in summer breaks. Two and Three units will be awarded for industrial trainings held after IV and VI semester respectively. These trainings will be awarded in V and VII semester

respectively. These training will be evaluated in V and VII semester respectively by the concerned department through presentation/ viva-voce/any other suitable mode.

Both for self-arranged internships and for internships arranged through **T&P Cell**, administration and correspondence would be handled by the **T&P Cell**.

Evaluation of Industrial Training

a) Every student will submit a written report to the TPC on the work carried out during the training period along with a certificate from the Organization where training was undertaken. Chairman, **T&P Cell** reports to the respective Departments.

b) A time slot of 2 hour/ week/ batch will be assigned in the students time table and the students will be asked to present their work in the form of a seminar of about 30-minutes duration, before a committee appointed by the HOD and other students of that batch.

c) The performance of the students will be evaluated by the committee in marks on the basis of (i) the training report, (ii) presentation, (iii) viva-voce.

d) The grades will be computed on the basis of the established procedure as for other courses.

2.20 SODECA/ NCC/ NSO/ NSS

Students will be required to earn 4 Credits from NCC/NSO/NSS and SODECA activities apart from normal teaching schedule. A student will be awarded 0.5 Credit every semester for successfully completing the activity. NCC / NSO /NSS activities will be managed by the respective cell. The faculty coordinators of NCC / NSO / NSS will decide and announce the policies on earning Credits in these activities from time to time. The evaluation process and grade will be carried out by Chief Proctor office.

3. REGISTRATION AND ATTENDANCE
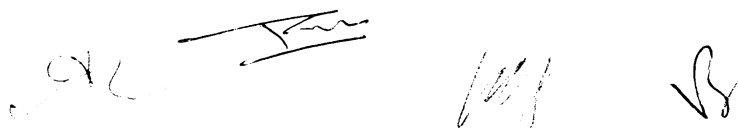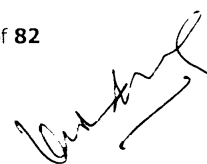
3.1 Registration

Registration is a very important procedural part of the academic system. The registration procedure ensures that the student's name is on the roll list of each course that he / she wants to study. **No credit is given if the student attends a course for which he/she has not registered.** Registration for courses to be taken in a particular semester will be done according to a specified schedule before the end of the previous semester. Each student is required to complete the registration process. The student must also take steps to pay his/her dues before the beginning of the semester. Students who do not make payments by a stipulated date can be de-registered for the particular semester.

As students have to report on the date prescribed by office of Dean UD to mark his/her attendance in person, before the start of Semester. This is a requirement for validation of registration of existing students.

In-absentia registration or registration after the specified date will be allowed only in rare cases at the discretion of Dean UD. In case of illness or absence during registration, the student should intimate the same to his/ her Course Coordinator and Dean, UD.

Brief description of registration related activities is given in the following paragraphs. The relevant dates are included in the Semester Schedule that is made available before the start of the semester. There may be changes in the schedule and/ or procedure of registration from time to time. The students are intimated through e-mail about any such change to the e-mail address allocated to each student by the Institute at the time of admission. **This e-mail address is the only channel through which the Institute would communicate with the student. For cyber security reasons, e-mail accounts that are not used for a certain length of time are disabled and such accounts locked / deleted by the Institute. Students must therefore login into their e-mail accounts regularly.**

3.2 Registration and Student Status

The student is required to register in accordance with UD's academic calendar. Failure to register before the last date for late registration will imply that the student has discontinued studies and his/her name will be struck-off the rolls for that semester.

All registered students are considered as full-time students at the Institute. They are expected to be present at the Institute and devote full time to academics and co-curricular and extra -curricular activities in the campus.

3.3 Maximum and Minimum Number of Students for an elective Course
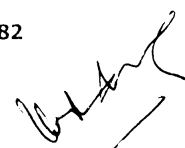
Department will float elective courses to be run in particular semester. There are two types of elective courses viz. Departmental elective and open elective. The maximum and minimum number of students requirements for elective course is shown below.

Table-3.1

Type of Elective	Number of Students	
	Maximum	**Minimum**
Open elective	90	20
Departmental elective	-	Minimum of 10 or actual number of student admitted

3.4 Late Registration

For reasons beyond his/her control, if a student is not able to register or send an authorized representative with a medical certificate, he/she may apply to the Dean UD for late registration. Dean UD will consider and may approve late registration in genuine cases on payment of an extra fee called late registration fee. Late registration is permitted until a date specified in the Semester Schedule, typically one week after the beginning of the semester.

3.5 Add / Drop, Audit and Withdrawal of Courses

a) **Add / Drop:** A student has the option to add courses that he/she has not registered for, or drop courses for which he / she has already registered for. This facility is restricted to a period stipulated in the Semester Schedule, during the first week of the semester, subject to vacancy status of the courses concerned.

b) **Audit:** A student may apply for changing a credit course to an audit course before a deadline specified in the Semester Schedule.

c) **Withdrawal:** A student who wants to withdraw from a course should apply before a deadline specified in the Semester Schedule. A withdrawal grade (W) will be awarded in such cases.

3.6 Registration in Special Module Courses
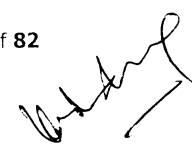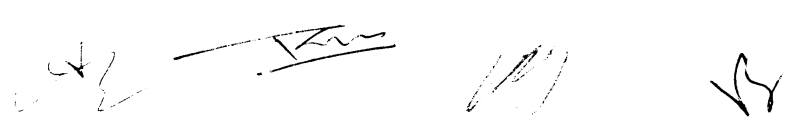
Special module courses, i.e. 'V'-category courses, are of 1 or 2 credit courses that can be offered at the beginning of the semester and the regular registration procedure will be followed. A 'V'-category course may also be offered during the semester. In such a case, students will be allowed to add this course before classes for the course begin. These courses will usually cover specialized topics that are not generally available in the regular courses. Eligible students can register for these courses. The course coordinator will evaluate the students' performance and award a letter grade. The credits so earned will count towards the appropriate category for degree completion purposes.

3.7 Registration for Non-graded Units

Details pertaining to registration and other modalities of earning non-graded units are given in Section 6.

3.8 Pre-requisite Requirement(s) for Registration

A student can register for a course only if he / she fulfill the pre-requisite requirement(s). Request for relaxation of pre-requisite requirement(s) may be

raised by students under special circumstances. Such a request needs approval of the UGDAC.

The concerned UDBOS must mention about the pre-requisite of each course.

3.9 Overlapping/Equivalent Courses

A student is not allowed to earn credits from two overlapping / equivalent courses. Overlapping / equivalent courses, wherever applicable, are specified in the Description of Course Contents.

3.10 Limits on Registration

An undergraduate student (B. Tech.) should register for a minimum of 12 credits in a semester. The maximum number of credits permitted for a UG student in a semester is 28, with a provision to register for up to 30 credits in a maximum of two semesters during the entire period of their study.

3.11 Registration and Fee Payment
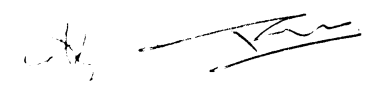
Every registered student must pay the stipulated fees in full before the specified deadlines. In the event that a student does not make these payments, he/she can be de-registered from all courses and his/her name can be struck off from the rolls.

3.12 Attendance, Continuous Absence and Registration Status

It is mandatory for the students to attend classes of all registered semesters. Attendance Records of all students for each course will be maintained.

The Course Coordinator will announce the class policy on attendance with respect to grading etc., at the beginning of the semester. This shall be done keeping in mind the importance of classroom learning in the teaching-learning process. Once the class attendance policy has been made clear to all the students registered for the course, the Course Coordinator will implement the same in totality.

For the purpose of attendance calculation, every scheduled practical class will count as one unit irrespective of the number of contact hours.

Attendance record will be maintained based upon roll calls (or any equivalent operation) in every scheduled lecture, tutorial and practical class. Students are required to strictly adhere to and comply with any method or device employed by the Course Coordinator/Instructor for purpose of Attendance Recording. Failure to do so may call for disciplinary action. The course coordinator will maintain and consolidate attendance record for the course (lectures, tutorials and practicals together, as applicable).

1. All the students are expected to attend every lecture, tutorial, practical or drawing class scheduled for them.

2. The students must have a minimum attendance of 75% of the total number of classes including lectures, tutorials and practical, held in a subject in order to be eligible to appear at the end term examination for that subject.

3. Any relaxation in the minimum percentage of attendance shall be as per RTU exam regulation.

4. Attendance of the students shall be monitored and displayed during a semester as per the guidelines approved by the UDAC/BOM.

5. The names of the students whose attendance is less than 75% in the classes held in a course will be intimated by the Course Coordinator on the last teaching day, to the Head of Department, who will consolidate the list for all such students for all the courses of a given yearly level of a program, will display it on the notice board of the Department. The list of such students shall also be forwarded to the Dean UD. These students shall not be allowed to appear in the end term examination of that course and shall be awarded the grade 'F' irrespective of their performance in Class Work Sessional (CWS)/ Mid Term Examination (MTE), etc.

6. A student must inform the Dean UD immediately of any instance of continuous absence from classes.

7. A student who is absent due to illness or any other emergency, up to a maximum of two weeks, should approach the course coordinator for make-up quizzes, assignments and laboratory work.

8. A student who has been absent from a mid term test due to illness should approach the course coordinator for a make-up test immediately on return to class. The request should be supported with a medical certificate from Institute's medical officer. A certificate from a registered medical practitioner will also be acceptable for a student normally residing off-campus provided registration number of the medical practitioner appears explicitly on the certificate.

9. In case of absence on medical grounds or other special circumstances, before or during the major examination period, the student can apply for 'I' grade. At least 75 % attendance in a course is necessary for being eligible for request of I-grade in that course. An application requesting I-grade should be made at the earliest but not later than the last day of End term examination. An application should be made by the student. On submission of a medical certificate / Dean's permission, the Proctor section verifies the certificate and forwards the request to the concerned course coordinator. The course coordinator verifies the attendance requirement and forwards the application to the Head of the Department / Centre / School of the student's programme. Head's approval is contingent upon the satisfaction of attendance requirement. On approval, an 'I' grade is awarded to the student. All evaluation requirements for students with 'I' grade should be completed before the end of the first week of the next semester. Upon completion of all course requirements, the 'I' grade is converted to a regular grade (A to F, NP or NF).

10. In case the period of absence on medical grounds is more than 20 working days during the semester, a student may apply for withdrawal from the semester, i.e. withdrawal from all courses registered that semester. Such application must be made as early as possible and latest before the start of the End Term Examination. No applications for semester withdrawal will be considered after the End Term Examination have commenced. Dean UD, depending on the

merit of the case, will approve such applications. Partial withdrawal from courses registered in a semester is not allowed.

11. If a student is continuously absent from the institute for more than four weeks without notifying the Dean UD, his/her name will be removed from rolls for that semester.

3.13 Withdrawal from Course/Semester

1. A student who wants to withdraw from a course shall apply through the Convener BOS to the Dean UD, on a prescribed form within one week from the end of the Mid Term examination under the advice of his/ her Course Coordinator. If his/ her request for withdrawal is granted, it will be recorded in the registration record of the student and the concerned Course Coordinator will be informed about it.

2. In case a student is unable to attend classes for more than four weeks in a semester he/she may apply to the Dean UD through Convener BOS, for withdrawal from the semester, which shall mean withdrawal from all the registered courses in the semester. However, such application shall be made under the advice of the UGDAC, as early as possible and latest before the start of the end term Examination **Partial withdrawal from the semester shall not be allowed.**

3. In case the period of absence on medical grounds is more than twenty working days during the semester, a student may apply for withdrawal from the semester on Medical Grounds, if he /she so desires. The application must be made to the Dean UD through Convener BOS under the advice of the Course Coordinator, as early as possible and latest before the beginning of end term examination.

4. Any application on medical grounds shall be accompanied with a medical certificate from University Doctor/ Medical Officer. A certificate from a Registered Medical Practitioner containing the registration number may also be accepted in those cases where a student is normally residing off-campus or becomes ill while away from the University.

5. A student rusticated or suspended or debarred from the classes by the University due to any reason whatsoever or having withdrawn from a semester/ year on medical grounds, shall have to meet the requirement of 75% attendance in each course in a semester and shall have to complete the program within its maximum time limit of eight years for Four Year UG program as specified in **Regulations excluding** the period of expulsion, if any.

3.14 Termination of Enrollment

1. If a student registered in the First Year of the Program is continuously absent from the classes for more than four weeks without informing the Course Coordinators, the Coordinator shall immediately bring it to the notice of Head of Department for informing the Dean UD. The names of such students shall be removed from the University rolls and such absence during First Year will render the student ineligible for re-admission in current semester.

2. The student who has earned not more than 10 credits at the end of first semester shall be given a warning for his/ her poor performance by Dean UD. The enrolment of a student in a program shall stand terminated if he/she fails to earn 18 credits at the end of first year. The communication regarding termination of enrolment shall be issued by the Dean UD within fifteen days from the date of declaration of results.

3. The duration of the B. Tech. program is 4 years i.e. 8 semesters. The enrolment of a student will stand cancelled at the end of 8 years from the date of initial registration in the first semester.

4. A student whose enrolment has been terminated may appeal to the VC for reconsideration within fifteen days from the date of issuance of the communication of termination and the appeal will be disposed off within fifteen days. If the appeal is allowed, his/her registration and enrolment shall be restored.

3.15 Feedback Mechanisms

1. Student feedback: The feedback from the students forms a very vital benchmark for the quality and excellence. All course coordinators would take feedback from the students continuously. It is expected that after each assessment (MTE & ETE) the student would be informed of their marks and if any discrepancy is pointed out, necessary updating would be made. At the end of each semester a comprehensive feedback about the faculty members, the courses, the methodology, the laboratory environment and other relevant issues shall be taken from the students. The feedback shall be conducted soon after the end term examination.

2. Faculty members have been assigned additional duty as mentors to small groups of students. It is expected that the mentors would play the role of guardian to the students. The mentors are expected to help students in getting adjusted in the academic environment. The mentors would provide guidance in choosing courses, electives and also in overcoming academic lags.

3. The mentors would keep track of achievements, prizes and punishments of students & would be providing feedback in the "Extra Curricular and Discipline" course.
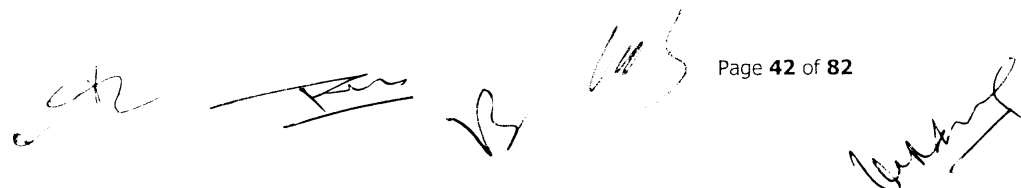
3.16 CONDUCT AND DISCIPLINE

1. Students shall conduct themselves both within and outside the University campus in a manner befitting their association with this Institute. It is expected that they will not indulge in activities which may tarnish the image of the University and/ or are in conflict with the objectives of the University.

