



# HINDUSTAN UNIVERSITY

HINDUSTAN INSTITUTE OF TECHNOLOGY & SCIENCE

**B.Tech.**

**(Mechatronics Engineering)**

**CURRICULUM & SYLLABI**

**For the Academic year**

**2015 – 2016**

**DEPT. OF MECHANICAL ENGINEERING  
HINDUSTAN INSTITUTE OF TECHNOLOGY & SCIENCE  
HINDUSTAN UNIVERSITY**

## **ACADEMIC REGULATIONS FOR B. TECH.**

**(Effective from 2015)**

### **1.0 Vision, Mission and Objectives**

**1.1** The Vision of the Institute is “To make every man a success and no man a failure”.

The Institute has identified itself with a mission to provide every individual with a conducive environment suitable to achieve his / her career goals, with a strong emphasis on personality development, and to offer quality education in all spheres of engineering, technology, applied sciences and management, without compromising on the quality and code of ethics.

**1.2** Further, the Institute always strives

- To train our students with the latest and the best in the rapidly changing fields of Engineering, Technology, Management, Science & Humanities.
- To develop the students with a global outlook possessing, state of the art skills, capable of taking up challenging responsibilities in the respective fields.
- To mould our students as citizens with moral, ethical and social values so as to fulfil their obligations to the nation and the society.
- To promote research in the field of Science, Humanities, Engineering, Technology and allied branches.

**1.3** Aims and Objectives of the Institute are focused on

- Providing world class education in engineering, technology, applied sciences and management.
- Keeping pace with the ever changing technological scenario to help the students to gain proper direction to emerge as competent professionals fully aware of their commitment to the society and nation.
- To inculcate a flair for research, development and entrepreneurship.

### **2.0 Admission**

**2.1.** The admission policy and procedure shall be decided from time to time by the Board of Management (BOM) of the Institute, following guidelines issued by Ministry of Human Resource Development (MHRD), Government of India. The number of seats in each branch of the B.Tech programme will be decided by BOM as per the directives from MHRD, Government of India and taking into account the market demands. Some seats for Non Resident Indians and a few seats for foreign nationals shall be made available.

#### **2.2. (i) Full-Time:**

At the time of applying for admission, the candidates should have passed / appeared and be awaiting results of the final examination of the 10+2 system or its equivalent with Mathematics, Physics and Chemistry as subjects of study.

#### **(ii) Lateral Entry:**

At the time of applying for admission, the candidates should have a Diploma in Engineering/Technology in the relevant branch of specialization awarded by the State Board of Technical Education, Tamil Nadu or any other authority accepted by the Board of Management of the University as equivalent thereto.

**2.3.** The selected candidates will be admitted third semester to the B.Tech programme after he/she fulfils all the admission requirements set by the Institute and after the payment of the prescribed fees.

2.4. In all matters relating to admission to the B.Tech programme, the decision of the Institute and its interpretation given by the Chancellor of the Institute shall be final.

2.5. If at any time after admission, it is found that a candidate has not fulfilled any of the requirements stipulated by the Institute, the Institute may revoke the admission of the candidate with information to the Academic Council.

### 3.0 Structure of the B.Tech Programme

3.1 The programme of instruction will consist of:

- i) a general Core foundation (**CF**) programme comprising
  - English;
  - Basic Sciences (BS) including Physics, Chemistry, Mathematics;
  - Engineering Sciences (ES), including Materials, Workshop, Drawing, Basics of Electrical/Electronics/Mechanical/Computer Engineering, Instrumentation;
- ii) Compulsory Core courses (**CC**) consisting of
  - a. Professional Core (**PC**), an engineering core programme introducing the students to the foundations of engineering in his/her branch (Department) comprising theory and Practical/field work/ Mini project/ Project ;
  - b. Professional Electives (**PE**)- an elective programme enabling the students to take up a group of courses for specialisation/ interest to him/her in his/her branch (Department);
- iii) Engineering Electives(**EE**) - Engineering electives offered by other engineering departments;
- iv) Open Electives(**OE**)- Courses offered by non-Engineering departments (Humanities and Management Schools) other than communication skills and personality development credit courses;
- v) Non-CGPA courses shall be offered in any semester which are compulsory, but not calculated for GPA. The credits will be mentioned in the grade card.

In addition, a student should satisfactorily complete NSS/NCC/NSO and Professional practice like Seminar and/or Internship in Industry or elsewhere, Soft skill development.

3.2 The complete programme will consist of 4 categories: **Core Foundation (CF)** consists of English, Basic Sciences, Engineering Sciences; **Core Courses (CC)** consists of Professional Core (PC), Professional Elective (PE), and Practical/field work/projects; **Engineering Elective (EE)** and **Open Electives (OE)** distributed over seven semesters with two semesters per year. The eighth semester may be left for the project work so that the student can take up industrial project.

3.3 All the Professional Electives shall be from V semester onwards and VIII semester may be left for the project work.

3.4 The Engineering Elective and Open Elective shall start from III and IV semester respectively.

3.5 Every B. Tech. Programme will have a curriculum and syllabi (course contents) approved by Academic Council.

3.6 Credits are assigned to the courses based on the following general pattern:

- One credit for one hour/week/Semester for *Theory/Lecture (L)* or *Tutorials (T) Courses*;  
and,
- One credit for three hours/week/Semester for *Laboratory/Practical(P) Courses*;
- *One credit for 4 weeks of Industrial Training and*

- One credit for 4 hours of project per week per semester.

*NOTE:* Other student activities not demanding intellectual work or enabling proper assessments like, practical training, study tour and guest lecture not to carry *Credits*;

As per guidelines, *Credit* values for different academic activities to be represented by following the well accepted practice

Lectures (hrs/wk/Sem.)	Tutorials (hrs/wk/Sem.)	Practical Work (hrs/wk/Sem.)	<i>Credits</i> (L: T: P)	Total <i>Credits</i>
3	0	0	3:0:0	3
3	1	0	3:0:0	4
2	1	0	2:1:0	3
2	0	2	2:0:1	3
2	1	2	2:1:1	4
0	0	3	0:0:1	1
0	0	6	0:0:2	2

**3.7** The curriculum of any branch of the B. Tech. programme is designed to have a minimum total of **180 credits** for the award of B. Tech. degree.

