



HINDUSTAN

**INSTITUTE OF TECHNOLOGY & SCIENCE
(DEEMED TO BE UNIVERSITY)**

Academic Regulations for B. Tech. / B. Tech. (Hons.)

Degree Programme

(Applicable for the students admitted from 2022-2023)

Choice Based Credit System (CBCS)

Under NEP

“TO MAKE EVERY MAN A SUCCESS AND NO MAN A FAILURE”

HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE

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I. PREAMBLE

Hindustan Institute of Technology and Science (HITS) - Deemed to be university under section 3 of UGC Act has introduced Choice Based Credit System (CBCS) from the academic year 2015-16. Choice Based Credit System (CBCS) is a proven, flexible mode of learning in higher education which facilitates a student to have guided freedom in selecting his/her own choices of courses in the curriculum for completing a degree program. This revision of regulations, curriculum and syllabi has been carried out further to make it more flexible and adaptive to the technology advancements and industry expectations aiming at multidisciplinary and holistic education under the NEP 2020.

The system permits a student to

- (i) Learn at their own pace through flexible learning process
- (ii) Choose electives from a wide range of courses offered within and outside their departments
- (iii) Undergo additional courses in their special areas of interest and earn additional credits to obtain B. Tech. (Hons) or B. Tech. Minor
- (iv) Adopt an interdisciplinary / multidisciplinary approach in learning
- (v) Avail transfer of Credits under Academic Bank of Credit
- (vi) Gain Non – CGPA credits to enhance skill/employability by taking up additional project work, entrepreneurship, co-curricular and vocational training.
- (vii) Learn and earn credits through MOOC and Project Based Learning
- (viii) Enhance domain Knowledge, Skill and Attitude through participation in innovative Curriculum Design, Delivery, Continuous Assessments, Industry Internships and Projects.
- (ix) Avail multiple entry and exit option

The Curriculum is designed based on Choice Based Credit System (CBCS) with focus on Project Based Learning and Industrial Training, enabling the students to become eligible and fully equipped for employment in industries, higher studies or entrepreneurship.

II. DEFINITIONS AND NOMENCLATURE

In these Regulations, unless the context otherwise requires:

1. “Programme” means Degree Programme like B.Tech. Degree Programme.
2. “Discipline” means specialization or branch of B.Tech. Degree Programme, (e.g. Civil Engineering).
3. “Course” means a theory or practical subject that is normally studied in a semester, (e.g. Mathematics, Physics, etc.).
4. “Vice – Chancellor of HITS” means the Head of the Institution.
5. “Registrar” is the Head of all Academic and General Administration of the Institution.
6. “Dean” means the authority of the institution who is responsible for all academic activities and implementation of relevant rules of these Regulations pertaining to their respective Academic programmes.
7. “Controller of Examinations” means the authority of the institution who is responsible for all activities related to the Examinations conducted by the Institution, publication of results, award of grade sheets and degrees.
8. “Head Student Affairs” is responsible for all student related activities including student discipline, extra and co – curricular activities, attendance and meetings with class representatives, Student Council and parent – teacher meet.
9. “HoD” means the Head of the Department concerned.
10. “Institution” means Hindustan Institute of Technology and Science (HITS), Chennai.
11. “TCH” means Total Contact Hours – refer to teaching – learning engagement.
12. “DEC” means Department Examination Committee.
13. “BoS” means Board of Studies.
14. “BoM” means Board of Management.
15. “ACM” means Academic Council Meeting the highest authoritative body for approval for all Academic Policies.
16. “Class Teacher” is a faculty of the class who takes care of the attendance, academic performance and the general conduct of the students of that class.
17. “CIA” is Continuous Internal Assessment which is assessed for every student for every course during the semester.
18. “ESE” is End Semester Examination conducted by the Institution at the End of the Semester for all the courses of that semester.
19. “AICTE” means All India Council for Technical Education.
20. “UGC” means University Grants Commission.