2. Lack of courtesy and decorum, unbecoming conduct, willful damage and/ or damage of University property or belongings of fellow students, disturbing others in their studies, adoption of unfair means during examinations, breach of rules and regulations of the University, unethical use of electronic media, noisy and unseemly
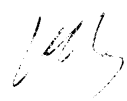
behavior and similar other undesirable activities shall constitute violation of the Code of Conduct for students.

3. Ragging, harassment, deception, intimidation, provocation or any unethical/ illegal act of any student in any form is strictly prohibited. Any such incident would be considered a serious offence and violation of Code of Conduct. Involvement of a student in ragging or any such act may lead to his/ her expulsion from the Institute.

4. Violation of the Code of Conduct shall invite disciplinary action which may include punishment such as reprimand, disciplinary probation, fine, debarring from examinations, withdrawal of scholarship and/or placement services, withholding of grades and/or degrees, cancellation of registration and even expulsion from the Institute. In all such cases the Extra-curricular and Discipline marks would be affected and in turn would affect the grades.

5. In certain cases, the student may be barred from applying for a change of program. The Course Coordinator / Instructor/ Tutor may take appropriate action against a student who misbehaves in his/her class. In all such cases, the Course Coordinator / Instructor/ Tutor shall inform all the details to the office of the Chief Proctor for record. The Chief Warden (Hostels) may reprimand, impose fine or take any other suitable measure against a resident who violates either the Code of Conduct or rules and regulations pertaining to the Hostel. In all such cases, the Chief Warden shall inform all the details to the office of the Chief Proctor for record.

6. The SDC (Student Disciplinary Committee) shall investigate alleged misdemeanors, complaints, etc. and recommends a suitable course of action. SDC shall be constituted by Dean UD with one senior Professor as Chairman, at least Head of Departments and Chief Warden as Member with Chief Proctor as Member Secretary. Violation of the Code of Conduct by an individual or of a group of students can be referred to this committee by a student, faculty member or other functionaries of the University Departments.

7. Further, in exceptional circumstances, the Dean UD may appoint a special committee to investigate and/or recommend appropriate action for any act of gross indiscipline involving an individual or a number of students, which, in his/ her view, may tarnish the image of the University. The recommendation of SDC shall be submitted to Dean UD for approval. In cases when the expulsion of a student from the Institute has been recommended, the matter shall be sent to the Vice Chancellor for final decision.

8. A student, who feels aggrieved with the punishment awarded, may appeal to the Vice-Chancellor stating clearly the case and explaining his/ her position, and seeking reconsideration of the decision.

4. DEGREE REQUIREMENTS AND UNDERGRADUATE PROGRAMME STRUCTURES

4.1 Overall Requirements

The minimum credits required to obtain UG degree is 164 credits and 11 Non – graded units. For the students admitted through lateral entry, the minimum credits required to obtain UG degree is 129 credits and 04 Non – graded units. A student who has a minimum CGPA of 4.75 and completed the minimum required number of credits and Non–graded units as specified in the UG curriculum he/ she is registered for, is eligible for the award of the respective degree. The student shall not be allowed to drop credit of any departmental core subject for eligibility to award of degree. For B.Tech. programmes, the total credits are distributed over following categories :

(a) Institute Core (IC) :

- Basic Sciences (BS) : Mathematics, Physics and Chemistry courses

- Engineering Arts and Science (EAS): Fundamental engineering courses

- Humanities and Social Sciences including Management courses(HSMC):

(b) Departmental Core (DC) : courses of relevant discipline.

(c) Departmental Electives (DE) : electives related to the parent discipline.

(d) Open Category (OC) : electives can be taken outside or within the discipline; these credits can be used towards departmental specialization or minor area also (see Sec 4.6).

(e) Industrial Training

(f) Non-graded Core (NG) units : These are core requirements and can be earned through formal academic activity and informal co-curricular or extra-curricular activities.

4.2 Breakup of Degree Requirements

Earned Credit Requirements

The minimum earned credit/unit requirements for B.Tech. degree are given in Table 4.1.

Table 4.1 : Degree requirements of B.Tech. programmes

S.No.	Category	Symbol	B. Tech. Requirements	Remarks
1	Institute Core	IC	55 Credits	Common to all disciplines
2	Departmental core	DC	90 with min 15 as DE	Discipline specific
3	Departmental Elective	DE		
4	Open Category	OC	10 Credits	Open to student's choice
5	Industrial Training	TR	05 Credits	Discipline specific
6	SODECA (ANANDAM)	-	04 Credits	Common to all disciplines
	Non-graded Core	NG	11 units	See Sec. 4.3
	Total		164 Credits +11 non graded units	

Audit Courses

Audit Courses are the courses, which students opt for learning. No credits will be awarded for such courses. Audit facility is open to all undergraduate students who have 85 Earned Credits. A student will be permitted to do any number of audit courses over and above the graduation requirements. The audit limits for graduation are:

(a) B.Tech. (4-year) programme: A maximum of 8 credits from the elective courses in any category out of the total credits required for B.Tech. degree may be completed on audit basis.

(b) A student earns either an NP (audit pass) or an NF (audit fail) grade for an audit course. The audit pass (NP) grade may be awarded if the student satisfies the attendance criteria specified for the course and

he/she has obtained at least a 'E' grade. The course coordinator can specify a higher criterion for audit pass at the beginning of the semester. If either of these requirements is not fulfilled, the audit fail (NF) grade is awarded.

(c) Grades obtained in an audit course are not considered in the calculation of SGPA or CGPA.

4.3 Non-graded Core Requirement

As part of the curriculum, non-graded units have been prescribed as core requirements for the undergraduate degree. These units can be earned through a combination of formal academic activity and informal co-curricular or extra-curricular activities. The components of non-graded core requirement are listed in Table 4.2.

Table 4.2 : Components of Non-Graded Core Requirement

S.No.	Components	Units
1	Introduction to Engineering (Induction Programme)	0.5
2	Club Activities	0.5
3	Communication Skills and Language Lab(Language and Writing Skills)	3
4	Soft Skill Development	2
5	Human Values and Professional Ethics	3
6	Seminar (Presentation and Report Writing Skills)	2
	Total	11

The 11 units listed in Table 4.2 will be core requirement for all undergraduate programmes. A student must earn these 11 units over the complete duration of the programme with special considerations and requirements for each component. A student must get S grades to earn these units. The 'V' grade denotes excellent performance and completion of a
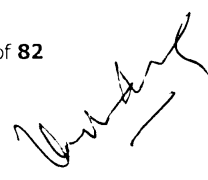
non-grade course. The 'G' grade denotes good performance and completion of a non-grade course. Incomplete performance in these components will be indicated by a Z grade. The description of the seven components is given in section 6.

4.4 Minimum and Maximum durations for completing degree requirements

(a) The minimum and maximum permitted duration of each academic programme will be determined in terms of number of registered regular semesters, hereinafter called registered semesters. Any semester in which a student has registered for a course will be called a registered semester subject to the following:

(i) Only the Odd and Even regular semesters of an academic year can be registered semesters. The summer semester will not be counted as a registered semester.

(ii) A semester when a student has been granted semester withdrawal or granted semester leave will not be considered as a registered semester.

(iii) The semester when a student is suspended from the Institute on disciplinary grounds will not be counted towards the number of registered semesters.

(iv) The duration for the UG program may be altered in accordance with the decision of the UDAC and BOM.

The summer semesters shall normally be available for earning credits. However, after the student has registered for the maximum permissible number of registered semesters, the subsequent summer semesters will not be available for earning credits.

(b) The minimum and maximum permissible number of registered semesters for completing all degree requirements is defined in Table 4.3.

Table 4.3 : Minimum and Maximum permissible duration for completing degree requirements.
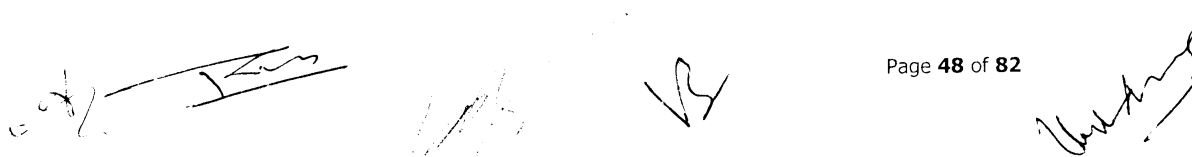
Programme Name	Minimum Number of Registered Semesters	Maximum Number of Registered Semesters Permitted for Completing Degree Requirements
B.Tech. (entry through REAP / JEE)	8	14*
B.Tech. (lateral entry through LEEP)	6	12**

* The maximum duration for a student for complying with degree requirement is EIGHT years from the date of first registration for his/her first semester failing which his /her admission to the program shall stand cancelled.

** The maximum duration for a student for complying with degree requirement is SEVEN years from the date of first registration for his/her first semester failing which his /her admission to the program shall stand cancelled.

4.5 Capability Linked Opportunities for Undergraduate Students

A student who clears all the first year credit requirements with CGPA 7.0 and above will be permitted to register for additional credits from third semester onwards. A student will be permitted to register for up to 28 credits per semester provided

(a) The student has cleared all courses for which the student has registered till then and

(b) His / her CGPA is 7 or above

A student registering for 28 credits in each semester after the end of first year, can complete a maximum of 202 credits at the end of 4 years. Similarly, a student registering for 24 credits in each semester after first year can complete a maximum of 178 credits. Since the graduation requirement for 4-year B.Tech programmes is 164 Earned Credits and 11

NG Units, it will be feasible for capable students to add value to their degrees by registering for additional courses of their choice.

Students can make use of these additional credits in two blocks of 20 credits to opt for:

(a) Minor / Interdisciplinary Area Specialization

(b) Departmental Specialization

A student based on his / her performance and interest can choose either one of the option. On successful completion of minor area credits or Departmental Specialization credit, above value addition will be indicated on the degree. On successful completion of minor area credits, the name of the Minor area will be indicated on the degree. On successful completion of Departmental Specialization credit, 'Honours' will be indicated on the degree.
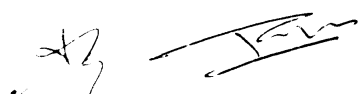
A set of pre-defined courses of total 20 credits in a focus area comprises a Departmental Specialization if the courses belong to the parent Department of an undergraduate programme, or a Minor/ Interdisciplinary Area Specialization if the courses belong to a different Department / Centre / School.

Details of credit requirements for capability linked opportunities have been mentioned in Appendix 2.

If any course of a Minor / Interdisciplinary area overlaps with any core course (DC category courses) or elective course (DE category courses) of the student's programme, then credits from this course will not count towards the minor area credit requirements, though this course may contribute towards satisfying the requirement of the Minor / Interdisciplinary area. In such a case, the requirement of 20 credits must be completed by taking other courses of the specialization.

4.6 Open Elective Courses

Open category elective courses are mandatory for B. Tech. Degree requirement. Every student has to earn minimum 10 credits by clearing
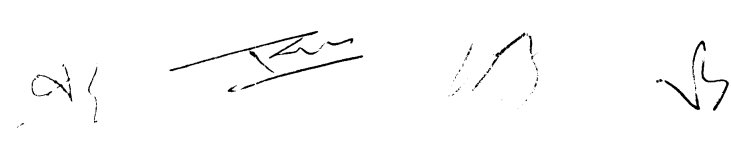
open category elective courses. Apart from basic degree requirements, open category elective courses are very important for earning additional degrees based on capacity link opportunities.

Every department/ BOS has to submit list of Open category elective courses based on minor/ interdisciplinary specialization and departmental specialization, department want to float.

Guidelines and template for it has been provided in Section 5.

4.7 Change of Programme at the End of the First Year

(a) An undergraduate student is eligible to apply for change of branch at the end of the first year only, provided he / she satisfies the following criteria after first semester:-

   (i) CGPA for General and OBC category students : >7.00

   (ii) CGPA for SC / ST and Person with Disability category students : >6.5

   (iii) Earned credits / non-graded units at the end : All credits of core and non-graded of the second semester of the first year units of the first year

(b) The student should have no disciplinary action against him/her.

(c) Change of the branch will be permitted strictly in the order of merit, in each category, as determined by CGPA at the end of first semester, subject to the limitation that the actual number of students in the third semester in the branch to which transfer is to be made should not exceed its sanctioned strength by more than 25% and the strength of the branch from which transfer is being sought does not fall below 75% of its sanctioned strength.

(d) In case more than one student applying for programme change has the same CGPA, the tie shall be resolved on the basis of merit rank for the entry in B. Tech. programme prescribed by the Govt. of Rajasthan of such applicants.

(e) The conditions mentioned in item (a) above will not be insisted upon for change to a branch in which a vacancy exists with reference to the sanctioned strengths, and the concerned student was eligible as per JEE Rank for admission to that branch at the time of entry to University Departments, RTU, Kota. However, these conditions will continue to apply in case of students seeking change to a branch to which the concerned student was not eligible for admission at the time of entry to UD, RTU, Kota.

4.8 Programme Structures

In compliance of sec 4.2, BOS of each programme shall prepare the scheme and syllabi as per the template given in Appendix 1. Details of various courses to be prepared by BOS and required for award of B.Tech. has been shown in Appendix 2 and Appendix 3. **In detailed syllabus, pre-requisite information for each course shall be mentioned**.

4.9 Measures for helping SC/ST Students

A number of measures exist for helping students belonging to SC and ST categories. A senior faculty member is appointed as adviser to SC/ST students for advising them on academic and non-academic matters.

4.10 Scholarships, Prizes, Medals and Merit Certificate

1. The University shall award the merit-cum-means (MCM) scholarships, University free studentship, SC/ST category University scholarship and other scholarships, award and prizes to the student of UG programs as may be approved by the UDAC. Other scholarships may be awarded by the University from the grant from individuals, trusts organizations and the Governments with a view to provide financial assistance to needy students under the terms and conditions specified by the University. Announcements on these scholarships stating eligibility and the value of scholarships etc. shall be made by the University while inviting applications from time to time.

2. Those students, who have been punished for unfair means during Mid-Term examination (MTE) or End Term Examination (ETE) or in Seminars/ project/ etc. or for serious act of indiscipline shall not be awarded Merit-cum-Means Scholarship and other Trust Scholarship or Medals, Prizes and Awards for that Academic Session only.

5. CAPABILITY-LINKED OPTIONS FOR UNDERGRADUATE STUDENTS

As described in Section 4.8, a student who clears all the first year credit requirements with CGPA 7.0 and above are eligible to register for additional credits from third semester onwards towards the following Capability-linked options. They can make use of these additional credits in two blocks for

(a) Minor/Interdisciplinary Area Specialization (20 credits)

(b) Departmental Specialization (20 credits)

A student based on his/her performance and interest can choose either one of the options. On successful completion of minor area credits or Departmental Specialization credit, above value addition will be indicated on the degree. On successful completion of minor area credits, the name of the Minor area will be indicated on the degree. On successful completion of Departmental Specialization credit, 'Honours' will be indicated on the degree.

A set of pre-defined courses of total 20 credits in a focus area comprises a Departmental Specialization if the courses belong to the parent Department of an undergraduate programme, or a set of pre-defined courses of total 20 credits in a focus area comprises a Minor / Interdisciplinary Area Specialization if the courses belong to a different Department / Centre / School.