**3.8** No semester shall have more than six lecture based courses and four laboratory courses as prescribed in the curriculum carrying a maximum of 30 credits, subject to the following:

Students are permitted to register for an additional course for earning additional credits from the V<sup>th</sup> semester onwards provided the student have at least 7.5 CGPA in earlier semester without any arrears .

However, in special cases, students of VII semester will be permitted to take two additional subjects to the following conditions:

- The maximum number of credits registered in any semester shall not exceed 30.
- No withdrawal from any of the courses for which a student has registered will be allowed, except as per regulation **8.0**.
- The student's Faculty Adviser and Head of the Dept. recommends the same.

**3.9** Every course of B. Tech. programme shall be placed in one of the four broad categories listed in Table 1.

**Table 1: Typical Curriculum Structure for B. Tech. Degree Programmes**

Sl. No.	Course Classification	Range of Total Credit (%)	Suggested (out of 180)	
			% of Total Credit	Credit
1	Core Foundation (CF)	20-30	26	47
2	Core Courses (CC)	55-65	59	106

	i) Professional Core (PC)#, Theory Lab/project	40-60 (30-40) (10-20)	51 (37) (14)	91 (66) (25)
	ii) Professional Electives (PE)	8-12	8	15
<b>3</b>	<b>Engineering Electives (EE)</b>	<b>5-10</b>	<b>8</b>	<b>15</b>
<b>4</b>	<b>Open Electives (OE)</b>	<b>5-10</b>	<b>7</b>	<b>12</b>
	<b>Total</b>		100	<b>180</b>

# Departments in consultation with their respective BOS are free to judiciously mix the theory and lab contents so as to meet the total credit criteria for PC.

A student must earn a minimum number of credits under each category as shown in Table-1 and also a minimum total of **180 credits** for the award of B. Tech degree. For Lateral entry students, minimum requirement is **136 credits** for the award of B. Tech degree.

**3.10** The suggested course distribution per semester is shown below. However, the departments are free to distribute the credit distributions for CC as per their requirement

<b>Comp/ Semester</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>Total</b>
CC		8	17	14	21	15	19	12	106
CF	20	16	4	4		3			47
EE			3	3	3	3	3		15
OE				3	3	3	3		12
Total	20	24	24	24	27	24	25	12	180

**3.11** The medium of instruction, examination and project reports will be English.

#### **4.0 Faculty Adviser**

**4.1** To help the students in planning their courses of study and for getting general advice on the academic programme, the concerned Department will assign a certain number of students to a Faculty member who will be called their Faculty Adviser.

#### **5.0 Class Committee**

**5.1** Every class of the B. Tech. programme will have a Class Committee consisting of Faculty and students.

**5.2** The constitution of the Class Committee will be as follows:

- a) One professor not associated with teaching the particular class to be nominated by the Dean (Academic) to act as Chairman of the Class Committee.
- b) Course coordinator of each of the lecture based subjects
- c) Workshop Superintendent (for first two semesters)
- d) Four students from the respective class; and
- e) Faculty Advisers of the respective class.

All teachers offering the common courses shall be invited to attend the class committee meetings.

**5.3** The basic responsibilities of the Class Committees are

- a) to review periodically the progress of the classes,
- b) to discuss issues concerning curriculum and syllabi and the conduct of the classes.
- c) The method of assessment in the course will be decided by the teacher, in consultation with the class committee, and will be announced to the students at the beginning of the semester. Each class committee will communicate its recommendations to the Head of the Department and the Dean (Academic).
- d) The Class Committees without student members is responsible for the finalisation of the semester results.
- e) The Class Committees shall meet at least thrice in a semester, once at the beginning of the semester, once after first unit test, once before end semester examination.

## 6. Grading

**6.1** A grading system as below will be adhered to.

Range of Marks	Letter Grade	Grade Points	Remarks
90 – 100	S	10	
80 - 89	A	09	
70 - 79	B	08	
60 - 69	C	07	
55 - 59	D	06	
45 - 54	E	05	
<45	U	00	To Reappear for end-semester examination
	RA	00	<i>Failure due to insufficient attendance/ sessional marks less than minimum required in course. Subsequently to be changed into pass (E to S) or U grade in the same semester.</i>

## 6.2 GPA and CGPA

GPA is the ratio of the sum of the product of the number of credits  $C_i$  of course “i” and the grade points  $P_i$  earned for that course taken over all courses “i” registered by the student to the sum of  $C_i$  for all “i”. That is,

$$GPA = \frac{\sum_i C_i P_i}{\sum_i C_i}$$

CGPA will be calculated in a similar manner, at any semester, considering all the courses enrolled from the first semester onwards.

**6.3** For the students with letter grade **RA** and **U** in certain subjects, the same will not be included in the computation of GPA and CGPA until after those grades are converted to the regular grades.

## **7.0 Enrolment and Registration**

### **7.1 Enrolment:**

A student will be eligible for enrolment only if he/she satisfies regulation 11 (maximum duration of the programme) and will be permitted to enrol only if he/she has cleared all dues to the Institute, Hostel, Library up to the end of the previous semester provided he/she is not debarred from enrolment on disciplinary grounds.

### **7.2 Registration:**

Except for the first year, registration of a semester will be done in the parent department during a specified week before the start of current semester.

Late registration/enrolment will be permitted with a fine as decided from time to time up to two weeks from the last date specified for registration.

**7.3** The registration sheet contains the course number, course name, number of credits, category for each course to be taken in that semester and signature of the course instructor. The student makes the choice of course in consultation with his/her Faculty Advisor.

## **8.0 Registration Requirement**

**8.1** The curriculum for any semester, except for the first and final semester will normally carry credits between 21 and 30.

**8.2** The student should make sure that the registration for CC/EE/OE courses for a particular semester is as per the student handbook. In case of non-conformity, the Faculty Advisor has the liberty to modify the registration as per the regulation that are in force, in consultation with the student.

**8.3** If a student finds his/her academic/course load heavy in any semester, or for any other valid reason, he/she may drop EE/OE courses within **fifteen days** of the commencement of the semester but before the commencement of first unit test with the written approval of his/her Faculty Advisor and Head of the Department.