21. “MHRD” means Ministry of Human Resource Development, Govt. of India.
22. “HS” means Humanities & Social Science Courses
23. “BS” means Basic Science Courses
24. “ES” means Engineering Science Courses
25. “PC” means Programme Core Courses
26. “DE” means Departmental Electives
27. “NE” means Non Departmental Electives
28. "EEC" means Employment Enhancement Courses

ACADEMIC REGULATIONS FOR B. Tech. / B.Tech. (Hons.)

Under Choice Based Credit System (CBCS)

(Effective from Academic year 2022 - 23)

1.0 Vision, Mission and Objectives

The Motto of the Institution is **“To make every man a success and no man a failure”**.

The Vision of the Institution is “To be an international institute of excellence, providing a conducive environment for education with a strong emphasis on innovation, quality, research and strategic partnership blended with values and commitment to society”

1.1 The Mission of the institution is

- To create an ecosystem that promotes learning and world class research.
- To nurture creativity and innovation.
- To instill highest ethical standards and values.
- To pursue activities for the development of the Society.
- To develop national and international collaborations with institutions and industries of eminence.
- To enable graduates to become future leaders and innovators.

Value Statement

Integrity, Innovation and Internationalisation

1.2 Further, the Institution always strives

- To train our graduates with the latest and the best in the rapidly changing fields of Architecture, Engineering, Technology, Management studies, Science and Humanities, Laws and Liberal Arts.
- To develop graduates, with a global outlook, possessing Knowledge, Skills and Attitude and capable of taking up challenging responsibilities in the respective fields.
- To mould our graduates 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 Architecture, Engineering, Technology, Management studies, Health Science, Law, Design, Science and Humanities, Liberal Arts and Allied disciplines.

1.3 Aims and Objectives of the Institution are focused on

- Providing state of the art education in Architecture, Engineering, Technology, Applied Sciences, Law, Health Sciences, Design, Liberal Arts, and Management studies.
- Keeping pace with the ever – changing technological scenario and help the graduates to emerge as competent professionals, fully aware of their commitment to the society and the nation.
- To inculcate a flair for Research, Development and Entrepreneurship.

2.0 Admission

The admission policy and procedure shall be decided from time to time by the Board of Management (BOM) of the Institution, based on the guidelines issued by the UGC/ Ministry of Human Resource Development (MHRD), Government of India. The number of seats in each of the B. Tech. degree programme will be decided by the Board of Management / Statutory authorities of the Government like AICTE/ UGC / etc., taking into account of market demands. Seats are also made available for Non – Resident Indians and foreign nationals as per the Statutory approval, who satisfy the admission eligibility norms of the Institution.

2.1. Eligibility for Admission – Multiple Entry

i. Regular Entry (Admission to First Year)

Pass in 10 + 2 examination or 12 examination under NEP or equivalent with Physics and Mathematics as compulsory courses along with Chemistry / Biotechnology/ Biology/ Technical Vocational course or any other course as third course as prescribed by AICTE / Statutory Authorities like CoA, BCI, etc., / Government. The candidates should have obtained the minimum marks as per AICTE norms.

ii. Lateral Entry for diploma holders (LES) (Admission to Second Year)

The candidates possessing a Diploma in Engineering/Technology in the relevant discipline of specialization with minimum 50% marks awarded by any State Board of Technical Education in India or any other competent/statutory authority as accepted by the Board of Management of the Institution as equivalent thereto are eligible for admission to the 3rd Semester of the B. Tech degree programme.

Or

The candidate who earned minimum 40 credits in the Academic Bank of Credits (ABC) in applied field or area through reputed institutions as accepted by the Board of Management of the Institution. However, the candidate is required to attain the additional credits as

recommended by “Course Mapping Committee” and approved by the Vice Chancellor, by registering the course with the prescribed fee.

iii. Lateral Entry for Engineering / Technology graduates (Admission to Second Year)

The candidates with B.Sc / BCA / UG degree in Engineering / Technology in a particular discipline are permitted to undergo B.Tech in any other Engineering / Technology programme and obtain additional degree by undergoing the scheme of study prescribed by the institution and satisfy the requirements for the degree as stipulated by statutory authorities.

iv. Lateral Entry for Engineering / Technology graduates (Admission to Third Year)