If any course of a Minor / Interdisciplinary area overlaps with any core course (DC category courses) or elective course (DE category courses) of the student's programme, then credits from this course will not count towards the minor area credit requirements, though this course may contribute towards satisfying the requirement of the Minor / Interdisciplinary area. In such a case, the requirement of 20 credits in case of minor area or 20 credits for departmental specialization must be completed by taking other courses of the Minor/Interdisciplinary Area Specialization or Departmental Specialization. A student interested in opting for a Capability- linked option can register for the same, on a first-come first served basis.

MOOC courses may be floated by the BOS for completing the credit requirement of upto 20 credits for Minor Area or Departmental / Interdisciplinary specialization.

8-10 weeks of MOOC courses shall be considered for 3 credits and 12-16 weeks for MOOC courses shall be considered for 4 credits. A list of the MOOC courses shall be submitted by the concerned BOS and approved by Dean UD, two months before the start of registration of the students to the Academic Cell. The students have to select the MOOC courses from the list provided by the concerned BOS.

Only those MOOCs courses will be considered for fulfilling the requirement of the B.Tech. Degree, which, have certification.

The student will inform in writing to respective UGDAC about the MOOCs courses intended to register from the list provided by concerned BOS at the time of registration of other courses. In house examination of the MOOC courses will be taken by the Course Coordinator appointed by Head of Department. Examination pattern for MOOC courses will be similar to that of regular courses. The student shall submit the certificate along with the credit earn to the UGDAC, who will ensure to submit the information about the credit and grade earn by the student during the semester (through the MOOCs courses) at the time of submission of other course grades.

Financial burden arising due to earn of credits will be paid by the students.

List and details of Minor Area and Departmental / Interdisciplinary specialization running at IIT, Delhi are given below for **illustration purpose only**.

All BOS are required to prepare and submit the details of courses required for Minor Area and Departmental / Interdisciplinary specialization in the formats given in below mentioned illustration.

Minor Area in Atmospheric Sciences (Centre for Atmospheric Sciences)

Minor Area Core

ASL310	Fundamentals of Atmosphere and Ocean	3	0	2	4
ASL320	Climate Change: Impacts, Adaptation and Mitigation	3	0	2	4
	Total Credits				**8**

Minor Area Electives

ASD330	Mini Project	0	0	12	6
ASL410	Numerical Simulation of Atmospheric and Oceanic Phenomena	3	0	2	4
ASL733	Physics of the Atmosphere	3	0	0	3
ASL734	Dynamics of the Atmosphere	3	0	0	3
ASL735	Atmospheric Chemistry and Air Pollution	3	0	0	3
ASL736	Science of Climate Change	3	0	0	3
ASL737	Physical and Dynamical Oceanography	3	0	0	3
ASL750	Boundary Layer Meteorology	3	0	0	3
ASL752	Mesoscale Meteorology	3	0	0	3
ASL753	Atmospheric Aerosols	3	0	0	3
ASL754	Cloud Physics	3	0	0	3
ASL755	Remote Sensing of the Atmosphere and Ocean	3	0	0	3
ASL756	Synoptic Meteorology	3	0	0	3
ASL757	Tropical Weather and Climate	3	0	0	3
ASL758	General Circulation of the Atmosphere	3	0	0	3
ASL759	Land-Atmosphere Interactions	3	0	0	3
ASL760	Renewable Energy Meteorology	3	0	0	3
ASL761	Earth System Modelling	3	0	0	3
ASL762	Air-Sea Interaction	3	0	0	3
ASL763	Coastal Ocean and Estuarine Processes	3	0	0	3
ASL822	Climate Variability	3	0	0	3
ASL823	Geophysical Fluid Dynamics	3	0	0	3

Minor Area in Biological Sciences (Kusuma School of Biological Sciences)

Minor Area Core

SBL201	High-Dimensional Biology	3	0	0	3
SBP200	Introduction to Practical Modern Biology	0	0	4	2
	Total Credits				**5**

Minor Area Electives

SBD301	Mini Project	0	0	6	3
SBL701	Biometry	3	0	0	3
SBL702	Systems Biology	3	0	0	3
SBL704	Human Virology	3	0	0	3
SBL707	Bacterial Pathogenesis	3	0	0	3
SBL708	Epigenetics in Health and Disease	3	0	0	3
SBL705	Biology of Proteins	3	0	0	3
SBL703	Advanced Cell Biology	3	0	0	3
SBL706	Biologics	3	0	0	3
SBL709	Marine Bioprospecting	3	0	0	3
SBL710	Chemical Biology	3	0	0	3

Minor Area in Business Management (Department of Management Studies)

Minor Area Core (All four courses leading to 12 credits)

MSL301	Organizational & People Management	3	0	0	3
MSL302	Managerial Accounting & Financial Management	3	0	0	3
MSL303	Marketing Management	3	0	0	3
MSL304	Managing Operations	3	0	0	3
	Total Credits				**12**

Minor Area Electives (9 credits required)

MSL704	Science & Technology Policy Systems	3	0	0	3
MSL709	Business Research Methods	1.5	0	0	1.5
MSL710	Creative Problem Solving	3	0	0	3
MSL711	Strategic Management	3	0	0	3
MSL712	Ethics & Values Based Leadership	1.5	0	0	1.5
MSL713	Information Systems Management	3	0	0	3
MSL714	Organizational Dynamics and Environment	3	0	0	3
MSL715	Quality and Environment Management Systems	3	0	0	3
MSL716	Fundamentals of Management Systems	3	0	0	3
MSL717	Business Systems Analysis & Design	3	0	0	3
MSL719	Statistics for Management	3	0	0	3
MSL720	Macroeconomic Environment of Business	3	0	0	3

Code	Course	L	T	P	C
MSL721	Econometrics	3	0	0	3
MSL724	Business Communication	1.5	0	0	1.5
MSL725	Business Negotiations	1.5	0	0	1.5
MSL727	Interpersonal Behavior & Team Dynamics	1.5	0	0	1.5
MSL729	Individual Behavior in Organization	1.5	0	0	1.5
MSL730	Managing With Power	1.5	0	0	1.5
MSL731	Developing Self Awareness	1.5	0	0	1.5
MSL733	Organization Theory	1.5	0	0	1.5
MSL734	Management of Small & Medium Scale Industrial Enterprises	3	0	0	3
MSL740	Quantitative Methods in Management	3	0	0	3
MSL780	Managerial Economics	1.5	0	0	1.5
MSL801	Technology Forecasting & Assessment	3	0	0	3
MSL802	Management of Intellectual Property Rights	3	0	0	3
MSL804	Procurement Management	3	0	0	3
MSL805	Services Operations Management	3	0	0	3
MSL806	Mergers & Acquisitions	3	0	0	3
MSL807	Selected Topics in Strategic Management	1	0	0	1
MSL808	Systems Thinking	3	0	0	3
MSL809	Cyber Security: Managing Risks	3	0	0	3
MSL810	Advanced Data Mining for Business Decisions	1.5	0	0	1.5
MSL811	Management Control Systems	3	0	0	3
MSL812	Flexible Systems Management	3	0	0	3
MSL813	Systems Methodology for Management	3	0	0	3
MSL814	Data Visualization	1.5	0	0	1.5
MSL815	Decision Support and Expert Systems	3	0	0	3
MSL816	Total Quality Management	3	0	0	3
MSL817	Systems Waste & Sustainability	3	0	0	3
MSL818	Industrial Waste Management	3	0	0	3
MSL819	Business Process Re-engineering	3	0	0	3
MSL820	Global Business Environment	3	0	0	3
MSL821	Strategy Execution Excellence	3	0	0	3
MSL822	International Business	3	0	0	3
MSL823	Strategic Change & Flexibility	3	0	0	3
MSL824	Policy Dynamics & Learning Organization	3	0	0	3
MSL825	Strategies in Functional Management	3	0	0	3
MSL826	Business Ethics	3	0	0	3
MSL827	International Competitiveness	3	0	0	3
MSL828	Global Strategic Management	3	0	0	3
MSL829	Current & Emerging Issues in Strategic Management	3	0	0	3
MSL830	Organizational Structure and Processes	3	0	0	3
MSL831	Management of Change	3	0	0	3
MSL832	Managing Innovation for Organizational Effectiveness	3	0	0	3
MSL833	Organizational Development	3	0	0	3
MSL834	Managing Diversity at Workplace	1.5	0	0	1.5
MSL835	Labor Legislation and Industrial Relations	3	0	0	3
MSL836	International Human Resources Management	1.5	0	0	1.5
MSL839	Current & Emerging Issues in Organizational Management	3	0	0	3
MSL840	Manufacturing Strategy	3	0	0	3
MSL841	Supply Chain Analytics	3	0	0	3
MSL842	Supply Chain Modeling	3	0	0	3
MSL843	Supply Chain Logistics Management	3	0	0	3
MSL844	Systems Reliability, Safety and Maintenance Management	3	0	0	3
MSL845	Total Project Systems Management	3	0	0	3
MSL846	Total Productivity Management	3	0	0	3
MSL847	Advanced Methods for Management Research	3	0	0	3
MSL848	Applied Operations Research	3	0	0	3
MSL849	Current & Emerging Issues in Manufacturing Management	3	0	0	3
MSL850	Management of Information Technology	3	0	0	3
MSL851	Strategic Alliance	1.5	0	0	1.5
MSL852	Network System: Applications and Management	3	0	0	3
MSL853	Software Project Management	3	0	0	3
MSL854	Big Data Analytics & Data Science	1.5	0	0	1.5
MSL855	Electronic Commerce	3	0	0	3
MSL856	Business Intelligence	3	0	0	3
MSL858	Business Process Management with IT	1.5	0	0	1.5
MSL859	Current and Emerging Issues in IT Mgmt.	3	0	0	3
MSL861	Market Research	3	0	0	3
MSL862	Product Management	3	0	0	3
MSL863	Advertising and Sales Promotion Mgmt.	3	0	0	3
MSL864	Corporate Communication	3	0	0	3
MSL865	Sales Management	3	0	0	3
MSL866	International Marketing	3	0	0	3
MSL867	Industrial Marketing Management	3	0	0	3
MSL868	Digital Research Methods	1.5	0	0	1.5
MSL869	Current & Emerging Issues in Marketing	3	0	0	3
MSL870	Corporate Governance	1.5	0	0	1.5
MSL871	Banking and Financial Services	1.5	0	0	1.5
MSL872	Working Capital Management	3	0	0	3
MSL873	Security Analysis & Portfolio Management	3	0	0	3
MSL874	Indian Financial System	1.5	0	0	1.5
MSL875	International Financial Management	3	0	0	3
MSL876	Economics of Digital Business	1.5	0	0	1.5
MSL877	Electronic Government	1.5	0	0	1.5
MSL878	Electronic Payments	1.5	0	0	1.5
MSL879	Current & Emerging Issues in Finance	3	0	0	3
MSL880	Selected Topics in Management Methodology	3	0	0	3
MSL881	Management of Public Sector Enterprises in India	3	0	0	3
MSL882	Enterprise Cloud Computing	1.5	0	0	1.5
MSL883	ICTs, Development and Business	1.5	0	0	1.5
MSL884	Information System Strategy	3	0	0	3
MSL885	Digital Marketing-Analytics & Optimization	3	0	0	3
MSL886	IT Consulting & Practice	3	0	0	3
MSL887	Mobile Commerce	3	0	0	3
MSL888	Data Warehousing for Business Decision	1.5	0	0	1.5
MSL889	Current & Emerging Issues in Public Sector Management	3	0	0	3
MSL891	Data Analytics using SPSS	1.5	0	0	1.5
MSL892	Predictive Analytics	1.5	0	0	1.5
MSL893	Public Policy Issues in the Information Age	1.5	0	0	1.5
MSL894	Social Media & Business Practices	3	0	0	3
MSL895	Advanced Data Analysis for Management	3	0	0	3
MSL896	International Economic Policy	3	0	0	3
MSL897	Consultancy Process & Skills	3	0	0	3
MSL898	Consultancy Professional Practice	3	0	0	3
MSL899	Current & Emerging Issues in Consultancy Management	3	0	0	3
MTL732	Financial Mathematics	4	3	1	0

Minor Area in Entrepreneurship (Department of Management Studies)

Minor Area Core : 5 Courses (Total of 12 Credits)

Code	Course	L	T	P	C
MSL305	New Venture Creation	2	0	2	3
MSL306	Ideation and Prototyping	2	0	2	3
MSL307	Venture Financing & Teaming	2	0	2	3
MSD308	Product Viability & Market Traction	0	0	3	1.5
MSD309	Business Plan & Funding	0	0	3	1.5

Minor Area Electives : 3 Courses (Total of 9 Credits) from the following lists

Code	Course	L	T	P	C
MSL301	Organization & People Management	3	0	0	3
MSL302	Managerial Accounting & Financial Management	3	0	0	3
MSL303	Marketing Management	3	0	0	3
MSL304	Managing Operations	3	0	0	3
MSL401	Entrepreneurial Design Thinking	3	0	0	3
MSL402	Social Innovation & Entrepreneurship	3	0	0	3
MSL403	Entrepreneurial Market Strategies	3	0	0	3
MSL404	Entrepreneurial Business Development	3	0	0	3
MSL405	Financial Accounting & Compliance for Startups	3	0	0	3
MSL406	Company Law, Governance, IPR & Legal Issues for Startups	3	0	0	3
MSL407	Corporate Innovation & Entrepreneurship	3	0	0	3
MSL408	Startup Performance Management	3	0	0	3
MSL409	Entrepreneurship and Life Balance	3	0	0	3
MSL706	Business Law	3	0	0	3
MSL720	Macroeconomic Environment of Business	3	0	0	3
MSL721	Econometrics	3	0	0	3
MSL734	Management of Small & Medium Scale Industrial Enterprises	3	0	0	3

Minor Area in Computational Mechanics (Department of Applied Mechanics)

Minor Area Core

APL300	Computational Mechanics	3	0	2	4
APL705	Finite Element Method	3	0	2	4

Minor Area Electives

APD311	Project	0	0	8	4
APL300	Computational Mechanics	3	0	2	4
APL310	Constitutive Modelling	3	0	2	4
APL340	Chaos	3	0	2	4
APL360	Engineering Fluid Flows	3	1	0	4
APL380	Biomechanics	3	0	2	4
APL410	Computational Fluid Dynamics	3	0	2	4
APL440	Parallel Processing in Computational Mechanics	3	0	2	4
APL705	Finite Element Method	3	0	2	4
APL710	Computer Aided Design	3	0	2	4
APL736	Multiscale Modelling of Crystalline Materials	3	0	2	4

Minor Area in Design (Department of Design)

Minor Area Core (10 credits)

DSP721	Design and Innovation Methods	1	0	4	3
DSL751	Form and Aesthetics	2	0	2	3
DSD799	Design Project	1	0	6	4
	Total Credits				**10**

Minor Area Electives (Minimum of 10 credits)