However, the student should ensure that the total number of credits registered in any semester should enable him/her to earn the minimum of **16** credits and registered all CC courses for that semester.

- 8.4** The number of EE/OE credits that a student can register during the semester should not exceed by more or less 6 credits of the total stipulated credits mentioned by the Department for the particular semester. However, this restriction is not applicable for final (8<sup>th</sup>) semester.
- 8.5** In case of an academic backlog carried forward in a semester, registration for additional subjects for extra credits will be restricted to maintain the minimum requirements as prescribed in regulations.
- 8.6** The students failing in EEs and OEs can opt for equivalent EEs and OEs and make up for required credits in the subsequent semesters

#### **9.0 Contact Courses**

- 9.1** A contact course may be offered during the regular semester by a Department, to a student who has obtained "**RA**" grade due to lack of attendance or due to lack of sessional marks in a course work.
- 9.2** No student should register for more than two contact courses during the semester.
- 9.3** The assessment procedure for the contact course will be similar to the regular semester course.
- 9.4** The students who has obtained **U** grade can apply for improvement of sessional marks in case their score is above 20. The maximum marks awarded shall be 30.

#### **10.0 Continuation of the Programme**

- 10.1** For those students who have not earned the minimum required credit prescribed for that particular semester examination, a warning letter to the concerned student and also to his/her parents regarding the shortage of his/her credit will be sent by the HOD after the announcement of the results of the university examinations. A student may dropout to complete the backlog requirements.

#### **11.0 Maximum Duration of the Programme**

##### **(i) Full-Time:**

A student is expected to complete the B.Tech programme in **eight semesters**. However, a student may complete the programme at a slower pace, but in any case **not more than 14 semesters**, excluding semesters withdrawn on medical grounds, etc. as per **12.0**.

##### **(ii) Lateral Entry:**

A student is expected to complete the B.Tech programme in **six semesters**. However, a student may complete the programme at a slower pace, but in any case **not more than 12 semesters**, excluding semesters withdrawn on medical grounds, etc. as per **12.0**.

#### **12.0 Temporary Withdrawal from the Programme**

A student may be permitted by the Dean (Academic) to withdraw from the programme for a semester or longer for reasons of ill health or other valid reasons. Normally a student will be permitted to withdraw from the programme only for a maximum continuous period of two semesters.



### 13.0 Discipline

13.1 Every student is required to observe discipline and decorous behaviour both inside and outside the campus and not to indulge in any activity which will tend to bring down the prestige of the University.

13.2 Any act of indiscipline of a student reported to the Dean (Academic) will be referred to a Discipline Committee so constituted. The Committee will enquire into the charges and decide on a suitable punishment if the charges are substantiated. The committee will also authorize the Dean (Academic) to recommend to the Vice Chancellor the implementation of the decision. The student concerned may appeal to the Vice Chancellor whose decision will be final. The Dean (Academic) will report the action taken at the next meeting of the Council.

13.3 Ragging of any form is a criminal and non-bailable offence in our country. The current State and Central legislations provide for stringent punishment including imprisonment. Once the involvement of student(s) is established in ragging, the offending student(s) will be dismissed from the institution. Every senior student of the institute, along with the parent, shall give an undertaking every year in this regard and this should be submitted at the time of enrolment.

### 14.0 Attendance

14.1 A student whose attendance is less than 75% in any course, whatever may be the reason for the shortfall of the attendance, will not be permitted to appear in the end-semester examination of the course in which shortfall exists.

His/her registration for that course will be treated as cancelled, and he/she shall be awarded '**RA**' grade (RA stands for registration cancelled for want of minimum attendance) in that subject. This grade shall appear in the grade card till the course is successfully completed.

In the case of a core course, the student should register for and repeat the course as per **9.0**.

14.2 The teacher handling a course must finalise the attendance 3 calendar days before the last instructional day of the course in the semester.

The particulars of all students who have attendance less than 75% in that course must be announced in the class by the teacher himself/herself.

Copies of the same should be sent to the Dean (Academic) and Heads of Departments concerned. Students who get less than 75% should not be permitted to sit for the end-semester examination for that course without the permission of Dean, Academic.

14.3 Condonation of Attendance: Every student is expected to put in 100% attendance. The minimum attendance requirement is 75%. For cases of casual absenteeism, no condonation of attendance is permissible. If a student has less than 75%, he/she should be assigned '**RA**' grade in that subject. The percentage of attendance in a subject shall be computed as:

(a) For calculation of attendance in normal cases:

For cases of casual absenteeism, actual % of attendance is computed as:

$$\frac{\text{Actual no. of classes attended} \times 100}{\text{Total no. of classes held till date of compilation of attendance}}$$

which should be  $\geq 75\%$ . Otherwise RA grade shall be awarded. Such cases will not come under the purview of Condonation of attendance.

(b) For the case of minor illness:

A student should have at least 65% attendance with medical certificate as calculated as per (a) above. For condonation the attendance is computed as:

Notional % of attendance =

$$\frac{\text{Actual no. of classes attended} \times 100}{(\text{Total no. of classes held in the semester}) - (\text{No. of classes held during the days of illness})}$$

which should be  $\geq 75\%$  for condonation.

(c) For calculation of attendance in case of prolonged illness and/or hospitalisation with medical certificate:

A student should have more than 50% attendance calculated as per (a) above to be eligible for condonation.

Notional % of attendance =

$$\frac{\text{Actual no. of classes attended} \times 100}{(\text{Total no. of classes held in the semester}) - (\text{No. of classes held during the days of prolonged illness and/or hospitalization})}$$

which should be  $\geq 75\%$  for condonation.

(d) Application for condonation recommended by the Faculty Advisor, concerned faculty member and the HOD is to be submitted to the Dean (Academic) who, depending on the merits of the case, may permit the student to appear for the end semester examination. A student will be eligible for this concession at most in two semesters during the entire degree programme. Application for medical leave, supported by medical certificate with endorsement by a Registered Medical Officer, should reach the HOD within seven days after returning from leave or, on or before the last instructional day of the semester, whichever is earlier.