The candidate who earned minimum 80 credits in the Academic Bank of Credits (ABC) in applied field or area through reputed institutions as accepted by the Board of Management of the Institution, However, the candidate is required to attain the additional credits as recommended by “Course Mapping Committee” and approved by the Vice Chancellor, by registering the course with the prescribed fee.

v. Lateral Entry for Engineering / Technology graduates (Admission to Fourth Year)

The candidate who earned 125 credits in the Academic Bank of Credits (ABC) in applied field or area through reputed institutions as accepted by the Board of Management of the Institution. However, the candidate is required to attain the additional credits as recommended by “Course Mapping Committee” and approved by the Vice Chancellor, by registering the course with the prescribed fee.

- 2.2 The candidate has to fulfil the prescribed admission requirements / norms of the Institution.
- 2.3. In all matters relating to admission to the B.Tech. degree programme, the decision of the Board of Management (BoM) of the Institution shall be final.
- 2.4. At any time after admission, if found that a candidate has not fulfilled one or many of the requirements stipulated by the Institution, or submitted forged certificates, the Institution has the right to revoke the admission and forfeit the fee paid. In addition, legal action may be taken against the candidate as decided by the Board of Management.

3.0 Student Discipline

Every student is required to observe utmost discipline and decorum both inside and outside the campus and do not indulge in any activity which may affect adversely the prestige / reputation of the Institution.

- 3.1** Any act of indiscipline of a student reported to the Head (Student affairs) and Head of the Department will be referred to a Discipline Committee constituted for the purpose. The Committee will enquire into the charges and decide on a suitable punishment if the charges are substantiated. The committee will also authorize the Head (Student Affairs) to recommend to the Vice-Chancellor for the implementation of the decision. The student concerned can appeal to the Vice-Chancellor, whose decision will be final.
- 3.2** Ragging in any form is a criminal and non-bailable offence in our country. The current State and Central legislations provide stringent punishments including imprisonment. Once the involvement of a student(s) is established in ragging, offending fellow students/staff, other disciplinary actions pertaining to POSH Act, Usage of Drugs, Damaging the institutional properties / reputation, abusive post(s) in social media, discriminatory abuse, violation in dress code and other harassment of any nature to the fellow students/staff etc. the student(s) will be liable to various disciplinary actions includes rustification from University, dismissed from the Institution, as per the laid down procedures of the UGC / Govt. / Institution. Every senior student of the Institution, along with their parent, shall give an undertaking at the beginning of every academic year in this regard and the same should be submitted at the time of registration for the academic year.

4.0 Structure of the B. Tech Degree Programme

- 4.1** All B. Tech. degree Programmes will have the curriculum and syllabi (for 4 years) as approved by the respective Board of Studies and Academic Council of the Institution.
- 4.2** Credits are the weightages, assigned to the courses based on the following general pattern:
- | | |
|---|---------------|
| One Lecture / Tutorial period per week | --- 1 credit |
| Up to Three periods of Practical classes per week | --- 1 credit |
| 4 periods of Practical classes per week | --- 2 credits |
- 4.3** The curriculum for B. Tech. programme is designed to have a minimum of **165 credits + 4 Non CGPA credits** that are distributed across eight semesters of study for the award of degree. Additional credits shall be earned to secure B.Tech. (Hons) and Minors vide clauses 4.6 and 4.7.

Choice Based Credit System (CBCS) is followed to provide the students, a balanced approach to their educational endeavour.

Under CBCS, the degree programme will consist of the following categories of courses:

- i) Humanities & Social Science Courses (HS) :** These courses introduce the students to Humanities & Social Science courses such as Indian Languages, Foreign Languages, NCC, Outreach, etc.