DSL782	Design for Usability	2	0	2	3
DSR832	Design for User Experience	3	0	0	3
DSR862	Design in Indian Context	3	0	0	3
DSR852	Strategic Design Management	2	0	2	3
DSR822	Design for Sustainability	2	0	2	3
DSR772	Transportation Design	2	0	2	3
DSL810	Special Topics in Design I	3	0	0	3
DSL820	Special Topics in Design II	3	0	0	3
DSV820	Special Modules in Design	1	0	0	1
DSP722	Applied Ergonomics	1	0	2	2
DSP712	Exhibitions and Environmental Design	2	0	2	3
DSR812	Media Studies	2	0	2	3
DSR762	Vehicle Design	2	0	2	3
COP315	Embedded System Design Project	1	0	6	4
MCL749	Mechatronics Product Design	3	0	2	4
MCL750	Product Design and Manufacturing	1	0	4	3
TXL777	Product Design and Development	3	0	0	3
APL710	Computer Aided Design	3	0	2	4
APL190	Design Engineering	3	0	2	4
HUL704	Inclusive Innovation	3	0	2	4
BML741	Medical Device Design	2	0	2	4
BMD742	Minor Biodesign Project	0	0	8	4
APL775	Design Methods	3	0	0	3
MCL744	Design for Manufacture and Assembly	3	0	2	4

Minor Area in Materials Engineering (Department of Applied Mechanics)

Minor Area Electives

APD310	Mini Project	0	0	6	3
APL102	Introducing to Materials Science	3	0	2	4
APL736	Multiscale Modelling of Crystalline Materials	3	0	2	4
APL750	Modern Engineering Materials	3	0	0	3
APL753	Properties and Selection of Engineering Materials	3	0	0	3
APL756	Microstructural Characterization of Materials	3	0	0	3
APL759	Phase Transformations	3	0	0	3
APL763	Micro & Nanoscale Mechanical Behaviour of Materials	3	0	2	4
APL764	Mechanical Behaviour of Biomaterials	3	0	0	3
APL765	Fracture Mechanics	3	0	0	3
APL767	Engineering Failure Analysis and Prevention	3	0	0	3

Minor Area Non Departmental Electives in Material Science

Minor Area Electives

MCL336	Advances in Wedding	3	0	2	4
MCL769	Metal Forming Analysis	3	0	2	4
MCL780	Casting Technology	3	0	2	4
MCL787	Welding Science and Technology	3	0	2	4
MCL791	Processing and Mechanics of Composites	3	0	2	4
PTL702	Polymer Science and Technology	3	0	0	3

Minor Area in Computer Science (Department of Computer Science and Engineering)

Note : A student needs to do a minimum of three courses out of Minor Area Core and remaining courses from Minor Area Electives.

Minor Area Core

COL106	Data Structures and Algorithms	3	0	4	5
COL202	Discrete Mathematical Structures	3	1	0	4
COL215	Digital Logic and System Design	3	0	4	5
COL216	Computer Architecture	3	0	2	4
COL226	Programming Languages	3	0	4	5
COP290	Design Practices	0	0	6	3
COL331	Operating Systems	3	0	4	5
COL333	Principles of Artificial Intelligence*	3	0	2	4
COL334	Computer Networks	3	0	2	4
COL351	Analysis and Design of Algorithms	3	1	0	4
COL352	Introduction to Automata and Theory of Computation	3	0	0	3
COL362	Introduction to Database Mgmt Systems*	3	0	2	4
COL380	Introduction to Parallel and Distributed Programming	2	0	2	3
	Total Credits (any three above courses)				**12-15**

Minor Area Electives

COD300	Design Project (Non-Graded)	0	0	4	2
COD310	Mini Project	0	0	6	3
COP315	Embedded System Design Project	0	1	6	4
COL341	Machine Learning	3	0	2	4
COL718	Architecture of High Performance Computers	3	0	2	4
COL719	Synthesis of Digital Systems	3	0	2	4
COL722	Introduction to Compressed Sensing	3	0	0	3
COL724	Advanced Computer Networks	3	0	2	4
COL726	Numerical Algorithms	3	0	2	4
COL728	Compiler Design	3	0	3	4.5
COL729	Compiler Optimization	3	0	3	4.5
COL730	Parallel Programming	3	0	2	4
COL732	Virtualization and Cloud Computing	3	0	2	4
COL733	Cloud Computing Technology Fundamentals	3	0	2	4
COL740	Software Engineering	3	0	2	4
COL750	Foundations of Automatic Verification	3	0	2	4
COL751	Algorithmic Graph Theory	3	0	0	3
COL752	Geometric Algorithms	3	0	2	4
COL753	Complexity Theory	3	0	0	3
COL754	Approximation Algorithms	3	0	0	3
COL756	Mathematical Programming	3	0	0	3
COL757	Model Centric Algorithm Design	3	0	2	4
COL758	Advanced Algorithms	3	0	2	4
COL759	Cryptography & Computer Security	3	0	0	3
COL760	Advanced Data Management	3	0	2	4
COL761	Data Mining	3	0	2	4
COL762	Database Implementation	3	0	2	4
COL765	Introduction to Logic and Functional Programming	3	0	2	4
COL768	Wireless Networks	3	0	2	4
COL770	Advanced Artificial Intelligence	3	0	2	4
COL772	Natural Language Processing	3	0	2	4
COL774	Machine Learning	3	0	2	4
COL776	Learning Probabilistic Graphical Models	3	0	2	4
COL780	Computer Vision	3	0	2	4
COL781	Computer Graphics	3	0	3	4.5
COL783	Digital Image Analysis	3	0	3	4.5
COL786	Advanced Functional Brain Imaging	3	0	2	4
COL788	Advanced Topics in Embedded Computing	3	0	0	3
COL812	System Level Design and Modelling	3	0	0	3
COL818	Principles of Multiprocessor Systems	3	0	2	4
COL819	Advanced Distributed Systems	3	0	2	4

COP820	Processor Design Laboratory	0	0	8	4
COL821	Reconfigurable Computing	3	0	0	3
COL829	Advanced Computer Graphics	3	0	2	4
COL830	Distributed Computing	3	0	0	3
COL831	Semantics of Programming Languages	3	0	0	3
COL832	Proofs and Types	3	0	0	3
COL851	Special Topics in Operating Systems	3	0	0	3
COL852	Special Topics in Compilers	3	0	0	3
COL860	Special Topics in Parallel Computation	3	0	0	3
COL861	Special Topics in Hardware Systems	3	0	0	3
COL862	Special Topics in Software Systems	3	0	0	3
COL863	Special Topics in Theoretical Computer Science	3	0	0	3
COL864	Special Topics in Artificial Intelligence	3	0	0	3
COL865	Special Topics in Computer Applications	3	0	0	3
COL866	Special Topics in Algorithms	3	0	0	3
COL867	Special Topics in High Speed Networks	3	0	0	3
COL868	Special Topics in Database Systems	3	0	0	3
COL869	Special Topics in Concurrency	3	0	0	3
COL870	Special Topics in Machine Learning	3	0	0	3
COL871	Special Topics in Programming Languages	3	0	0	3
COL872	Special Topics in Cryptography	3	0	0	3
COL886	Special Topics in Operating Systems	3	0	0	3
COD891	Minor Project	0	0	6	3
COD892	M.Tech. Project Part-I	0	0	14	7
COD893	M.Tech. Project Part-II	0	0	28	14
COR310	Professional Practices (CS)	1	0	2	2
COS310	Independent Study (CS)	0	3	0	3
COV877	Special Module on Visual Computing	1	0	0	1
COV878	Special Module in Machine Learning	1	0	0	1
COV879	Special Module in Financial Algorithms	2	0	0	2
COV880	Special Module in Parallel Computation	1	0	0	1
COV881	Special Module in Hardware Systems	1	0	0	1
COV882	Special Module in Software Systems	1	0	0	1
COV883	Special Module in Theoretical Computer Science	1	0	0	1
COV884	Special Module in Artificial Intelligence	1	0	0	1
COV885	Special Module in Computer Applications	1	0	0	1
COV886	Special Module in Algorithms	1	0	0	1
COV887	Special Module in High Speed Networks	1	0	0	1
COV888	Special Module in Database Systems	1	0	0	1
COV889	Special Module in Concurrency	1	0	0	1

Minor Area in Cogeneration and Energy Efficiency (Centre for Energy Studies)

Minor Area Core

ESL748	Economics of Energy Conservation	3	0	0	3
ESL784	Cogeneration and Energy Efficiency	3	0	0	3
ESL785	Energy Analysis	3	0	0	3
	Total Credits				**9**

Minor Area Electives

ESL714	Power Plant Engineering	3	0	0	3
ESL718	Power Generation, Transmission and Distribution	3	0	0	3
ESL722	Integrated Energy Systems	3	0	0	3
ESL726	Waste Heat Recovery	3	0	0	3
ESL776	Industrial Energy and Environmental Analysis	3	0	0	3
ESL875	Alternative Fuels for Transportation	3	0	0	3
ESL786	Exergy Analysis	3	0	0	3

Minor Area in Renewable Energy (Centre for Energy Studies)

Minor Area Electives

ESP713	Energy Laboratories	0	0	6	3
ESL731	Biomass - A Renewable Resource	3	0	0	3
ESL732	Bioconversion and Processing of Waste	3	0	0	3
ESL742	Economics and Financing of Renewable Energy Systems	3	0	0	3
ESL755	Solar Photovoltaic Devices and Systems	3	0	0	3
ESL768	Wind Energy and Hydro Power Systems	3	0	0	3
ESL770	Solar Energy Utilization	3	0	0	3
ESL840	Solar Architecture	3	0	0	3
ESL875	Alternative Fuels for Transportation	3	0	0	3
ESL880	Solar Thermal Power Generation	3	0	0	3

Minor Area in Technologies for Sustainable Rural Development (Centre for Rural Development and Technology)

Minor Area Core (Any three of the following courses)

RDL700	Biomass Production	3	0	0	3
RDL705	Rural Resources and Livelihoods	3	0	0	3
RDL722	Rural Energy Systems	3	0	0	3
RDL724	Technologies for Water and Waste Mgmt.	3	0	0	3
RDL730	Technology Alternatives for Rural Development	3	0	0	3
RDL760	Food Quality and Safety	3	0	0	3
	Total Credits				**9**

Minor Area Electives

RDL701	Rural Industrialization Policies Programmes and Cases	3	0	0	3
RDL710	Rural India and Planning for Development	3	0	0	3
RDL726	Herbal, Medicinal and Aromatic Plants	3	0	0	3
RDL740	Technology for Utilization of Wastelands and Weeds	3	0	0	3
RDL801	Successful Forms of Grassroot Organizations	3	0	0	3
RDL807	Women, Technology and Development	3	0	0	3
RDD750	Minor Project	0	0	6	3
RDP750	Biomass Lab	0	0	6	3
RDL702	Karigar & Traditional Industries	3	0	2	4
RDL725	Ecological Perspective of Growth & Development	3	0	0	3
RDL727	Conservation and Recycling Practice in Rural Area	3	0	2	4
RDL761	Value Chain in Agro-Food Processing	2	0	2	3
RDL770	Rural Value Chain and Technologies for Holistic Development	2	0	2	3

Minor Area / Departmental Specialization in Biopharmaceuticals and Fine Chemicals (Department of Chemical Engineering)

Minor Area / Specialization Core

CLD415	Major Project in Biopharmaceuticals and Fine Chemicals	0	0	10	5
	Total Credits				**5**

Minor Area / Specialization Electives

CLL296	Nano-engineering of Soft Materials	3	0	0	3
CLL730	Structure, Transport and Reactions in BioNano Systems	3	0	0	3
CLL742	Experimental Characterization of BioMacromolecules	3	0	0	3
CLL767	Structures and Properties of Polymers	3	0	0	3
CLL775	Polymerization Process Modeling	3	0	0	3
CLL778	Interfacial Behaviour and Transport of Biomolecules	3	0	0	3
CLL779	Molecular Biotechnology and in-vitro Diagnostics	3	0	0	3
CLL780	Bioprocessing and Bioseparations	3	0	0	3
CLL781	Process Operations Scheduling	3	0	0	3
CLL786	Fine Chemicals Technology	3	0	0	3
CLL791	Chemical Product and Process Integration	3	0	0	3
CLL792	Chemical Product Development and Commercialization	3	0	0	3
CLL793	Membrane Science and Engineering	3	0	0	3
SBL705	Biology of Proteins	3	0	0	3

Minor Area / Departmental Specialization in Complex Fluids and Materials (Department of Chemical Engineering)

Minor Area / Specialization Core

CLD413	Major Project in Complex Fluids	0	0	10	5
	Total Credits				**5**

Minor Area/Specialization Electives

Code	Title	L	T	P	C
CLL296	Nano-engineering of Soft Materials	3	0	0	3
CLL766	Interfacial Engineering	3	0	0	3
CLL767	Structures and Properties of Polymers	3	0	0	3
CLL771	Introduction to Complex Fluids	3	0	0	3
CLL772	Transport Phenomena in Complex Fluids	3	0	0	3
CLL773	Thermodynamics of Complex Fluids	3	0	0	3
CLL774	Simulation Techniques for Complex Fluids	3	0	0	3
CLL775	Polymerization Process Modeling	3	0	0	3
CLL776	Granular Materials	3	0	0	3
CLL777	Complex Fluids Technology	3	0	0	3

Minor Area/Departmental Specialization in Energy and Environment (Department of Chemical Engineering)

Minor Area/Specialization Core

Code	Title	L	T	P	C
CLD412	Major Project in Energy and Environment	0	0	10	5
	Total Credits				**5**

Minor Area/Specialization Electives

Code	Title	L	T	P	C
CLL705	Petroleum Reservoir Engineering	3	0	0	3
CLL706	Petroleum Production Engineering	3	0	0	3
CLL720	Principles of Electrochemical Engineering	3	0	0	3
CLL721	Electrochemical Methods	3	0	0	3
CLL722	Electrochemical Conversion and Storage Devices	3	0	0	3
CLL723	Hydrogen Energy and Fuel Cell Technology	3	0	0	3
CLL724	Environmental Engineering and Waste Management	3	0	0	3
CLL725	Air Pollution Control Engineering	3	0	0	3
CLL726	Molecular Modeling of Catalytic Reactions	3	0	0	3
CLL727	Heterogeneous Catalysis and Catalytic Reactors	3	0	0	3
CLL728	Biomass Conversion and Utilization	3	0	0	3
CLL733	Industrial Multiphase Reactors	3	0	0	3
CLL734	Process Intensification and Novel Reactors	3	0	0	3
CLL735	Design of Multicomponent Separation Processes	3	0	0	3
CLL736	Experimental Characterization of Multiphase Reactors	3	0	0	3
CLL743	Petrochemicals Technology	3	0	0	3
CLL768	Fundamentals of Computational Fluid Dynamics	2	0	2	3
CLL769	Applications of Computational Fluid Dynamics	2	0	2	3
CLL793	Membrane Science and Engineering	3	0	0	3
CLL794	Petroleum Refinery Engineering	3	0	0	3

Minor Area/Departmental Specialization in Process Engineering, Modelling and Optimization (Department of Chemical Engineering)

Minor Area/Specialization Core

Code	Title	L	T	P	C
CLD414	Major Project in Process Engineering, Modeling and Optimization	0	0	10	5
	Total Credits				**5**