(e) University is providing an incentive to those students who are involved in extracurricular activities such as representing the University in Sports and Games, Cultural Festivals, and Technical Festivals, NCC/ NSS events. For calculation of attendance for these cases:

A student should have at least 65% attendance with relevant certificate as calculated as per (a) above. For Condonation the attendance is computed as:

Notional % of attendance =

$$\frac{\text{Actual no. of classes attended} \times 100}{(\text{Total no. of classes held in the semester}) - (\text{No. of classes held during the days of on duty})}$$

which should be  $\geq 75\%$  for condonation.

All such applications should be recommended by the concerned HOD and forwarded to Dean (Academic) within seven instructional days after the programme / activity.

## **15.0 Assessment Procedure – Tests and Examinations**

**15.1** The Academic Council will decide from time to time on the system of tests and examinations in each subject in each semester.

**15.2** For each theory course, the assessment will be done on a continuous basis as follows:

Test / Exam	Weightage	Duration of Test / Exam
First Periodical Test	10%	2 Periods
Second Periodical Test	10%	2 Periods
Model Test	20%	3 hours
Seminar/ Assignments/Quiz	10%	-
End – semester examination	50%	3 Hours

No retest will be conducted for sessional examinations.

**15.3** For practical courses, the assessment will be done by the subject teachers as below:

- (i) Weekly assignment/Observation note book / lab records and viva – weightage 60%.
- (ii) End semester examination of 3 hours duration including viva– weightage 40%.

**15.4** For courses on Physical Education, NSS, etc. the assessment will be as satisfactory/not satisfactory only.

## **16. Project evaluation**

**16.1** For Project work, the assessment will be done on a continuous basis as follows:

Review / Examination	Weightage
First Review	10%
Second Review	20%
Third Review	20%
End-semester Examination	50%

For end – semester examination, the student will submit a Project Report in a format specified by the Dean (Academic). The first three reviews will be conducted by a Committee constituted by the Head of the Department. The end – semester examination will be based on the report and a viva-voce examination on the project conducted by a Committee constituted by the Registrar / Controller of examination. This will include an external expert.

**16.2** The project reports of B.Tech students who have not completed their course work will be evaluated in that semester itself and the result sent, in confidential, to the Controller of examination. The result of the project work evaluation will be declared by Controller of examination only after the successful completion of the course requirements.

## **17. Declaration of results**

**17.1 (i)** A candidate who secures not less than 45% of total marks prescribed for a course with a minimum of 50% of the marks prescribed for the end semester examination shall be declared to have passed the course and earned the specified credits for the course.

**(ii)** To be Eligible to appear for the end semester examinations for a particular course, a candidate will have to secure a minimum of 40% marks in the sessional for that course.

**17.2** After the valuation of the answer scripts, the tabulated results are to be scrutinized by the Result Passing Boards of UG programmes constituted by the Vice-Chancellor. The recommendations of the Result Passing Boards will be placed before the Standing Sub Committee of the Academic Council constituted by the Chancellor for scrutiny. The minutes of the Standing Sub Committee along with the results are to be placed before the Vice-Chancellor for approval. After getting the

approval of the Vice-Chancellor, the results will be published by the Controller of Examination/Registrar.

- 17.3** If a candidate fails to secure a pass in a course due to not satisfying the minimum requirement in the end semester examination, he/she shall register and re-appear for the end semester examination during the following semester. However, the sessional marks secured by the candidate will be retained for all such attempts.
- 17.4** If a candidate fails to secure a pass in a course due to insufficient sessional marks though meeting the minimum requirements of the end semester examination, and wishes to improve on his/her sessional marks, he/she will have to register for the particular course and attend the course as per **9.0** with permission of the HOD concerned and Dean (Academic) with a copy marked to the Registrar. The sessional and external marks obtained by the candidate in this case will replace the earlier result.
- 17.5** A candidate can apply for the revaluation of his/her end semester examination answer paper in a theory course within 2 weeks from the declaration of the results, on payment of a prescribed fee through proper application to the Registrar/Controller of Examinations through the Head of the Department. The Registrar/ Controller of Examination will arrange for the revaluation and the results will be intimated to the candidate concerned through the Head of the Department. Revaluation is not permitted for practical courses and for project work.
- 17.6** After ten semesters, the sessional marks of the candidate will not be considered for a pass in a course. A candidate who secures minimum required marks for passing will be given only up to C grade irrespective of marks obtained and declared pass in the course.

## **18.0 Course Repetition**

- 18.1** A student who earns U or RA grade in a core course has to repeat it compulsorily when the course is offered next as specified in **9.0**.

A student securing a U or RA grade in an elective course may repeat it if he/she so desires to get a successful grade.

A course successfully completed cannot be repeated.

## **19.0 Grade Card**

- 19.1** Letter grade

Based on the performance, each student is awarded a final letter grade at the end of the semester, in each subject. The letter grades and the corresponding grade points are as **6.1**.

- 19.2** A student is considered to have completed a subject successfully and earned credits if he/she secures a letter grade other than U or RA in that subject. A letter grade **U or RA** in any subject implies a failure in that subject.

- 19.3** After results are declared, grade sheet will be issued to each student which will contain the following details:

- (i) Program and branch for which the student has enrolled.
- (ii) Semester of registration.
- (iii) The course number, name of the course, category of course and the credits for each course registered in that semester
- (iv) The letter grade obtained in each course
- (v) Semester Grade Point Average (GPA)

- (vi) The total number of credits earned by the student up to the end of that semester in each of the course categories.
- (vii) The Cumulative Grade Point Average (CGPA) of all the courses taken from the first semester.

## **20. Class/Division**

**20.1** Classification is based on CGPA and is as follows:

CGPA  $\geq$  8.0 : **First Class with distinction**

$6.5 \leq$  CGPA < 8.0: **First Class**

$5.0 \leq$  CGPA < 6.5: **Second Class.**

**20.2(i)** Further, the award of 'First class with distinction' is subject to the candidate becoming eligible for the award of the degree having passed the examination in all the courses in his/her first appearance within the minimum duration of the programme.

(ii) The award of 'First Class' is further subject to the candidate becoming eligible for the award of the degree having passed the examination in all the courses **within 10 semesters.**

(iii) The period of authorized discontinuation of the programme (vide clause 12.0) will not be counted for the purpose of the above classification.