- ii) **Basic Science Courses (BS)** : These courses introduce the students to Basic Science courses such as Mathematics, Physics, Chemistry, etc.
- iii) **Engineering Science Courses (ES)** : These courses introduce the students to Basic Engineering courses such as Material Science, Basic Workshop, Engineering Drawing, Engineering, Graphics, Basics of Civil, Electrical/Electronics/Mechanical/Computer/Instrumentation Engineering, etc.
- iv) **Programme Core Courses (PC)** : These courses introduce the students to the foundation of Engineering related to the chosen programme of study.
- v) **Departmental Electives (DE)** : These courses offered in certain semesters in-which the students to take up a group of courses for specialization / interest to him/her in his/her programme of study.
- vi) **Non-Departmental Electives (NE)** : These courses offered in certain semesters in-which the students to take up a the courses on his/her interest offered by other department across the institution.
- vii) **Employment Enhancement Courses (EEC)** : These courses offered in certain semesters which are pertaining to Employment Enhancement of the students includes Project, Design Project, Internship
- viii) **Mandatory Courses (MC)** : These courses offered in certain semesters are compulsory, but these courses are non-credit courses and hence not used for calculation of GPA and CGPA. However, the courses will be mentioned in the grade sheet
- ix) **Non-CGPA courses:** These courses offered in certain semesters are compulsory, but not used for calculation of GPA and CGPA. However, the credits will be mentioned in the grade sheet.
- x) **Online / MOOC Courses** under Swayam and other recognizing online platforms will be considered as equivalent to courses mapped with the prior approval of Dean / Vice Chancellor through HoD.

4.4 Non – CGPA courses

The student shall select any two courses /activity listed in **Table 1** during the course of study. The student has to make his / her own efforts for earning the credits. The grades given will be Pass / Fail (P/F). The respective class teachers have to encourage, monitor and record the relevant activities of the students, based on the rules issued from time to time by the Institution and submit the End semester report to the Head of the Department.

Table 1. Non CGPA Courses

S.No.	Course / Activity	Credits
1	Technical Certification Course	2
2	Sports	2
3	Art and Cultural activities	2
4	Foreign Languages	2
5	Publication in Conferences / Seminar	2
6	Indexed Journal Publications	2
7	Patent Publication	2
8	Start ups	2
9	Industrial Training	2
10	Proficiency Certification	2
11	Technical Certification	2
12	State / National Level Social activity to support gender equality and Inclusion	2

4.5 A student must earn compulsorily, the credits mentioned under each category shown in **Table 2** and also a minimum total of **169 credits, i.e 165 credits (CGPA) + 4 credits (Non CGPA)** for the award of B. Tech. degree. For Lateral entry students, the 41 credits required for first and second semester of B. Tech shall be deemed to have been earned based on their curriculum in the diploma course. They have to earn a minimum of **128 credits (124 credits + 4 Non CGPA credits)** for the award of B. Tech. degree.

4.6 Students are eligible for award of **B.Tech.(Hons)** upon successful completion of **181 credits (165 regular credits + 12 Additional Credits+ 4 Non CGPA credits)**.

Student shall have CGPA of 6.5 at the time enrolment for B.Tech. (Hons) as detailed in clause 7.0.

4.7 Students are eligible for the award of **B.Tech. with Minor specialisation** upon successful completion of 9 additional credits totalling to **178 credits (165 regular credits + 9 Additional Credits + 4 Non CGPA credits)**

Student shall have CGPA of 6.0 at the time enrolment for B.Tech. (Minors) as detailed in clause 8.0.

Table 2. Distribution of Credits

No.	Category	Credits	Percentage (%)
1	Humanities & Social Science Courses (HS)	16	10
2	Basic Science Courses (BS)	24	15
3	Engineering Science Courses (ES)	16	10
4	Programme Core Courses (PC)	60	36
5	Departmental Electives (DE)	15	9
6	Non Departmental Electives (NE)	12	7
7	Employment Enhancement Courses (Project/ Summer Internship)	22	13
	Total Credits	165	100 %
NON CGPA			
10	Professional Development Courses (Table-1)	4	---
11	Mandatory Courses	--	--
Honours / Minors (Optional)			
11	Honours	12	---
12	Minors	9	---

4.8 The medium of instruction is English for all courses, examinations, seminar presentations and project reports.

5.0 Faculty Advisor

Faculty Advisors are assigned by the respective department to a certain number of students to help the students in planning their selection of courses and programme of study and for getting general advice on the academic programme, Such Faculty Advisor will continue to mentor the students assigned to him for the entire duration of the programme.