Minor Area/Specialization Electives

Code	Title	L	T	P	C
CLL390	Process Utilities and Pipeline Design	3	0	0	3
CLL475	Safety and Hazards in Process Industries	3	0	0	3
CLL477	Materials of Construction	3	0	0	3
CLL707	Population Balance Modeling	3	0	0	3
CLL733	Industrial Multiphase Reactors	3	0	0	3
CLL734	Process Intensification and Novel Reactors	3	0	0	3
CLL735	Design of Multicomponent Separation Processes	3	0	0	3
CLL736	Experimental Characterization of Multiphase Reactors	3	0	0	3
CLL761	Chemical Engineering Mathematics	3	0	0	3
CLL762	Advanced Computational Techniques in Chemical Engineering	2	0	2	3
CLL768	Fundamentals of Computational Fluid Dynamics	2	0	2	3
CLL769	Applications of Computational Fluid Dynamics	2	0	2	3
CLL781	Process Operations Scheduling	3	0	0	3

Code	Title	L	T	P	C
CLL782	Process Optimization	3	0	0	3
CLL783	Advanced Process Control	3	0	0	3
CLL784	Process Modeling and Simulation	3	0	0	3
CLL785	Evolutionary Optimization	3	0	0	3
CLL791	Chemical Product and Process Integration	3	0	0	3
CLL792	Chemical Product Development and Commercialization	3	0	0	3
CLL793	Membrane Science and Engineering	3	0	0	3

Minor Area/Departmental Specialization in Nano-science and Technology (Department of Physics)

Minor Area/Specialization Core

Code	Title	L	T	P	C
PYL112	Quantum Mechanics	3	1	0	4
PYL201	Fundamentals of Dielectrics & Semiconductors	3	1	0	4
	Total Credits				**8**

Minor Area/Specialization Electives

Code	Title	L	T	P	C
PYL321	Low Dimensional Physics	3	0	0	3
PYL322	Nanoscale Fabrication	3	0	0	3
PYL323	Nanoscale Microscopy	2	0	0	2
PYL324	Spectroscopy of Nanomaterials	2	0	0	2
PYL421	Functional Nanostructures	3	0	0	3
PYL422	Spintronics	3	0	0	3
PYL423	Nanoscale Energy Materials & Devices	3	0	0	3
PYV428	Selected Topics in Nanotechnology	2	0	0	2
PYV429	Special Topics in Nanotechnology	1	0	0	1
PYD414	Project III	0	0	8	4

Minor Area/Departmental Specialization in Photonics Technology (Department of Physics)

Minor Area/Specialization Core

Code	Title	L	T	P	C
PYL112	Quantum Mechanics	3	1	0	4
PYL115	Applied Optics	3	1	0	4
	Total Credits				**8**

Minor Area/Specialization Electives

Code	Title	L	T	P	C
PYL311	Lasers	3	0	0	3
PYL312	Semiconductor Optoelectronics	3	0	0	3
PYL313	Fourier Optics and Holography	3	0	0	3
PYL411	Quantum Electronics	3	0	0	3
PYL412	Ultrafast Laser Systems and Applications	3	0	0	3
PYL413	Fiber and Integrated Optics	3	0	0	3
PYD414	Project III	0	0	8	4
PYL414	Engineering Optics	3	0	0	3
PYV418	Selected Topics in Photonics	2	0	0	2
PYV419	Special Topics in Photonics	1	0	0	1

Minor Area/Departmental Specialization in Theoretical and Computational Techniques in Physics (Department of Physics)

Minor Area/Specialization Core

Code	Title	L	T	P	C
PYL112	Quantum Mechanics	3	1	0	4
PYL204	Computational Physics	3	1	0	4
	Total Credits				**8**

Minor Area/Specialization Electives

Code	Title	L	T	P	C
PYL332	General Theory of Relativity & Cosmology	3	0	0	3
PYD414	Project III	0	0	8	4
PYL432	Quantum Electrodynamics	3	0	0	3
PYL433	Gauge Field Theory	3	0	0	3
PYV435	Monte Carlo and Molecular Dynamics Simulation	2	1	0	3
PYL745	Advanced Statistical Mechanics	3	0	0	3
PYL749	Quantum Information and Computing	3	0	0	3
PYL739	Computational Techniques for Solid State Materials	3	0	0	3
PYL743	Group Theory	3	0	0	3
PYV431	Relativistic Quantum Mechanics	2	0	0	2
PYV438	Selected Topics in Theoretical and Computational Physics	2	0	0	2
PYV439	Special Topics in Theoretical and Computational Physics	1	0	0	1

Interdisciplinary Specialization in Biodesign

Specialization Core

BML741	Medical Device Design	2	0	4	4
BMD742	Minor Biodesign Project	0	0	8	4
	Total Credits				**8**

Specialization Electives

APL380	Biomechanics	3	0	2	4
BML700	Intro. to Basic Medical Sciences for Engineers	3	0	0	3
BML710	Industrial Biomaterial Technology	3	0	0	3
BML720	Medical Imaging	3	0	0	3
BML735	Biomedical Signal and Image processing	2	0	2	3
BML736	Application of Mathematics in Biomedical Engineering	2	0	0	2
BML743	Special Topics in Biodesign	3	0	0	3
BML750	Point of Care Medical Diagnostic Devices	3	0	0	3
BML770	Fundamentals of Biomechanics	3	0	0	3
BML771	Orthopaedic Device Design	3	0	0	3
BML772	Biofabrication	3	0	0	3
BML810	Tissue Engineering	3	0	0	3
BML820	Biomaterials	3	0	0	3
BML830	Biosensor Technology	3	0	2	4
CLL779	Molecular Biotechnology and in-vitro Diagnostics	3	0	0	3
MCL442	Thermofluid Analysis of Biosystems	3	0	0	3
TXL773	Medical Textiles	3	0	0	3

Interdisciplinary Specialization in Robotics

Specialization Core

Core 1

MCL111*	Kinematics and Dynamics of Machines	3	0	2	4
MCL212*	Control Theory and Applications	3	0	2	4
ELL225*	Control Engineering-I	3	1	0	4
COP315*	Embedded System Design Project	0	1	6	4
ELL365*	Embedded Systems	3	0	0	3
	Total Credits				**13/14**

*Students of ME1/ME2 to take only one of these courses as core.
#Students of CS1/CS5 to take only one of these courses as core.
+Core for EE1/EE3 students only.

Other Students can select any one of the Core one courses mentioned above.

Core 2

JRL301	Robotics Technology	3	0	0	3

Core 3

JRD301	Mini Project in Robotics	0	0	14	7
	Total Credits				**13/14**

Since the course may have pre-requisites, plan in advance.
A student is required to complete (one of the core 1 course), (core 2 course) and (core 3 course).

Specialization Electives

COL106	Data Structures	3	0	2	4
COL333	Principles of Artificial Intelligence	3	0	2	4
COL341	Machine Learning	3	0	2	4
COL351	Analysis and Design of Algorithms	3	1	0	4
COL671	Artificial Intelligence	3	0	2	4
COL740	Software Engineering	3	0	2	4
COL752	Geometric Algorithms	3	0	0	3
COL774	Machine Learning	3	0	2	4
COL770	Advanced Artificial Intelligence	3	0	2	4
COL780	Computer Vision	3	0	2	4
COL783	Digital Image Analysis	3	0	3	4.5
COL864	Special Topics in Artificial Intelligence	3	0	0	3
COL870	Special Topics in Machine Learning	3	0	0	3
ELL406	Robotics and Automation	3	0	0	3
ELL409	Machine Intelligence and Learning	3	0	2	4
ELL703	Optimal Control Theory	3	0	0	3
ELL715	Digital Image Processing	3	0	2	4
ELL767	Mechatronics	3	0	0	3
ELL787	Embedded Systems and Applications	3	0	0	3
ELL791	Neural Systems and Learning Machines	3	0	2	4

ELL793	Computer Vision	3	0	0	3
ELL798	Agent Technology	3	0	0	3
MTL342	Analysis and Design of Algorithms	3	1	0	4
MTL509	Numerical Analysis	3	1	0	4
MTL729	Computational Algebra and its Applications	3	0	0	3
MTL744	Mathematical Theory of Coding	3	0	0	3
MTL811	Mathematical Foundation of Artificial Intelligence	3	0	0	3
MTL851	Applied Numerical Analysis	3	0	0	3
MCL731	Analytical Dynamics	3	0	0	3
MCL738	Dynamics of Multibody Systems	2	0	2	3
MCL745	Robotics	3	0	2	4
MCL749	Mechatronics Product Design	3	0	2	4
MCL837	Advanced Mechanisms	2	0	2	3
MCL845	Advanced Robotics	2	0	2	3

Departmental Specialization in Applications and Information Technology (Department of Computer Science and Engineering)

Specialization Core

COD494	B.Tech. Project Part-II	0	0	16	8
COL703	Logic for Computer Science	3	0	2	4
	Total Credits				**12**

Specialization Electives

COL333	Principles of Artificial Intelligence*	3	0	2	4
COL362	Introduction to Database Mgmt. Systems*	3	0	2	4
COL722	Introduction to Compressed Sensing	3	0	0	3
COL757	Model Centric Algorithm Design	3	0	2	4
COL760	Advanced Data Management	3	0	2	4
COL761	Data Mining	3	0	2	4
COL762	Database Implementation	3	0	2	4
COL765	Introduction to Logic and Functional Programming	3	0	2	4
COL770	Advanced Artificial Intelligence	3	0	2	4
COL786	Advanced Functional Brain Imaging	3	0	2	4
COL865	Special Topics in Computer Applications	3	0	0	3
COL869	Special Topics in Concurrency	3	0	0	3
COV885	Special Module in Computer Applications	1	0	0	1
COV888	Special Module in Database Systems	1	0	0	1
COV889	Special Module in Concurrency	1	0	0	1
SIL769	Internet Traffic-Measurement, Modeling & Analysis	3	0	2	4
SIL801	Special Topics in Multimedia System	3	0	0	3
SIL802	Special Topics in Web Based Computing	3	0	0	3
SIV813	Applications of Computer in Medicines	1	0	0	1
SIV861	Information and Comm Technologies for Development	1	0	0	1
SIV864	Special Module on Media Processing & Communication	1	0	0	1
SIV871	Special Module in Computational Neuroscience	1	0	0	1
SIV889	Special Module in Human Computer Interaction	1	0	0	1
SIV895	Special Module on Intelligent Information Processing	1	0	0	1

Departmental Specialization in Architecture and Embedded Systems (Department of Computer Science and Engineering)

Specialization Core

COD494	B.Tech. Project Part-II	0	0	16	8
COL703	Logic for Computer Science	3	0	2	4
	Total Credits				**12**

Specialization Electives

COP315	Embedded System Design Project	0	1	6	4
COL718	Architecture of High Performance Computers	3	0	2	4
COL719	Synthesis of Digital Systems	3	0	2	4
COL788	Advanced Topics in Embedded Computing	3	0	0	3

COL812	System Level Design and Modelling	3	0	0	3
COL818	Principles of Multiprocessor Systems	3	0	2	4
COP820	Processor Design Laboratory	0	0	8	4
COL821	Reconfigurable Computing	3	0	0	3
COL861	Special Topics in Hardware Systems	3	0	0	3
COV881	Special Module in Hardware Systems	1	0	0	1

Departmental Specialization in Data Analytics and Artificial Intelligence (Department of Computer Science and Engineering)

Specialization Core

COD494	B.Tech. Project Part 2	0	0	16	8
COL703	Logic for Computer Science	3	0	2	4
	Total Credits				**12**

Specialization Electives

COL333	Principles of Artificial Intelligence*	3	0	2	4
COL341	Machine Learning	3	0	2	4
COL362	Introduction to Database Mgmt. Systems*	3	0	2	4
COL760	Advanced Data Management	3	0	2	4
COL761	Data Mining	3	0	2	4
COL762	Database Implementation	3	0	2	4
COL765	Introduction to Logic and Functional Programming	3	0	2	4
COL770	Advanced Artificial Intelligence	3	0	2	4
COL772	Natural Language Processing	3	0	2	4
COL774	Machine Learning	3	0	2	4
COL776	Learning Probabilistic Graphical Models	3	0	2	4
COL786	Advanced Functional Brain Imaging	3	0	2	4
COL864	Special Topics in Artificial Intelligence	3	0	0	3
COL868	Special Topics in Database Systems	3	0	0	3
COL869	Special Topics in Concurrency	3	0	0	3
COL870	Special Topics in Machine Learning	3	0	0	3
COV878	Special Module in Machine Learning	1	0	0	1
COV884	Special Module in Artificial Intelligence	1	0	0	1
COV888	Special Module in Database Systems	1	0	0	1
COV889	Special Module in Concurrency	1	0	0	1

Departmental Specialization in Graphics and Vision (Department of Computer Science and Engineering)

Specialization Core

COD494	B.Tech. Project Part 2	0	0	16	8
COL703	Logic for Computer Science	3	0	2	4
	Total Credits				**12**

Specialization Electives

COL780	Computer Vision	3	0	2	4
COL781	Computer Graphics	3	0	3	4.5
COL783	Digital Image Analysis	3	0	3	4.5
COL829	Advanced Computer Graphics	3	0	2	4
COV877	Special Module on Visual Computing	1	0	0	1
SIL801	Special Topics in Multimedia System	3	0	0	3

Departmental Specialization in Software Systems (Department of Computer Science and Engineering)

Specialization Core

COD494	B.Tech. Project Part 2	0	0	16	8
COL703	Logic for Computer Science	3	0	2	4
	Total Credits				**12**

Specialization Electives

COL724	Advanced Computer Networks	3	0	2	4
COL728	Compiler Design	3	0	3	4.5
COL729	Compiler Optimization	3	0	3	4.5
COL730	Parallel Programming	3	0	2	4
COL732	Virtualization and Cloud Computing	3	0	2	4
COL733	Cloud Computing Technology Fundamentals	3	0	2	4
COL740	Software Engineering	3	0	2	4
COL768	Wireless Networks	3	0	2	4
COL819	Advanced Distributed Systems	3	0	2	4
COL851	Special Topics in Operating Systems	3	0	0	3
COL852	Special Topics in Compilers	3	0	0	3
COL860	Special Topics in Parallel Computation	3	0	0	3

COL862	Special Topics in Software Systems	3	0	0	3
COL867	Special Topics in High Speed Networks	3	0	0	3
COL871	Special Topics in Programming Languages	3	0	0	3
COL886	Special Topics in Operating Systems	3	0	0	3
COV876	Special Module on Automated Reasoning Methods for Program Analysis	1	0	0	1
COV880	Special Module in Parallel Computation	1	0	0	1
COV882	Special Module in Software Systems	1	0	0	1
COV887	Special Module in High Speed Networks	1	0	0	1
SIL765	Networks & System Security	3	0	2	4
SIL769	Internet Traffic -Measurement, Modeling & Analysis	3	0	2	4

Departmental Specialization in Theoretical Computer Science (Department of Computer Science and Engineering)

Specialization Core

COD494	B.Tech. Project Part-II	0	0	16	8
COL703	Logic for Computer Science	3	0	2	4
	Total Credits				**12**