## **Transfer of credits**

**21.1.** Within the broad framework of these regulations, the Academic Council, based on the recommendation of the transfer of credits committee so constituted by the Chancellor may permit students to earn part of the credit requirement in other approved institutions of repute and status in the country or abroad.

**21.2** The Academic Council may also approve admission of lateral entry (who hold a diploma in Engineering/ technology) candidates with advance credit based on the recommendation of the transfer of credits committee on a case to case basis.

## **22.0 Eligibility for Award of the B.Tech Degree**

**22.1** A student shall be declared to be eligible for award of the B.Tech degree if he/she has

- (i) registered and successfully completed all the core courses and projects;
- (ii) successfully acquired the minimum 180 credits within the stipulated time;
- (iii) earned the specified credits in all the categories of subjects as specified in the curriculum corresponding to the branch of his/ her study ;
- (iv) no dues to the Institute, Hostels, Libraries etc.; and
- (v) no disciplinary action is pending against him / her.

The award of the degree must be recommended by the Academic Council and approved by the Board of Management of the University.

## **23.0 Change of Branch**

**23.1** If the number of students in any branch of B.Tech. class as on the last instructional day of the First Semester is less than the sanctioned strength, then the vacancies in the said branches can be filled by transferring students from other branches. All such transfers will be allowed on the basis of merit of the students. The decision of the Chancellor shall be final while considering such requests.

**23.2** All students who have successfully completed the first semester of the course will be eligible for consideration for change of branch subject to the availability of vacancies.

**24.0 Power to modify**

Notwithstanding all that has been stated above, the Academic Council shall modify any of the above regulations from time to time subject to approval by the Board of Management.

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**SEMESTER I**

S. No.	Course Code	Course Classification	Course Title	L	T	P	C	TCH
<b>Theory</b>								
1	EL A 3101	CF	Technical English	3	0	0	3	3
2	MA A 3101	CF(BS)	Engineering Mathematics– I	3	1	0	4	4
3	PH A 3101/ CY A 3101	CF(BS)	Engineering Physics / Engineering Chemistry	3	0	0	3	3
4	ME A 3101	CF(ES)	Computer Aided Engineering Drawing	1	1	3	3	5
5	CS A 3101	CF(ES)	Computer Programming	3	0	0	3	3
<b>Practical</b>								
6	PH A 3131/ CY A 3131	CF(BS)	Physics lab/Chemistry Lab*	0	0	3	1	3
7	CS A 3131	CF(ES)	Computer Programming Lab	0	0	3	1	3
8	EL A 3131	CF	Communication Skills Lab-I	0	0	3	1	3
9	GE A 3131	CF(ES)	Engineering Practices Lab-I	0	0	3	1	3
<b>Total</b>							<b>20</b>	<b>30</b>

**SEMESTER II**

S. No.	Course Code	Course Classification	Course Title	L	T	P	C	TCH
<b>Theory</b>								
1	MA A 3102	CF (BS)	Engineering Mathematics – II	3	1	0	4	4
2	PH A 3101/ CY A 3101	CF(BS)	Engineering Chemistry / Engineering Physics*	3	0	0	3	3

3	ME A 3102	CF(ES)	Engineering Mechanics	3	1	0	4	4
4	EE B 3122	CC (PC)	Basics of Electrical and Electronics Engineering	3	1	0	4	4
5	ME B 3101	CC(PC)	Manufacturing Technology- I	3	0	0	3	3
6	ELA3102	CF(English)	Personality Development and Soft Skills	3	0	0	3	3
<b>Practical</b>								
7	PH A 3131/ CY A 3131	CF(BS)	Physics lab/Chemistry Lab*	0	0	3	1	3
8	GE A 3132	CF(ES)	Engineering Practices Lab-II	0	0	3	1	3
9	EE B 3145	CC (PC)	Basic Electrical and Electronics Lab	0	0	3	1	3
<b>Total</b>							<b>24</b>	<b>30</b>

**SEMESTER III**

S. No.	Course Code	Course Classification	Course Title	L	T	P	C	TCH
<b>Theory</b>								
1	MA A 3201	CF (BS)	Engineering Mathematics – III	3	1	0	4	4
2	MH B 3201	CC (PC)	Digital and Power Electronics	3	1	0	4	4
3	MH B 3202	CC (PC)	Electrical Machines and Drives	3	1	0	4	4
4	MH B 3203	CC (PC)	Kinematics of Machinery	3	1	0	4	4
5	ME B 3206	CC (PC)	Strength of Materials	3	1	0	4	4
6	CY A 3102		Environmental Science And Engineering	3	0	0	3	3
<b>Practical</b>								
6	MH B 3231	CC (PC)	Electrical Machines and Drives Lab	0	0	3	1	3
7	MH B 3232	CC (PC)	Digital and Power Electronics Lab	0	0	3	1	3
8	MH B 3233	CC (PC)	Computer Aided Design Lab	0	0	3	1	3
9	SS A 3231	CF(ES)	Aptitude III <sup>\$</sup>	1	0	1	1	2
<b>Total</b>							<b>27</b>	<b>34</b>

**SEMESTER IV**

S. No.	Course Code	Course Classification	Course Title	L	T	P	C	TCH
<b>Theory</b>								
1	MA A 3204	CF (BS)	Probability and Statistics	3	1	0	4	4
2	ME B 3203	CC (PC)	Manufacturing Technology-II	3	0	0	3	4
3	MH B 3204	CC (PC)	Microprocessor and Microcontroller	3	0	0	3	4
4	MH B 3205	CC (PC)	Fundamentals of Control Systems	3	0	0	3	4
5		EE	Engineering Elective-II	3	0	0	3	3
6		OE	Open Elective-I	3	0	0	3	3
<b>Practical</b>								
6	MH B 3234	CC (PC)	Manufacturing Process Lab	0	0	3	1	3
7	MH B 3235	CC (PC)	Microprocessor and Microcontroller Lab	0	0	3	1	3
8	MH B 3237	CC (PC)	Fluid Mechanics and Machinery Lab	2	0	2	3	4
9	MH B 3236	CC (PC)	Design Project-I*	0	0	0	2	-
10	SS A 3232	CF(ES)	Aptitude IV <sup>\$</sup>	1	0	1	1	2
<b>Total</b>							<b>27</b>	<b>34</b>

Note: \* The Design Project by students which does not require contact hours.