5.1 Class Committee

5.1.1 Every section / batch of the B. Tech. Degree programme will have a Class Committee consisting of Faculty and students.

The constitution of the Class Committee will be as follows:

- a. Senior Faculty not associated with teaching a course for the particular class shall be nominated by the Head of the Department to act as the Chairman of the Class Committee as approved by the Dean.
- b. Course coordinator of each of the lecture – based courses (for common courses).
- c. Class teacher of the class.
- d. All Faculty handling the courses for that class in the semester.
- e. Workshop Superintendent (for first two semesters); as applicable.
- f. Four students from the respective class nominated by Head of the Department
- g. Faculty Advisors of the respective class.

5.1.2 Course committee

A course committee shall be constituted by the HOD for all the common courses, with the faculty who are teaching the courses and with a Professor of the core department as the Chairman. The Course committee shall meet periodically to ensure the quality of progression of the course in the semester.

5.2 HoDs meeting with the students

- a. The HoD shall convene a closed meeting prior to each class committee and course committee meeting with the following members.
 - i. HoD
 - ii. Senior Faculty not associated with teaching a course for the class
 - iii. Class Teacher
 - iv. Five student representatives nominated by the class teacher/ HoD.
- b. The above committee shall discuss the academic and other issue, if any, and obtain independent feedback on all faculties on the Teaching Learning Processes, in order to take necessary action. The minutes of the meeting along with student representation and the corrective actions shall be forwarded to the Dean by the HoD.

5.3 Basic Responsibilities of Class Committee and Course committee

- a. The points of discussion during the above HoDs meeting shall be discussed in the Class committee and Course Committee meetings.
- b. To review periodically the progress of the students.
- c. To discuss issues concerning curriculum and syllabi and the conduct of the classes.

- d. To inform the students about the method of assessment as recommended by the Department Examination Committee (“DEC”) at the beginning of the semester. Each class committee / course committee will communicate its recommendations and the minutes of the meetings to the Head of the Department, Dean and the Head (Student Affairs).
- e. To conduct meetings at least thrice in a semester as per the Academic Plan issued by the Dean.
- f. To review the academic performance of the students including attendance, internal assessment and other issues like discipline, maintenance etc.

6.0 Registration for courses in a Semester

A student will be eligible for registration of courses only if student satisfies the regulation clause 12.0 (progression) and clause 13.0 (Maximum duration), and has cleared all dues to the Institution including Hostel, Library and other applicable fees up to the end of the previous semester provided that student is not debarred from enrolment on disciplinary grounds or for other reasons.

- 6.1** The institution follows a Choice Based Credit System. Accordingly, the students shall be given the option for selecting their DE / NE courses, and credits. The student is given the option of selecting the number of credits to undergo in a semester, subject to the curriculum requirements of minimum and maximum credits prescribed.
- 6.2** Except for the first year, registration for a semester shall be done during a specified week before the start of the semester as per the Academic Schedule.
- 6.3** Late registration/enrolment will be permitted by the respective Dean for genuine cases, on recommendation by the Head of the respective department, with a late fee as decided from time to time.
- 6.4** The student shall make the choice of course in consultation with the Faculty Advisor.
- 6.5** Students shall have to pay additional fee as prescribed, for registering in certain elective courses under Non - Departmental Electives courses offered by certain specific Departments and for higher level Foreign Languages, as decided from time to time.

7.0 B. Tech, (Honours) Programme

A new academic programme B.Tech. (Hons.) is introduced in order to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area. The features of the new programme, include:

- a. The number of credits to be earned for Honours specialization is 12 credits.
- b. B.Tech. students in regular stream can opt for B.Tech. (Hons.), provided they have a CGPA of 6.5 up to the end of third semester at the time of registration.
- c. The students opting for this program have to take four additional courses of their specialization of a minimum of 3 credits each from 3rd to 8th semesters with not more than 2 additional courses in a semester.
- d. The students are permitted to register for only one Honours specialization, during their period of study.
- e. The list of such additional courses offered by the various Departments of the respective school will be announced in the beginning of the academic year to facilitate the registration process.
- f. The student can also opt for post graduate level courses
- g. The faculty advisor will suggest the additional courses to be taken by the students based on their choice and level of their academic competence.
- h. The students should pay the prescribed fee for each additional course(s).