Specialization Electives

COL726	Numerical Algorithms	3	0	2	4
COL730	Parallel Programming	3	0	2	4
COL750	Foundations of Automatic Verification	3	0	2	4
COL751	Algorithmic Graph Theory	3	0	0	3
COL752	Geometric Algorithms	3	0	0	3
COL753	Complexity Theory	3	0	0	3
COL754	Approximation Algorithms	3	0	0	3
COL756	Mathematical Programming	3	0	0	3
COL757	Model Centric Algorithm Design	3	0	2	4
COL758	Advanced Algorithms	3	0	2	4
COL759	Cryptography & Computer Security	3	0	0	3
COL830	Distributed Computing	3	0	0	3
COL831	Semantics of Programming Languages	3	0	0	3
COL832	Proofs and Types	3	0	0	3
COL860	Special Topics in Parallel Computation	3	0	0	3
COL863	Special Topics in Theoretical Computer Science	3	0	0	3
COL866	Special Topics in Algorithms	3	0	0	3
COL872	Special Topics in Cryptography	3	0	0	3
COV879	Special Module in Financial Algorithms	2	0	0	2
COV883	Special Module in Theoretical Computer Science	1	0	0	1
COV886	Special Module in Algorithms	1	0	0	1

Departmental Specialization in Environmental Engineering (Department of Civil Engineering)

Specialization Core

CVD412	B.Tech. Project Part-II	0	0	12	6
CVL313	Air and Noise Pollution	3	0	0	3
CVL721	Solid Waste Engineering	3	0	0	3
CVL724	Environmental Systems Analysis	3	0	2	4
	Total Credits				**16**

Specialization Electives (8 Credits)

CVL311	Industrial Waste Management	3	0	0	3
CVL312	Environmental Assessment Methodologies	3	0	0	3
CVL727	Environmental Risk Assessment	3	0	0	3
CVL820	Environmental Impact Assessment	3	0	0	3
CVL822	Emerging Technologies for Environmental Management	3	0	0	3
CVL823	Thermal Techniques for Waste Mgmt.	3	0	0	3
CVL824	Life Cycle Analysis & Design for Environment	3	0	0	3

Departmental Specialization in Geotechnical Engineering (Department of Civil Engineering)

Specialization Core

CVD412	B.Tech. Project Part-II	0	0	12	6
CVL421	Ground Engineering	3	0	0	3
CVL422	Rock Engineering	3	0	0	3
CVL423	Soil Dynamics	3	0	0	3
CVP424	Environmental Geotechniques and Geosynthetics	3	0	0	3
	Total Credits				**18**

Specialization Electives (5 Credits)

CVL431	Design of Foundations & Retaining Structures	3	0	0	3
CVL432	Stability of Slopes	2	0	0	2
CVL433	FEM in Geotechnical Engineering	3	0	0	3
CVL434	Geotechnical Design Studio	0	0	4	2
CVL435	Underground Structures	2	0	0	2

Departmental Specialization in Structural Engineering (Department of Civil Engineering)

Specialization Core

CVD412	B.Tech. Project Part-II	0	0	12	6
CVL441	Structural Design	3	0	0	3
CVL442	Structural Analysis-III	3	0	0	3
CVL443	Prestressed Concrete & Industrial Structures	3	0	0	3
CVL758	Solid Mechanics in Structural Engineering	3	0	0	3
	Total Credits				**18**

Specialization Electives (6 Credits)

CVL763	Analytical and Numerical Methods for Struct. Engineering	2	1	0	3
CVL765	Concrete Mechanics	3	0	0	3
CVL766	Design of Bridge Structures	3	0	0	3
CVL768	Design of Masonry Structures	3	0	0	3
CVL769	Design of Tall Buildings	3	0	0	3
CVL770	Prestressed and Composite Structures	3	0	0	3
CVL771	Advanced Concrete Technology	3	0	0	3
CVL857	Structural Safety and Reliability	3	0	0	3
CVL858	Theory of Plates and Shells	3	0	0	3
CVL859	Theory of Structural Stability	3	0	0	3
CVL862	Design of Offshore Structures	3	0	0	3
CVL866	Wind Resistant Design of Structures	3	0	0	3

Departmental Specialization in Transportation Engineering (Department of Civil Engineering)

Specialization Core

CVD412	B.Tech. Project Part-II	0	0	12	6
CVL740	Pavement Materials and Design of Pavements	2	0	2	3
CVL741	Urban and Regional Transportation Planning	2	0	2	3
CVL742	Traffic Engineering	3	0	2	4
	Total Credits				**16**

Specialization Electives (8 Credits)

CVL361	Introduction to Railway Engineering	3	0	0	3
CVL461	Logistics and Freight Transport	3	0	0	3
CVL462	Introduction to Intelligent Transportation Systems	3	0	0	3
CVL743	Airport Planning and Design	3	0	0	3
CVL744	Transportation Infrastructure Design	3	0	0	3
CVL746	Public Transportation Systems	3	0	0	3
CVL841	Advanced Transportation Modelling	2	0	2	3
CVL842	Geometric Design of Roads	2	0	2	3
CVL847	Transportation Economics	3	0	0	3

Departmental Specialization in Water Resources Engineering (Department of Civil Engineering)

Specialization Core

CVL382	Groundwater	2	0	0	2
CVL481	Water Resources Management	3	0	0	3
CVL482	Water Power Engineering	2	0	2	3
CVL483	Groundwater & Surface-water Pollution	2	0	0	2
CVD412	B.Tech. Project Part-II	0	0	12	6
	Total Credits				**16**

Specialization Electives (8 Credits)

CVL284	Fundamentals of Geographic Information Systems	2	0	2	3
CVL383	Water Resources Systems	2	0	0	2
CVL384	Urban Hydrology	2	0	0	2
CVL385	Frequency Analysis in Hydrology	2	0	0	2
CVL386	Fundamentals of Remote Sensing	2	0	2	3
CVP484	Computational Aspects in Water Resources	1	0	4	3

CVL485	River Mechanics	2	0	2	3
CVL486	Geo-informatics	2	0	2	3
CVL837	Mechanics of Sediment Transport	3	0	0	3

Departmental Specialization in Automotive Design (Department of Mechanical Engineering)

Specialization Core

MCD412	B.Tech. Project-II	0	0	14	7
MCL321	Automotive Systems	3	0	2	4
	Total Credits				**11**

Specialization Electives

MCL322	Power Train Design	3	0	0	3
MCL421	Automotive Structural Design	2	0	2	3
MCL422	Design of Brake Systems	2	0	2	3
MCL721	Automotive Prime Movers	3	0	0	3
MCL722	Mechanical Design of Prime Mover Elements	3	0	0	3
MCL723	Vehicle Dynamics	3	0	0	3
MCL724	Biomechanics of Trauma in Automotive Design	3	0	0	3
MCL725	Design Electronic Assist Systems in Automobiles	3	0	0	3
MCL726	Design of Steering Systems	3	0	0	3

Departmental Specialization in Technical and Innovative Textiles (Department of Textile Technology)

Specialization Electives

TXD402	Major Project Part-II	0	0	16	8
TXL710	High Performance and Specialty Fibres	3	0	0	3
TXL719	Functional and Smart Textiles	3	0	0	3
TXL734	Nonwoven Science and Engineering	3	0	0	3
TXL740	Science & App. of Nanotechnology in Textiles	3	0	0	3
TXL752	Design of Functional Clothing	3	0	0	3
TXL773	Medical Textiles	3	0	0	3
TXL775	Technical Textiles	3	0	0	3
TXL776	Design & Manuf. of Text. Reinforced Composites	3	0	0	3

Departmental Specialization in Textile Business Management (Department of Textile Technology)

Specialization Electives

MCL756	Supply Chain Management	3	0	0	3
MCL760	Project Management	3	0	0	3
TXD402	Major Project Part-II	0	0	16	8
TXL381	Costing and its Application in Textiles	3	1	0	4
TXL781	Costing, Project Formulation and Appraisal	3	0	0	3
TXL782	Production and Operations Management in Textile Industry	3	0	0	3
TXL783	Design of Experiments and Statistical Techniques	3	0	0	3
TXV702	Management of Textile Business	1	0	0	1

Departmental Specialization in Appliance Engineering (Department of Electrical Engineering)

Specialization Electives

ELD451	BTP Part-II	0	0	16	8
ELL319	Digital Signal Processing	3	0	2	4
ELL365	Embedded Systems	3	0	0	3
ELL450	Special Topics in AE-I	3	0	0	3
ELL754	Permanent Magnet Machines	3	0	0	3
ELL756	Special Electrical Machines	3	0	0	3
ELL762	Intelligent Motor Controllers	3	0	0	3
ELL766	Appliance System	3	0	0	3
ELL767	Mechatronics	3	0	0	3
ELV750	Special Modules in AE-I	1	0	0	1

Departmental Specialization in Cognitive and Intelligent Systems (Department of Electrical Engg.)

Specialization Electives

ELD457	BTP Part-II	0	0	16	8
ELL409	Machine Intelligence and Learning	3	0	2	4
ELL457	Special Topics in C&IS – I	3	0	0	3
ELL704	Advanced Robotics	3	0	0	3
ELL707	Systems Biology	3	0	0	3
ELL715	Digital Image Processing	3	0	2	4

ELL741	Neuromorphic Engineering	3	0	0	3
ELL762	Intelligent Motor Controllers	3	0	0	3
ELL779	Forecasting Techniques for Power Systems	3	0	0	3
ELL784	Introduction to Machine Learning	3	0	0	3
ELL786	Multimedia Systems	3	0	0	3
ELL788	Computational Cognition and Perception	3	0	0	3
ELL789	Intelligent Systems	3	0	0	3
ELL791	Neural Systems and Learning Machines	3	0	2	4
ELL793	Computer Vision	3	0	0	3
ELL794	Human-Computer Interface	3	0	0	3
ELL795	Swarm Intelligence	3	0	0	3
ELL796	Signals and Systems in Biology	3	0	0	3
ELL798	Agent Technology	3	0	0	3
ELL799	Natural Computing	3	0	0	3
ELV780	Special Modules in Computers	1	0	0	1

Departmental Specialization in Communication Systems and Networking (Dept. of Electrical Engg.)

Specialization Electives

ELD458	BTP Part-II	0	0	16	8
ELL411	Digital Communications	3	0	2	4
ELL458	Special Topics in CS&N – I	3	0	0	3
ELL713	Microwave theory and techniques	3	0	0	3
ELL714	Basic Information Theory	3	0	0	3
ELL716	Telecom Switching and Transmission	3	0	0	3
ELL717	Optical Communication Systems	3	0	0	3
ELL723	Broadband Communication Systems	3	0	0	3
ELL725	Wireless Communications	3	0	0	3
ELL785	Computer Communication Networks	3	0	0	3
ELV720	Special Modules in CS&N – I	1	0	0	1

Departmental Specialization in Electric Transportation (Department of Electrical Engineering)

Specialization Electives

ELD454	BTP Part-II	0	0	16	8
ELL334	DSP based Control of drives	3	0	2	4
ELL450	Special Topics in AE – I	3	0	0	3
ELL454	Special Topics in ET – I	3	0	0	3
ELL750	Modeling of electrical machines	3	0	0	3
ELL754	Permanent Magnet Machines	3	0	0	3
ELL755	Variable Reluctance Machines	3	0	0	3
ELL764	Electric vehicles	3	0	0	3
ELV753	Special Modules in ET – I	1	0	0	1

Departmental Specialization in Energy-Efficient Technologies (Department of Electrical Engineering)

Specialization Electives

ELD453	BTP Part-II	0	0	16	8
ELL408	Low Power Circuit Design	3	0	0	3
ELL453	Special Topics in EET – I	3	0	0	3
ELL721	Introduction to Telecommunication Systems	3	0	0	3
ELL743	Photovoltaics	3	0	0	3
ELL757	Energy Efficient Motors	3	0	0	3
ELL763	Advanced Electrical Drives	3	0	0	3
ELL765	Smart Grid Technology	3	0	0	3
ELL797	Energy Efficient Computing	3	0	0	3
ELV752	Special Modules in EET – I	1	0	0	1

Departmental Specialization in Information Processing (Department of Electrical Engineering)

Specialization Electives

ELD459	BTP Part-II	0	0	16	8
ELL459	Special Topics in IP – I	3	0	0	3
ELL460	Special Topics in IP – II	3	0	0	3
ELL714	Basic Information Theory	3	0	0	3
ELL715	Digital Image processing	3	0	2	4
ELL718	Statistical signal processing	3	0	0	3
ELL719	Detection and Estimation Theory	3	0	0	3
ELL720	Advanced Digital Signal Processing	3	0	0	3
ELL784	Introduction to Machine Learning	3	0	0	3
ELL786	Multimedia Systems	3	0	0	3
ELL793	Computer Vision	3	0	0	3

ELL794	Human-Computer Interface	3	0	0	3
ELV781	Special Modules in IP – I	1	0	0	1
CRL707	Human and Machine Speech Communications	3	0	0	3

Departmental Specialization in Nano-electronic and Photonic Systems (Department of Electrical Engg.)

Specialization Electives

ELD456	BTP Part-II	0	0	16	8
ELL456	Special Topics in NE&PS – I	3	0	0	3
ELL730	IC Technology	3	0	0	3
ELL732	Micro and Nanoelectronics	3	0	0	3
ELL737	Flexible Electronics	3	0	0	3
ELL738	Micro and Nano photonics	3	0	0	3
ELL739	Advanced semiconductor devices	3	0	0	3
ELL740	Compact Modeling of Semiconductor Devices	3	0	2	4
ELL741	Neuromorphic Engineering	3	0	0	3
ELL742	Introduction to MEMS Design	3	0	0	3
ELL743	Photovoltaics	3	0	0	3
ELL744	Electronic and Photonic Nanomaterials	3	0	0	3
ELL745	Quantum Electronics	3	0	0	3
ELV731	Special Modules in NE&PS – I	1	0	0	1

Departmental Specialization in Smart Grid and Renewable Energy (Department of Electrical Engg.)