### SEMESTER V

S. No.	Course Code	Course Classification	Course Title	L	T	P	C	TCH
<b>Theory</b>								
1	MH B 3301	CC (PC)	Machine Dynamics	3	1	0	4	4
2	MH B 3302	CC (PC)	Metrology and Measurements	3	0	0	3	3
3	MH B 3303	CC (PC)	Hydraulics and Pneumatics	3	0	0	3	3
4		CC (PE)	Professional Elective-I	3	0	0	3	3
5		EE	Engineering Elective-III	3	0	0	3	3
6		OE	Open Elective-II	3	0	0	3	3
<b>Practical</b>								
6	MH B 3331	CC (PC)	Kinematics and Dynamics Lab	0	0	3	1	3
7	MH B 3332	CC (PC)	Metrology and Measurements	0	0	3	1	3
8	MH B 3333	CC (PC)	Hydraulics and Pneumatics Lab	0	0	3	1	3
9	MH B 3334	CC	Condition Monitoring and Non Destructive Testing Lab	2	0	2	3	4
10	SS A 3331	CF(ES)	Preplacement Program	1	0	1	1	2
<b>Total</b>							<b>26</b>	<b>34</b>

Note: \* The Design Project by students which does not require contact hours.

### SEMESTER VI

S. No.	Course Code	Course Classification	Course Title	L	T	P	C	TCH
<b>Theory</b>								
1	MH B 3304	CC (PC)	Sensors and PLC	3	0	0	3	3
2	MH B 3305	CC (PC)	Virtual Instrumentation	3	0	0	3	3
3		CC (PE)	Professional Elective-II	3	0	0	3	3
4		CC (PE)	Professional Elective-III	3	0	0	3	3
5		EE	Engineering Elective-IV	3	0	0	3	3
6		OE	Open Elective-III	3	0	0	3	3
<b>Practical</b>								
6	MH B 3335	CC (PC)	PLC and Motion Control Lab	0	0	3	1	3
7	MH B 3336	CC (PC)	Virtual Instrumentation Lab	0	0	3	1	3
8	MH B 3337	CC (PC)	CNC Lab	2	0	2	3	4
9	MH B 3338	CC	Design Project-II	0	0	6	3	-
<b>Total</b>							<b>26</b>	<b>29</b>

Note: \* The Design Project by students which does not require contact hours.

**SEMESTER VII**

S. No.	Course Code	Course Classification	Course Title	L	T	P	C	TCH
<b>Theory</b>								
1	MH B 3401	CC (PC)	Design of Mechatronics System	3	0	0	3	3
2	MH B 3402	CC (PC)	Robotics and Machine Vision System	3	0	0	3	3
3		CC (PE)	Professional Elective-IV	3	0	0	3	3
4		CC (PE)	Professional Elective-V	3	0	0	3	3
5		EE	Engineering Elective-V	3	0	0	3	3
6		OE	Open Elective-IV	3	0	0	3	3
<b>Practical</b>								
6	MH B 3431	CC (PC)	Robotics and Machine Vision System Lab	0	0	3	1	3
7	MH B 3432	CC (PC)	Building Automation Lab	2	0	2	3	4
8	AT B 3435	CC (PC)	Autotronics Lab	2	0	2	3	4
9	MH B 3433	CC (PC)	Comprehension & Viva-voce II	0	0	0	3	0
<b>Total</b>							<b>28</b>	<b>29</b>

Note: \* The Design Project by students which does not require contact hours.

**SEMESTER VIII**

S. No.	Course Code	Course Classification	Course Title	L	T	P	C	TCH
<b>Practical</b>								
1	MH B 3441	CC (PC)	Project & Viva-voce	0	0	24	6	24
<b>Total</b>							<b>6</b>	<b>24</b>

**Professional Elective Courses – PE**

<b>Sl. No</b>	<b>Course</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>TCH</b>
<b>Semester V</b>							
1.	MH C 3351	Process Automation	3	0	0	3	3
2.	ME C 3352	Non-destructive Testing Methods*#	3	0	0	3	3
3.	MH C 3352	Electronic Devices and Circuits	3	0	0	3	3
4.	ME C 3362	Operation Research	3	0	0	3	3
5.	MH C 3353	Applied Thermodynamics	3	0	0	3	3
<b>Semester VI</b>							
1.	MHC 3354	CNC Technology	3	0	0	3	3
2.	MH C 3355	Material Science	3	0	0	3	3
3.	MH C 3356	Artificial Intelligence for Mechatronics Systems	3	0	0	3	3
4.	MH C 3357	Embedded System	3	0	0	3	3
5.	AT C 3352	Heat and Mass Transfer	3	0	0	3	3
6.	MH C 3358	Design of Mechanical Elements	3	0	0	3	3
7.	MH C 3359	Computer Integrated Manufacturing	3	0	0	3	3
8.	MH C3360	Digital Image Processing	3	0	0	3	3
<b>Semester VII</b>							
1.	MH C 3451	Medical Mechatronics	3	0	0	3	3
2.	ME C 3360	Maintenance Engineering	3	0	0	3	3
3.	ME C 3351	Composite Materials and Structures	3	0	0	3	3
4.	ME C 3373	Applied Thermal Engineering	3	0	0	3	3
5.	ME C 3358	Un-conventional Machining Processes	3	0	0	3	3
6.	MH C 3452	Service and Field Robots	3	0	0	3	3
7.	MH C 3453	Product Design and Costing	3	0	0	3	3
8.	MH C 3454	Rapid Prototyping	3	0	0	3	3
9.	MH C 3455	Building Automation	3	0	0	3	3
10.	MH C 3456	Underwater Robotics	3	0	0	3	3

11.	MH C 3455	Finite Element Method	3	0	0	3	3
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**Engineering Elective Courses**  
**Semester –III (Engineering Elective-I)**