8.0 B. Tech with Minor specialization:

Students, who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering / Technology/ Arts/ Fashion/ Humanities/ Management/ Basic Sciences, may opt for additional courses in minor specialisation groups offered by a department other than their parent department. Such students shall select the stream of courses offered with pre – requisites by the respective departments and earn a Minor Specialization.

- a. The number of credits to be earned for Minor specialization is 9 credits through three courses.
- b. The students are permitted to register for their minor specialization courses from the 3rd semester onwards subject to a maximum of two additional courses per semester.
- c. The list of such additional courses offered by the various departments and the schedule will be announced in the beginning of the academic year to facilitate the registration process.

- d. The students have to pay the prescribed fee for each additional course.

9.0 Attendance

The faculty handling a course must finalise the attendance, 3 calendar days before the last instructional day of the course and submit to the HoD through the class teacher.

- a. A student **with less than 75% attendance in TCH (Total Contact Hours) in any course, will not be permitted to appear for the end-semester examination in that particular course**, irrespective of the reason for the shortfall of the attendance. The student is however permitted to avail additional Academic Leave up to 10% towards special OD for attending academic related activities like, Industrial Visits, Seminars, Conferences, Competitions etc., with the prior approval of the HoD or on genuine medical reasons. On reporting back, the student shall submit the relevant documents for proof to the HoD for approval of the additional academic leave.
- b. A student with an attendance (“TCH” – Total Contact Hours) below 75% (65% for genuine medical conditions / Special On Duty leave) in any course will fall under the category “RA”, which means Repeat the Course for want of attendance. Students under “RA” category will **not** be permitted to attend the Regular End Semester Examinations for that course and Continuous Internal Assessment (CIA) marks obtained in the respective course will be treated as null and void.
- c. The list of such students under “RA” will be notified by the respective Departments at the end of the course work for each semester. The students with RA courses shall repeat the course as per the procedure vide Clause 9.3.

9.1 Additional condonation may be considered for specific and genuine cases which includes approved leave for attending select NCC / Sports Camps or for cases requiring prolonged medical treatment or critical illness involving prolonged hospitalization.

9.2 For such select NCC / Sports Camps prior permission for leave shall be obtained by the respective faculty coordinator / Director of sports from the designated authority, before deputing the students.

For medical cases requiring prolonged medical treatment / critical illness, submission of complete medical history and records with prior intimation from the parent / guardian regarding the health condition, progress of treatment, etc., to Head (Student Affairs) is mandatory. The assessment of such cases will be done by the attendance sub – committee based on the merit of the case and put up their recommendation to the Vice – Chancellor /

designated authority. Such additional condonation is permitted only twice for a student in the entire duration of the programme.

The Vice-Chancellor based on the recommendation of the attendance sub - committee may then accord additional condonation of attendance, only if the Vice-Chancellor/Designated deems it fit and deserving. But in any case, the additional condonation cannot exceed 10% of TCH.

9.3 Repeat Classes Procedure for RA

- a. The students shall register for the RA courses at the beginning of every semester by paying the requisite fee and attend the repeat classes for RA course during the last period of the time table or by attending special classes with the course faculty or by attending any other special schedule as approved by the Dean/HoD and shall gain the requisite eligibility to attend the End Semester Examination (ESE). The odd semester courses will be offered in the Odd semester and the Even semester courses will be offered in the even semester. The student is permitted to register for a maximum of 5 RA courses under this option.
- b. The Continuous Internal Assessment Marks obtained by the student during their regular semester for the course in which they have been categorized as RA will become null and void. The students shall attend the RA classes and take up fresh Continuous Internal Assessments during the repeat classes and gain required attendance and CIA marks
- c. The students under “RA” category, who have secured the requisite attendance as applicable vide clause 9.0 and obtained internal assessment marks, by successfully completing the End of day courses or by attending special classes with the course faculty during the semester, are eligible to register for the End Semester Examinations for that course whenever the examination is conducted. This examination will be treated as arrear (supplementary) examination.

d. Detention

A student who **secures RA in all the** Theory / Elective / Theory with Practical component courses excluding Non – Department Elective (NE) prescribed in a semester shall repeat the semester by re-registering for the respective semester in the next academic year. However, student is permitted to appear for arrear (supplementary) examinations, if any, as per eligibility.