Specialization Electives

ELD452	BTP Part-II	0	0	16	8
ELL402	Computer Communications	3	0	0	3
ELL417	Renewable Energy Systems	3	0	0	3
ELL765	Smart Grid Technology	3	0	0	3
ELL770	Power System Analysis	3	0	0	3
ELL771	Special Topics in SG&RE – I	3	0	0	3
ELL772	Planning and Operation of Smart Grid	3	0	0	3
ELL773	High Voltage DC Transmission	3	0	0	3
ELL774	Flexible AC Transmission Systems	3	0	0	3
ELL775	Power System Dynamics	3	0	0	3
ELL789	Intelligent Systems	3	0	0	3
ELV451	Special Modules in SG&RE – I	1	0	0	1

Departmental Specialization in Systems and Control (Department of Electrical Engineering)

Specialization Electives

ELD450	BTP Part-II	0	0	16	8
ELL436	Digital Control	3	0	0	3
ELL700	Linear Systems Theory	3	0	0	3
ELL702	Nonlinear Systems	3	0	0	3
ELL703	Optimal Control Theory	3	0	0	3
ELL704	Advanced Robotics	3	0	0	3
ELL705	Stochastic Filtering and Identification	3	0	0	3
ELL707	Systems Biology	3	0	0	3
ELL708	Selected Topics in Systems and Control	3	0	0	3
ELL762	Intelligent Motor Controllers	3	0	0	3
ELV700	Special Modules in Systems and Control	1	0	0	1

Departmental Specialization in VLSI and Embedded Systems (Department of Electrical Engineering)

Specialization Electives

ELD455	BTP Part-II	0	0	16	8
ELL365	Embedded Systems	3	0	0	3
ELL455	Special Topics in V&ES – I	3	0	0	3
ELL720	Advanced Digital Signal Processing	3	0	0	3
ELL730	IC Technology	3	0	0	3
ELL731	Mixed signal circuit design	3	0	0	3
ELL733	Digital ASIC Design	3	0	2	4
ELL734	MOS VLSI Design	3	0	0	3
ELL735	Analog Integrated Circuits	3	0	0	3
ELL736	Solid State Imaging Sensors	3	0	0	3
ELL740	Compact Modeling of Semiconductor Devices	3	0	2	4
ELL741	Neuromorphic Engineering	3	0	0	3
ELL747	Active and Passive Filter Design	3	0	0	3
ELL748	System-on-Chip Design and Test	3	0	0	3
ELL749	Semiconductor Memory Design	3	0	0	3
ELV730	Special Modules in V&ES – I	1	0	0	1

6. NON-GRADED CORE FOR UNDERGRADUATE STUDENTS

In order to synergize formal academics with informal outside-class-room learning experience, mechanisms for earning non-graded units have been introduced in the undergraduate curriculum. In order to earn these units, a student will need to involve himself/herself in activities beyond the classroom engagements. For earning 1 unit a student will typically need to work for 2-3 hours per week (28-42 hours per semester) in on-campus activities. In case of project / design / internship activities, the student engagement expected is typically 20 man-days of work per non-graded unit. A student would not be allowed to earn credits as well as non-graded units for the same effort - it is important that the efforts towards earning non-graded units should be distinct from that spent on earning credits. Also, the effort for earning different components of the non-graded units also should be distinct, i.e., the same effort would not be evaluated for more than one non-graded activity.

Non-graded core of the undergraduate curriculum comprises the following components:

Table-6.1

S. No.	Components	Semester	Units
1.	Introduction to Engineering (Induction Programme) SAN101	I	0.5
2.	Club Activities TPN101	II	0.5
3.	Communication Skills and Language Lab (Language and Writing Skills) HUN102	I or II	3
4.	Soft Skill Development TPN102 TPN103	III and IV	2
5.	Human Values and Professional Ethics HUN101	I or II	3
6.	Seminar (Presentation and Report Writing Skills) XXN201 XXN202	V and VI	2
	Total		**11**

These 11 units form a compulsory graduation requirement for all the undergraduate (B.Tech.) programmes. A student will need to earn these 11 units over the duration of the programme with special consideration and requirements for each component as detailed in the following sections. Each component would be constituted by one or more non-graded courses, and a

student will need to get an 'S' grade in these courses to earn the respective non-graded unit(s). The 'S' grade denotes satisfactory performance and completion of a non- grade course. The 'V' grade denotes excellent performance and completion of a non- grade course. The 'G' grade denotes good performance and completion of a non- grade course. Incomplete status in such courses will be indicated by a 'Z' grade. The student would be required either to repeat the course / activity or continue with the project / internship until such time that the evaluating faculty member / committee is satisfied with the effort to award an 'S' grade. No partial / fractional units can be awarded. For example, if a particular activity carries 2 units, a student cannot be awarded 1 unit or fractional units for incomplete work, but would need to repeat / complete the work to the satisfaction of the evaluating faculty member / committee to become eligible for award of 2 units.

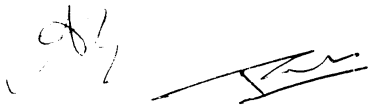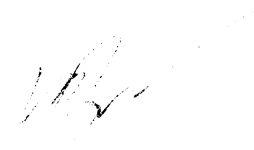## 6.1 Introduction to Engineering (Induction Programme)

This non-graded component is aimed at orienting and exciting students in the subject of engineering in general and their respective disciplines in particular. The objectives of the component are:
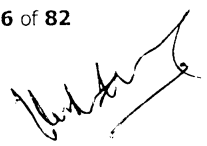
- Exposing students to "Engineering" as a profession that creates wealth for nations, and as a vehicle for economic growth.

- Exposing students to Science/ Engineering as a medium through which one can address problems facing the society including some of the grand challenges.

- Excite students by enabling them to appreciate the role and enormous impact of research in science/ engineering on our day to day lives.

- Enlighten students about the various career options available to them.

- Make students aware of the issues involved in engineering a

product, and help them appreciate why the process of design and innovation leading to products and systems is both personally satisfying and professionally rewarding.

- Excite students about potential role models and successful alumni in engineering profession.

- Motivate students to take up some co-curricular activities on their own during their stay in the Institute. The activities to realize the above-mentioned objectives as part of this non-graded component include:

- Understanding engineering through product dissection and reverse engineering. (The products given to students to dissect could be physical in form or in the form of videos).

- Screening of videos that bring out the strong relation between science / engineering and societal needs.

- Conducting design and innovation contests among students.

- Solving science / engineering puzzles in the class.

- Lectures by successful industrialists, alumni and entrepreneurs about their journey.

- Exposure to successful research cases from the Institute and the impact of the same.

- Exposure to successful products / innovations from the Institute which have reached people/ industry/ society.

- Some interesting demonstrations in laboratories.

- Hands-on exercises in laboratories including use of breadboard circuits, Lego sets, robot kits, balsa bridge engineering kits, fibre optics kits, mobile apps etc.

- Industry visits

- Visits to on-going exhibitions in the city

- Do-it-yourself projects in teams

- Lectures by faculty, visitors, and alumni on some exciting topics.

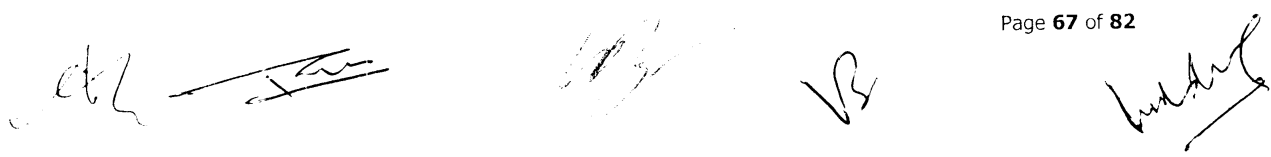This non-graded unit is administered in the form of one non-graded courses of 0.5 unit:

SAN101 Introduction to Engineering in the first semester of the undergraduate programme, and Course coordinator of SAN101 would be identified by the Student Activity Cell (Chief Proctor). It is necessary to get a satisfactory (S) grade in the course for completing the degree requirements. Attendance would be one of the main criteria for evaluation. Apart from this, active participation and quiz based evaluation etc. would also be used as a basis to decide 'S' or 'V' or 'G' or 'Z' grade. In case a student is awarded 'Z' grade he/she would need to repeat the course in the subsequent year(s).

6.2 Club Activities

All students, in the second semester, are required to participate in club activity based on their choice and available seats on first come first serve basis. The activity is to promote their hobby and broaden their vision towards life. The participation would enable students to look beyond academics and promote extra-curricular activities. Institute level clubs will be run by **T&P Cell.** Each club will have one faculty coordinator where students will register. The evaluation process for S, V, G and Z grade will be carried out by Faculty Coordinator of the respective Club under the control of **T&P Cell**. In case a student is awarded 'Z' grade he/she would need to repeat the activity in the subsequent year(s).

6.3 Communication Skills (Language and Writing Skills)

All students, in the first two semesters, are required to undergo exercises designed to impart language skills- enhancing their ability of listening comprehension, reading and writing in English. These exercises would be tailored according to the background of the students. The English language ability of the students would be assessed through a test to be conducted in

the beginning, typically during their admission and orientation period. The students would also be exposed to principles of English grammar and nuances of technical writing. Textual material and lectures would focus on the relationship between Engineering, Humanities and Social Sciences.

This component is also administered in the form of one course of three unit: HUN102 Communication Skills and Language Lab in the first semester or in the second semester. Course coordinators for these courses are identified by the Head, Humanities and Social Sciences. Assessment of a student towards S, V and G grade in each of these courses would typically be on the basis of attendance, participation and performance in the exercises. A student could also be prescribed self learning exercises or additional practice sessions during vacations as requirement for securing S, V and G grade. In case a student is awarded 'Z' grade he/she would need to repeat the activity in the subsequent year(s). Student's involvement, during regular semester, would typically be two hours per week.

6.4 Soft Skill Development

All students, in the third and fourth semesters, are required to participate in the soft skill development classes/ program/ activities. Activities like group discussion, team working, time management, stress management, body language, communication skill, work ethics etc. may help students to develop right attitude. This program is required to master the art of expressing their feelings and thoughts in desired manner and to start their preparation so that students can be JOB READY. The participation would groom students in reducing worries and help students to develop positive attitude at future work places. **Course coordinator of TPN102 and TPN103 would be identified by the Chairman, T&P Cell**. The activities will be conducted by **T&P Cell** in coordination with respective Head of Department. **The evaluation process for S, V, G and Z grade will be carried out by T&P Cell.**

6.5 Human Values and Professional Ethics
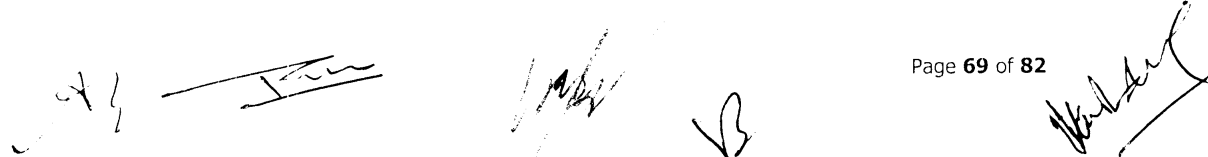
There is increasing consensus worldwide that engineering ethics should be incorporated into the engineering curriculum to provide students with an exposure to the kind of professional ethical dilemmas they might face on an individual basis as well as in the larger context of ethical aspects of technology development. Workshops, discussion/ debates, use of theatre-in-education, case-study based approaches, etc. are often used for illustration and discussion of engineering ethics and such inputs could be provided in a stand-alone manner, integrated into existing courses or both. The objective of this non-graded component is to sensitize students about Professional Ethics and Social Responsibility (PESR) through a combination of the above-mentioned approaches, supplemented by discussion and supplementary materials, to help students to become ethical professionals. A student is required to complete this non-graded component of the undergraduate programme by the course HUN101 running in first or second semester. The student will earn 3 unit by getting S or V or G grade in the course.

6.6 Seminar (Presentation and Report Writing Skills)

The objective of this non-graded component is to provide the students with an opportunity to develop their skills in preparing write-ups and / or making presentations, and reading / listening to others' write-ups / presentations. A student would be required to earn these non-graded units in their 5th and 6th semesters. This component would be administered in two parts:

1. Seminar courses

    1. These courses (XXN201, XXN202, etc.) introduced by the parent Department of each student. These courses would be non-credit electives, offered in V and VI semester. These seminar sessions would be held for two hours per week. The main emphasis of these

courses will be presentation and report writing skills of the students. The course coordinator for these courses shall be appointed by HoD. Students need to register for at least one such course in his / her parent department for earning one unit.

2. Technical Seminars/Conference/ Competitions
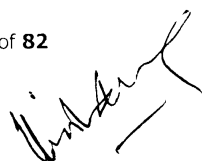
Students may earn the remaining one unit through any one of the following means:

i. Paper_Publication Technical publications in Journals or Conferences would be considered, provided (i) the number of authors of the paper does not exceed 2 students and the faculty member supervising the work. The faculty member certifies that the paper was written by the concerned students.

ii. Paper_Presentation By presenting a paper in National or International Conference / Seminar or winning a award in a technical paper presentation during a Technical event an institute level. The student will need to submit a copy of the certificate and the abstract of the paper presented.

iii. Curricular_Activities By submitting documentary evidence of excellence in debating and/or writing as certified by faculty in-charge of these activities, or inter college or University level to the Head of Department. In all such cases, the student should submit documentary evidence.

iv. Institutional_Activities A student who performs as a compere for any of the Institute functions (only those listed in the Institute calendar). The student will need to produce a signed letter from the faculty incharge of the Institute function stating the student's role as compere. The letter must include the date, time, venue and duration of the event. Any event lasting less than 1 hour will not be counted.

v. Winning_Competetion A student who wins first, second or third position in any event / competition conducted at inter-Hostel level, or Institute level or participate in Inter-Institute or University level would qualify for this option. The event / competition must be either a debate / declamation / extempore. Since many such events do not have certificates issued, the student must submit a letter signed by the warden or faculty incharge stating the date, time, venue of the event / competition along with the number of participants and position secured. In case number of participants is less than 20, the event shall not be counted.

vi. University_Events A student who participate in Inter-Institute or University level Literary/Technical event would qualify for this option.

vii. Coordinating_Events Academic Events in Department or Institute Level. A minimum of three such documents certified by the Faculty in charge of the Board / Club / Activity as mentioned above would qualify a student to earn one unit of Communication Skills / Seminar. In each case, before recommending the award of non-graded units for the above activities, the Faculty in charge of the Board / Club / Activity should keep in mind that a student engagement / effort (including preparations and the actual event) of 28-42 hours would be necessary for the award of one non-graded unit.

6.7 Emergent Cases
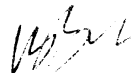
Not with standing anything contained in these Regulations, Vice Chancellor, RTU may, in emergent situation, take such action including insertion, suspension or modification of any Regulation(s)

on behalf of the UDAC as he deems appropriate and report it to the next meeting of the BOM for its approval.
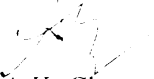
(Prof. Anil K. Mathur)
Dean UD

(Prof. K. S. Grover)
Prof. Civil Engg

(Prof. V. Pandey)
HOD HEAS

(Prof. A.K. Chaturvedi)
Charman, Examination Cell
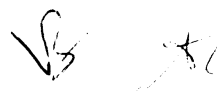
(Dr. R.K.Banyal)
HOD Comp.

(Dr. Vikas Bansal)
Asso. Dean, Academic Cell

Template for Course Structure for B. Tech. Program

Semester	Course-1	Course-2	Course-3	Course-4	Course-5	Course-6	Course-7	Course-8	Course-9	Course-10	SODECA (Anandam)	L	T	P	Credits	Non-Graded Units	Contact Hours
I	MTL100	CSL100	PYL100/ CML100	MEL100 /CEL100/EEL100	CEP102/MEP102	MEP101/XXP200		OPEN ELECTIVE	SAN101	HUN101/ HUN102	SAA100						
	Engineering Mathematics I	Programming for Problem Solving	Engineering Physics / Engineering Chemistry	*Basic Mechanical Engineering / Basic Civil Engineering / Introduction to Electrical & Electronics Engineering	Computer Aided Engineering Graphics / Computer Aided Machine Drawing	Product Realization through Manufacturing / Skill Development Laboratory			Induction Programme (Non-graded)	Human Values and Professional Ethics (Non-graded) / Communication Skills and Language Lab (Non-graded)							
	3 1 0 4	2 0 2 3	3 1 2 5	2 0 2 3	0 0 2 1	0 0 2 1			0 0 1 0.5	2 0 2 3	0 5	12	2	13	17.5	3.5	27
II	MTL101	CSL101	CML100 /PYL100	MEL100 /CEL100/EEL100	MEP102/CEP102	XXP200/MEP101			TPN101		SAA100						
	Engineering Mathematics II	Data Analysis & AI Using Python	Engineering Chemistry / Engineering Physics	*Basic Mechanical Engineering / Basic Civil Engineering / Introduction to Electrical & Electronics Engineering	Computer Aided Machine Drawing / Computer Aided Engineering Graphics	Skill Development Laboratory / Product Realization through Manufacturing			Club activity (Non-graded)	Communication Skills and Language Lab (Non-graded) / Human Values and Professional Ethics (Non-graded)							
	3 1 0 4	2 0 2 3	3 1 2 5	2 0 2 3	0 0 2 1	0 0 2 1			0 0 1 0.5	2 0 2 3	0.5	12	2	13	17.5	3.5	27

* Students of CS, EC, EE, EIC, IT will study MEL100 and CEL100
Students of CE, PE, PC will study MEL100 and EEL100
Students of AE, ME, PIE will study CEL100 and EEL100

Half of the Students admitted to First year will study the courses 3-6 in first semester and then remaining half in the second semester.