Sl. No	Course Code	Course Title	L	T	P	C	TCH
<b>Department of Aeronautical Engineering</b>							
1	AE D 3251	Aircraft Design	3	0	0	3	3
2	AE D 3252	Elements of Avionics	3	0	0	3	3
<b>Department of Automobile Engineering</b>							
3	AT D 3251	Renewable sources of Energy	3	0	0	3	3
4	AT D 3252	Concept of Engineering Design	3	0	0	3	3
<b>Department of Chemical Engineering</b>							
5	CH D 3251	Petrochemical Engineering	3	0	0	3	3
<b>Department of Civil Engineering</b>							
6	CE D 3251	Green & Smart Buildings	3	0	0	3	3
<b>Department of Computer Science &amp; Engineering</b>							
7	CS D 3251	Object Oriented Programming	3	0	0	3	3
8	CS D 3252	Java programming	3	0	0	3	3
9	CS D 3253	Web Development	3	0	0	3	3
<b>Department of Electronics &amp; Communication Engineering</b>							
10	EC D 3251	Communication Engineering	3	0	0	3	3
11	EC D 3252	Linear Circuits	3	0	0	3	3
<b>Department of Electrical &amp; Electronics Engineering</b>							
12	EE D 3251	Electrical Drives And Control	3	0	0	3	3
<b>Department of Electronics &amp; Instrumentation Engineering</b>							
13	EI D 3251	Measurements and Instrumentation	3	0	0	3	3
14	EI D 3252	Digital Principles and System Design	3	0	0	3	3

15	EI D 3253	Instrumentation for Environmental Analysis	3	0	0	3	3
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**Semester –IV (Engineering Elective-II)**

<b>Sl. No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>TCH</b>
<b>Department of Aeronautical Engineering</b>							
16	AE D 3253	Aero Engine Maintenance and Repair	3	0	0	3	<b>3</b>
17	AE D 3254	Aircraft Maintenance Practices	3	0	0	3	<b>3</b>
18	AE D 3255	Introduction to NDT	3	0	0	3	<b>3</b>
<b>Department of Automobile Engineering</b>							
19	AT D 3253	Special Type of Vehicles	3	0	0	3	<b>3</b>
20	AT D 3254	Automobile Air Conditioning	3	0	0	3	<b>3</b>
<b>Department of Chemical Engineering</b>							
21	CH D 3252	Genetic Engineering	3	0	0	3	<b>3</b>
<b>Department of Civil Engineering</b>							
22	CE D 3252	Solid Waste Management	3	0	0	3	<b>3</b>
<b>Department of Computer Science &amp; Engineering</b>							
23	CS D 3254	Python Programming	3	0	0	3	<b>3</b>
24	CS D 3255	C with Assembly language programming	3	0	0	3	<b>3</b>
25	CS D 3256	Mobile Application Development	3	0	0	3	<b>3</b>
<b>Department of Electronics &amp; Communication Engineering</b>							
26	EC D 3253	Basics of Digital Signal Processing Techniques	3	0	0	3	<b>3</b>
27	EC D 3254	Data Communication and Network System	3	0	0	3	<b>3</b>
<b>Department of Electrical &amp; Electronics Engineering</b>							
28	EE D 3252	Electronics And Microprocessors	3	0	0	3	<b>3</b>
<b>Department of Electronics &amp; Instrumentation Engineering</b>							
29	EI D 3254	Automotive Instrumentation and Embedded Systems	3	0	0	3	<b>3</b>
30	EI D 3255	Aircraft Systems and Instrumentation	3	0	0	3	<b>3</b>
31	EI D 3256	Microprocessor and Applications	3	0	0	3	<b>3</b>

**Semester –V (Engineering Elective-III)**

<b>Sl. No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>TCH</b>
<b>Department of Aeronautical Engineering</b>							
32	AE D 3351	Air Transportation & Aircraft Maintenance	3	0	0	3	<b>3</b>
33	AE D 3352	Experimental Stress Analysis	3	0	0	3	<b>3</b>
34	AE D 3353	Computer Integrated Manufacturing	3	0	0	3	<b>3</b>
<b>Department of Automobile Engineering</b>							
35	AT D 3351	Fuel Cells and Applications	3	0	0	3	<b>3</b>
36	AT D 3352	Automotive Safety	3	0	0	3	<b>3</b>
37	AT D 3353	ECU development in Automobile systems	3	0	0	3	<b>3</b>
<b>Department of Chemical Engineering</b>							
38	CH D 3351	Neural Networks and Artificial Intelligence	3	0	0	3	<b>3</b>
39	CH D 3352	Polymer and Elastomer Technology	3	0	0	3	<b>3</b>
<b>Department of Civil Engineering</b>							
40	CE D 3351	Intelligent Transportation System	3	0	0	3	<b>3</b>
<b>Department of Computer Science &amp; Engineering</b>							
41	CS D 3351	Software Project Management	3	0	0	3	<b>3</b>
42	CS D 3352	Digital Image Processing	3	0	0	3	<b>3</b>
43	CS D 3353	System Modelling and Simulation	3	0	0	3	<b>3</b>
<b>Department of Electronics &amp; Communication Engineering</b>							
44	EC D 3351	Mobile Communication Engineering	3	0	0	3	<b>3</b>
45	EC D 3352	Radar and Optical Communication	3	0	0	3	<b>3</b>
<b>Department of Electrical &amp; Electronics Engineering</b>							
46	EE D 3351	Control Engineering	3	0	0	3	<b>3</b>
<b>Department of Electronics &amp; Instrumentation Engineering</b>							
47	EI D 3351	Instrumentation and Process Control	3	0	0	3	<b>3</b>
48	EI D 3352	Bio-medical Instrumentation	3	0	0	3	<b>3</b>
49	EI D 3353	Instrumentation in Automotive Industries	3	0	0	3	<b>3</b>