- e. **Summer Semester:** With the specific approval of the Vice – Chancellor / Designated Authority and as per the requirements / availability of the required time slot and other resources, the Institution may conduct a special Summer Semester after the regular ESE in April/May usually, for students having RA courses in both Even and Odd semesters and conduct the summer semester examinations for the eligible students. However, it is the sole discretion of the vice chancellor to permit such summer semester schedules.

9.4 Student who have obtained “RA” for any course but appeared for the ESE examination in that particular course under any circumstance, the marks obtained will be considered as “null and void”. The result of the particular course will be marked “RA” in the semester grade sheet and he/she has to gain the requisite eligibility to attend the End Semester Examination (ESE) for the course vide clause 9.3.

9.5 Student shall remit all payments due to the Institution within the prescribed dates, (unless and otherwise special approvals are obtained by any student for extension of payment dates) failing which their names, roll numbers will be blocked in the institution’s registry / ERP till the dues are cleared. Students having arrears in fee (Tuition fee / Hostel fee or any other) payment to the institution will be prevented from appearing for current semester ESE. However, they can appear for the Examinations in their arrear courses.

10.0 Assessment Procedure

Every course shall have two components for assessment namely,

- a. Continuous Internal Assessment “CIA”: This assessment will be carried out throughout the semester as per the Academic Schedule.
- b. End Semester Examination “ESE”: This assessment will be carried out at the end of the Semester as per the Academic Schedule. In the End Semester Examination (“ESE”) **the student should secure the prescribed minimum mark in each course in the ESE as given in the Table 3 for passing.**
- c. **There are no separate minimum marks prescribed for CIA for any course.**

The weightages for the various categories of the courses for CIA and ESE is given in Table 3.

Table 3 Weightage of the CIA and ESE for various categories of the courses

No.	Category of Courses	CIA weightage	ESE Weightage	Minimum ESE marks to be obtained (50% of ESE)	Passing minimum (CIA + ESE) (out of 100)
1.	Theory Course	50%	50%	25	45%
2.	Theory Course with Practical Components	50%	50%	25	45%
3.	Department Elective (DE)/ Non – Department Elective (NE)	50%	50%	25	45%
4.	Mandatory Courses	50%	50%	25	45%
5.	Practical Course	50%	50%	25	50%
6.	Design Project	50%	50%	25	50%
7.	Internship	50%	50%	25	50%
8.	Project and Viva Voce	50%	50%	25	50%

d. Improvement of CIA Marks

The students who fail in a course (“F” Grade) due to less CIA marks but having required attendance and other eligibility to appear for ESE is allowed to improve his /her CIA marks by under going the fresh internal evaluation procedure and appear for ESE whenever it is offered in the subsequent semester(s) as detailed in clause 11.d.

e. Procedure for improvement in CIA Marks

Students who wish to improve their CIA marks in a particular course shall register for the same with the respective HoD / Course faculty whenever the course is offered in the subsequent semester(s). The student has to remit the prescribed fee at the time of registration and undergo the internal assessment improvement procedure as prescribed by the course faculty with the approval of HoD. Student can write the ESE in the subsequent semester(s) and the revised internal assessment mark (CIA) will be considered for processing the results. **This will be considered as arrear (supplementary) examinations.** The improved CIA mark in the subsequent attempt(s) is limited to a maximum of 30 marks out of 50 (60%) only. The number of courses for which a student can register for internal improvement

scheme at a time is restricted to a maximum of 5. The student, if so desire, will be allowed to attend repeat classes for RA as mentioned in clause 9.3 with the approval of course faculty.