Semester	Course-1	Course-2	Course-3	Course-4	Course-5	Course-6	Course-7	Course-8	Course-9	Course-10	SODECA (Anandam)	L	T	P	Credits	Non-Graded Units	Contact Hours
III					CEL101	HUL201/HUL202				TPN102	SAA100						
					Environmental Science	General Studies / Economics and Financial Management				Soft Skill Development -1							
					2 0 0 2	3 1 0 4				0 0 2 1	0 5				28	1	
IV					MTL102	HUL202/HUL201				TPN103	SAA100						0
					Advanced Mathematics (Branch specific)	Economics and Financial Management / General Studies				Soft Skill Development-2							

Sem																
						3 1 0 4	3 1 0 4			0 0 2 1	0.5				28	1

Note: *Students of Circuit branches will study Environmental Science in III Semester and Advanced Mathematics in IV Semester. while Students of Non-Circuit branches will study Environmental Science in IV Semester and Advanced Mathematics in III Semester.

**Students of Circuit branches will study General Studies in III Semester and Economics and Financial Management in IV Semester while Students of Non-Circuit branches will study General Studies in IV Semester and Economics and Financial Management in III Semester.

Sem																
V						XXT301	HUL203		XXN201		SAA100					0
						Industrial training (45 days)	Indian Constitution		Seminar-1 (Non - Graded)							
						0 0 2 2	3 1 0 4		0 0 2 1		0.5				28	1.0
VI									XXN202		SAA100					0
									Seminar-2 (Non - Graded)							
									0 0 2 1		0.5				28	1.0
VII						XXD411	XXT302				SAA100					0
						Project Part-1	Industrial training (60 days)									
						0 0 8 4	0 0 2 3				0.5				28	0
VIII						XXD412	HUL204				SAA100					0
						Project Part-2	Innovation & Entrepreneurship									
						0 0 8 4	3 0 0 3				0.5				28	0

CREDIT AND COURSE REQUIREMENTS FOR B. TECH. DEGREE

		L	T	P	Credit
Institute Core: Basic Sciences					
CML100	Engineering Chemistry	3	1	2	5
MTL100	Engineering mathematics-I	3	1	0	4
MTL101	Engineering mathematics-II	3	1	0	4
MTL102	Advanced Mathematics (Branch specific)	3	1	0	4
PYL100	Engineering Physics	3	1	2	5
	Total Credits				22
Institute Core: Engineering Arts and Sciences					
MEL100	*Basic Mechanical Engineering	2	0	2	3
CEL100	*Basic Civil Engineering	2	0	2	3
CSL100	Programming for Problem Solving	2	0	2	3
CSL101	Data Analysis Using Python	2	0	2	3
CEL101	Environmental Science	2	0	0	2
EEL100	*Introduction to Electrical and Electronics Engineering	2	0	2	3
CEP100	Computer Aided Engineering Graphics	0	0	2	1
MEP100	Computer Aided Machine Drawing	0	0	2	1
XXP200	Skill Development Laboratory	0	0	2	1
MEP101	Product Realization through Manufacturing	0	0	2	1
	Total Credits				18
Institute Core: Humanities and Social Sciences					
HUL201	General Studies	3	1	0	4
HUL202	Economics and Financial Management	3	1	0	4
HUL203	Indian Constitution	3	1	0	4
HUL204	Innovation & Entrepreneurship	3	0	0	3
	Total Credits				15
Institute Core: Total Credits					55
Departmental Core (for example)					70-75
Departmental Electives (minimum 15 credits)					15-20
Industrial Trainings					05
Total Credits (Departmental Core + Departmental Electives)					90
Open Electives (float minimum 10 open electives)					10
SODECA (ANANDAM)					04
	Total Credits				**164**
	Non - Graded Units				**11**

* Students of CS,EC, EE, EIC, IT will study MEL100 and CEL100
Students of CE,PE, PC will study MEL100 and EEL100
Students of AE,ME, PIE will study CEL100 and EEL100

CREDIT AND COURSE REQUIREMENTS FOR B. TECH. DEGREE (ILLUSTRATION)

		L	T	P	Credit
Institute Core: Basic Sciences					
CML100	Engineering Chemistry	3	1	2	5
MTL100	Engineering mathematics-I	3	1	0	4
MTL101	Engineering mathematics-II	3	1	0	4
MTL102	Advanced Mathematics (Branch specific)	3	1	0	4
PYL100	Engineering Physics	3	1	2	5
	Total Credits				22
Institute Core: Engineering Arts and Sciences					
MEL100	*Basic Mechanical Engineering	2	0	2	3
CEL100	*Basic Civil Engineering	2	0	2	3
CSL100	Programming for Problem Solving	2	0	2	3
CSL101	Data Analysis Using Python	2	0	2	3
CEL101	Environmental Science	2	0	0	2
ELL100	*Introduction to Electrical and Electronics Engineering	2	0	2	3
CEP100	Computer Aided Engineering Graphics	0	0	2	1
MEP100	Computer Aided Machine Drawing	0	0	2	1
XXP200	Skill Development Laboratory	0	0	2	1
MEP101	Product Realization through Manufacturing	0	0	2	1
	Total Credits				18
Institute Core: Humanities and Social Sciences					
HUL201	General Studies	3	1	0	4
HUL202	Economics and Financial Management	3	1	0	4
HUL203	Indian Constitution	3	1	0	4
HUL204	Innovation & Entrepreneurship	3	0	0	3
	Total Credits				15
Institute Core: Total Credits					**55**
Departmental Core (for example)					
CVL111	Elements of Surveying	3	0	2	4
CVL121	Engineering Geology	3	0	0	3
CVP121	Engineering Geology Lab	0	0	2	1
CVL141	Civil Engineering Materials	3	0	0	3
CVL212	Environmental Engineering	3	0	2	4
CVL222	Soil Mechanics	3	0	0	3
CVP222	Soil Mechanics Lab	0	0	2	1
CVL242	Structural Analysis-I	3	0	0	3
CVP242	Structural Analysis Lab	0	0	2	1
CVL243	RC Design	3	0	0	3
CVP243	Structures & Material (Concrete) Lab	0	0	3	1.5

CVL244	Construction Practices	2	0	0	2
CVL245	Construction Management	2	0	0	2
CVL261	Introduction to Transportation Engineering	3	0	0	3
CVP261	Transportation Engineering Lab	0	0	2	1
CVL281	Hydraulics	3	1	0	4
CVP281	Hydraulics Lab	0	0	2	1
CVL282	Engineering Hydrology	3	0	2	4
CVL321	Geotechnical Engineering	3	1	0	4
CVP321	Geotechnical Engineering Lab	0	0	2	1
CVL341	Structural Analysis-II	3	0	0	3
CVL342	Steel Design	3	0	0	3
CVP342	Structures & Material (Steel) Lab	0	0	2	1
CVL381	Design of Hydraulic Structures	3	0	2	4
CVD411	B.Tech. Project Part-I	0	0	8	4
CVP441	Structural Design & Detailing	0	0	3	1.5
CVD411	Project Part-1	0	0	8	4
CVD412	Project Part-2	0	0	8	4
	Total Credits				70-75
Departmental Electives (minimum 15 credits)					15-20
Total Credits (Departmental Core + Departmental Electives)					90
Open Electives (float minimum 10 open electives)					10
Industrial Trainings					05
SODECA (ANANDAM)					04
	Total Credits				164
	Non - Graded Units				11

* Students of CS,EC, EE, EIC, IT will study **MEL100 and CEL100**
Students of CE,PE, PC will study **MEL100 and EEL100**
Students of AE,ME, PIE will study **CEL100 and EEL100**

CREDIT AND COURSE REQUIREMENTS FOR B. TECH. DEGREE WITH MINOR AND / OR DEPARTMENTAL SPECIALIZATION

		L	T	P	Credit
Institute Core: Basic Sciences					
CML100	Engineering Chemistry	3	1	2	5
MTL100	Engineering mathematics-I	3	1	0	4
MTL101	Engineering mathematics-II	3	1	0	4
MTL102	Advanced Mathematics (Branch specific)	3	1	0	4
PYL100	Engineering Physics	3	1	2	5
	Total Credits				22
Institute Core: Engineering Arts and Sciences					
MEL100	*Basic Mechanical Engineering	2	0	2	3
CEL100	*Basic Civil Engineering	2	0	2	3
CSL100	Programming for Problem Solving	2	0	2	3
CSL101	Data Analysis Using Python	2	0	2	3
CEL101	Environmental Science	2	0	0	2
ELL100	*Introduction to Electrical and Electronics Engineering	2	0	2	3
CEP100	Computer Aided Engineering Graphics	0	0	2	1
MEP100	Computer Aided Machine Drawing	0	0	2	1
XXP200	Skill Development Laboratory	0	0	2	1
MEP101	Product Realization through Manufacturing	0	0	2	1
	Total Credits				18
Institute Core : Humanities and Social Sciences					
HUL201	General Studies	3	1	0	4
HUL202	Economics and Financial Management	3	1	0	4
HUL203	Indian Constitution	3	1	0	4
HUL204	Innovation & Entreprenureship	3	0	0	3
	Total Credits				15
Institute Core: Total Credits					55
Departmental Core					70-75
Departmental Electives (minimum 15 credits)					15-20
Total Credits (Departmental Core + Departmental Electives)					90
Open Electives (float minimum 10 open electives)					10
Industrial Trainings					05
SODECA (ANANDAM)					04
CREDIT REQUIREMENTS For B.TECH. DEGREE					
	Total Credits				*164*
	Non - Graded Units				*11*

Credit Requirement for B.TECH. +Minor Degree					
	Courses for Minor (20 Credit by open elective courses related to minor specialization)				20
	Total Graded Credit requirement for B.Tech. + Minor)				*184*
	Non Graded Units				*11*

Credit Requirement for B.TECH. (Honours)					
	Courses for Departmental specialization (20 Credit by open elective courses related to Departmental specialization)				20
	Total Graded Credit requirement for B. Tech. (Honours)				*184*
	Non Graded Units				*11*

* Students of CS,EC, EE, EIC, IT will study MEL100 and CEL100
Students of CE,PE, PC will study MEL100 and EEL100
Students of AE,ME, PIE will study CEL100 and EEL100

CREDIT AND COURSE REQUIREMENTS FOR B. TECH. DEGREE WITH MINOR AND / OR DEPARTMENTAL SPECIALIZATION

(ILLUSTRATION)

		L	T	P	Credit
Institute Core: Basic Sciences					
CML100	Engineering Chemistry	3	1	2	5
MTL100	Engineering mathematics-I	3	1	0	4
MTL101	Engineering mathematics-II	3	1	0	4
MTL102	Advanced Mathematics (Branch specific)	3	1	0	4
PYL100	Engineering Physics	3	1	2	5
	Total Credits				22
Institute Core: Engineering Arts and Sciences					
MEL100	*Basic Mechanical Engineering	2	0	2	3
CEL100	*Basic Civil Engineering	2	0	2	3
CSL100	Programming for Problem Solving	2	0	2	3
CSL101	Data Analysis Using Python	2	0	2	3
CEL101	Environmental Science	2	0	0	2
ELL100	*Introduction to Electrical and Electronics Engineering	2	0	2	3
CEP100	Computer Aided Engineering Graphics	0	0	2	1
MEP100	Computer Aided Machine Drawing	0	0	2	1
XXP200	Skill Development Laboratory	0	0	2	1
MEP101	Product Realization through Manufacturing	0	0	2	1
	Total Credits				18
Institute Core : Humanities and Social Sciences					
HUL201	General Studies	3	1	0	4
HUL202	Economics and Financial Management	3	1	0	4
HUL203	Indian Constitution	3	1	0	4
HUL204	Innovation & Entrepreneurship	3	0	0	3
	Total Credits				15
Institute Core: Total Credits					55
Departmental Core (for example)					
CVL111	Elements of Surveying	3	0	2	4
CVL121	Engineering Geology	3	0	0	3
CVP121	Engineering Geology Lab	0	0	2	1
CVL141	Civil Engineering Materials	3	0	0	3
CVL212	Environmental Engineering	3	0	2	4
CVL222	Soil Mechanics	3	0	0	3
CVP222	Soil Mechanics Lab	0	0	2	1
CVL242	Structural Analysis-I	3	0	0	3
CVP242	Structural Analysis Lab	0	0	2	1
CVL243	RC Design	3	0	0	3
CVP243	Structures & Material (Concrete) Lab	0	0	3	1.5

CVL244	Construction Practices	2	0	0	2
CVL245	Construction Management	2	0	0	2
CVL261	Introduction to Transportation Engineering	3	0	0	3
CVP261	Transportation Engineering Lab	0	0	2	1
CVL281	Hydraulics	3	1	0	4
CVP281	Hydraulics Lab	0	0	2	1
CVL282	Engineering Hydrology	3	0	2	4
CVL321	Geotechnical Engineering	3	1	0	4
CVP321	Geotechnical Engineering Lab	0	0	2	1
CVL341	Structural Analysis-II	3	0	0	3
CVL342	Steel Design	3	0	0	3
CVP342	Structures & Material (Steel) Lab	0	0	2	1
CVL381	Design of Hydraulic Structures	3	0	2	4
CVD411	B.Tech. Project Part-I	0	0	8	4
CVP441	Structural Design & Detailing	0	0	3	1.5
CVD411	Project Part-1	0	0	8	4
CVD412	Project Part-2	0	0	8	4
	Total Credits				70-75

Departmental Electives (minimum 15 credits)

					15-20

Total Credits (Departmental Core + Departmental Electives)					90
Open Electives (float minimum 10 open electives)					10
Industrial Trainings					05
SODECA (ANANDAM)					04
	Total Credits				164
	Non - Graded Units				11

Credit Requirement for B.Tech. +Minor Degree					
	Courses for Minor (20 Credit by open elective courses related to minor specialization)				20
	Total Graded Credit requirement for B.Tech. +Minor)				184
	Non Graded Units				11
Credit Requirement for B.Tech. (Honours)					

	Courses for Departmental specialization (20 Credit by open elective courses related to Departmental specialization)				20
	Total Graded Credit requirement for B.Tech. (Honours)				184
	Non Graded Units				11

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