**Semester –VI (Engineering Elective-IV)**

Sl. No	Course Code	Course Title	L	T	P	C	TCH
<b>Department of Aeronautical Engineering</b>							
50	AE D 3354	Airframe Maintenance & Repair Practices	3	0	0	3	3
51	AE D 3355	Fundamentals of space vehicle design	3	0	0	3	3
52	AE D 3356	Aeroelasticity	3	0	0	3	3
<b>Department of Automobile Engineering</b>							
53	AT D 3354	Composite materials in Automotive Application	3	0	0	3	3
54	AT D 3355	Transport management	3	0	0	3	3
55	AT D 3356	Automobile Engineering	3	0	0	3	3
<b>Department of Chemical Engineering</b>							
56	CH D 3353	Transport Processes	3	0	0	3	3
<b>Department of Civil Engineering</b>							
57	CE D 3352	Remote Sensing Techniques and GIS	3	0	0	3	3
<b>Department of Computer Science &amp; Engineering</b>							
58	CS D 3354	Wireless Sensor Networks	3	0	0	3	3
59	CS D 3355	Cyber security & Cyber Laws	3	0	0	3	3
60	CS D 3356	Big Data Analytics	3	0	0	3	3
<b>Department of Electronics &amp; Communication Engineering</b>							
61	EC D 3353	Image Processing and Pattern Recognition	3	0	0	3	3
62	EC D 3354	Digital Design and Implementation using HDL & VHDL	3	0	0	3	3
63	EC D 3355	Basics of Satellite Communication	3	0	0	3	3
<b>Department of Electrical &amp; Electronics Engineering</b>							
64	EE D 3352	Energy Audit And Energy Regulation	3	0	0	3	3
<b>Department of Electronics &amp; Instrumentation Engineering</b>							
65	EI D 3354	Fiber Optics and Laser Instrumentation	3	0	0	3	3
66	EI D 3355	Power plant Instrumentation	3	0	0	3	3

67	EI D 3356	Microcontrollers and PLC	3	0	0	3	3
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**Semester –VII (Engineering Elective-V)**

Sl. No	Course Code	Course Title	L	T	P	C	TCH
<b>Department of Aeronautical Engineering</b>							
68	AE D 3451	Wind Tunnel Techniques	3	0	0	3	3
69	AE D 3452	Vibration and Aero Elasticity	3	0	0	3	3
70	AE D 3453	Fatigue and Fracture Mechanics	3	0	0	3	3
<b>Department of Automobile Engineering</b>							
71	AT D 3451	Vibration and Noise control	3	0	0	3	3
72	AT D 3452	Automotive Aerodynamics	3	0	0	3	3
73	AT D 3453	Autotronics	3	0	0	3	3
<b>Department of Chemical Engineering</b>							
74	CH D 3451	Industrial Catalysis	3	0	0	3	3
<b>Department of Computer Science &amp; Engineering</b>							
75	CS D 3451	Cyber Forensics	3	0	0	3	3
76	CS D 3452	Ethical Hacking	3	0	0	3	3
77	CS D 3453	IT infrastructure Management	3	0	0	3	3
<b>Department of Electronics &amp; Communication Engineering</b>							
78	EC D 3451	Fundamentals of Wireless Sensor Networks	3	0	0	3	3
79	EC D 3452	Telecommunication Switching Techniques	3	0	0	3	3
80	EC D 3453	Fundamentals of SDR	3	0	0	3	3
<b>Department of Electrical &amp; Electronics Engineering</b>							
81	EE D 3451	Building Energy Management And Control Systems	3	0	0	3	3
<b>Department of Electronics &amp; Instrumentation Engineering</b>							
82	EI D 3451	Internet of Things-Embedded Control	3	0	0	3	3
83	EI D 3452	Virtual Instrumentation	3	0	0	3	3
84	EI D 3453	Automotive Sensors and Applications	3	0	0	3	3

## Open Electives

### a) Semester IV (Open Elective-I)

Sl. No	Course Code	Course Title	L	T	P	C	TCH
<b>Department of English</b>							
1	EL F 3251	Introduction to Media Studies	3	0	0	3	3
2	EL F 3252	Introduction to Film Studies	3	0	0	3	3
<b>Department of Chemistry</b>							
3	CY F 3251	Applied Chemistry I	3	0	0	3	3
4	CY F 3252	Environment Science & Engineering	3	0	0	3	3
<b>Department of Foreign Language</b>							
5	FL F 3251	French	3	0	0	3	3
6	FL F 3252	German	3	0	0	3	3
7	FL F 3253	Japanese	3	0	0	3	3
<b>School of Management</b>							
8	MG F 3251	Organizational Behaviour	3	0	0	3	3
9	MG F 3252	Business Communication	3	0	0	3	3

### b) Semester – V(Open Elective-II)

Sl. No	Course Code	Course Title	L	T	P	C	TCH
<b>Department of English</b>							
1	EL F 3351	Writing for Media: Theory & Practice	3	0	0	3	3
2	EL F 3352	Introduction to Linguistics	3	0	0	3	3
<b>Department of Chemistry</b>							
3	CY F 3351	Applied Chemistry II	3	0	0	3	3
4	CY F 3352	Analytical Chemistry I	3	0	0	3	3
<b>School of Management</b>							

5	MG F 3351	Research methods in Business	3	0	0	3	3
6	MG F 3352	Entrepreneurship Development	3	0	0	3	3
7	MG F 3353	Principles of Management	3	0	0	3	3

c) Semester VI (Open Elective-III)

Sl. No	Course Code	Course Title	L	T	P	C	TCH
<b>Department of English</b>							
1	EN F 3353	Introduction to Translation Studies	3	0	0	3	3
2	EN F 3354	Indian Literatures in Translation	3	0	0	3	3
<b>Department of Chemistry</b>							
3	CY F 3252	Environment Science & Engineering	3	0	0	3	3
<b>Department of Foreign Language</b>							
4	FL F 3251	French	3	0	0	3	3
5	FL F 3252	German	3	0	0	3	3
6	FL F 3253	Japanese	3	0	0	3	3
<b>School of Management</b>							
7	MG F 3354	Business Plan and Ethics	3	0	0	3	3
8	MG F 3355	Business Economics	3	0	0	3	3
9	MG F 3356	Professional Ethics	3	0	0	3	3

d) Semester VII (Open Elective-IV)

Sl. No	Course Code	Course Title	L	T	P	C	TCH
<b>Department of English</b>							
1	EL F 3451	Advanced Academic Writing	3	0	0	3	3
<b>School of Management</b>							
2	MG F 3451	Total Quality Management	3	0	0	3	3
3	MG F 3452	Family Business Management	3	0	0	3	3
4	MG F 3453	Social Entrepreneurship	3	0	0	3	3