- f. Each faculty shall maintain separate Academic assessment record for all courses handled by him/her and the same shall be submitted to the HoD for periodical verification. The faculty shall deposit the Assessment records with the HoD at the end of each semester for safe custody.

10.1 Theory Course / DE / NE Assessment weightages

The general guidelines for the assessment of Theory Courses, Department Electives “DE” and Non – Department Electives “NE” shall be done on a continuous basis as given in Table 4a.

Table 4a: Weightage for Assessment – Theory Course / DE / NE

No.	CIA/ ESE	Assessment (Theory Course / DE / NE)	Weightage	Duration
1.	CIA	First Periodical Assessment	15%	2 periods
2.		Second Periodical Assessment	15%	2 Periods
3.		Seminar/Assignments/Project	10%	--
4.		Surprise Test / Quiz etc., as approved by the Department Examination Committee “DEC”	5%	--
5.		Attendance*	5%	--
6.	ESE	End Semester Examination	50%	2 to 3 hours

* Attendance Percentage

- ≥ 95 to ≤ 100 – 5 Marks
- ≥ 90 to < 95 – 4 Marks
- ≥ 85 to < 90 – 3 Marks
- ≥ 80 to < 85 – 2 Marks
- ≥ 75 to < 80 – 1 Mark
- < 75 – 0 Mark

10.2 Practical Course: For practical courses, the assessment will be done by the course teacher on a continuous basis as given in Table 4b.

- | | | |
|-----------------------------------|----|-----|
| a. Continuous Internal Assessment | -- | 50% |
| b. End Semester Examination | -- | 50% |

Table 4b: Weightage for Assessment – Practical Course

No.		Assessment (Practical Course)	Weightage	Duration
1.	CIA	First Periodical Assessment	15%	2 periods
2.		Second Periodical Assessment	15%	2 Periods
3.		Weekly assignment/Observation / lab records and viva as approved by the Department Examination Committee “DEC”	10%	--
4.		Surprise Test / Quiz etc., as approved by the Department Examination Committee “DEC”	5%	--
5.		Attendance*	5%	--
6.	ESE	End Semester Examination	50%	2 to 3 hours

* Attendance Percentage

- ≥ 95 to ≤ 100 – 5 Marks
- ≥ 90 to < 95 – 4 Marks
- ≥ 85 to < 90 – 3 Marks
- ≥ 80 to < 85 – 2 Marks
- ≥ 75 to < 80 – 1 Mark
- < 75 – 0 Mark

10.3 Theory courses with practical Component: For theory courses with practical component, assessment will be done on a continuous basis as given in Table 4c.

- a. Continuous Internal Assessment -- 50%
- b. End Semester Examination -- 50%

Table 4c : Weightage for assessment - Theory courses with practical Component

No.		Assessment (Theory courses with practical Component)	Weightage	Duration
1.	CIA	First Periodical Assessment (Theory)	15%	2 periods
2.		Second Periodical Assessment (Theory)	15%	2 Periods
3.		Practical Assessments #	10%	--
4.		Observation / lab records as approved by the Department Examination Committee “DEC”	5%	--
5.		Attendance*	5%	--
6.	ESE	End Semester Examination (Theory)	25%*	2 to 3 hours
7.		End Semester Examination (Practical)	25%*	2 to 3 hours

to be conducted by the course handling faculty

* Minimum 12.5 marks from ESE (Theory) and 12.5 marks from ESE (Practical) to pass the ESE.

10.4 Design Project – Assessment

A total of maximum three students can be formed as a Team to do the design project. The individual and group performance of the team should be assessed through appropriate rubrics as prescribed by the DEC with the approval of HoD. The general guideline for assessment of Design Project is given in Table 4d.

Table 4d : Assessment pattern for Design Project

No.	Review / Examination scheme	Weightage
1.	First Review	20%
2.	Second Review	20%
3.	Third Review	10%
4.	Project report and Viva – Voce (ESE)	50%

10.5 Internship

A student has to compulsorily attend Summer / Winter internship for a minimum period of one month. In lieu of Summer / Winter internship, the student is permitted to register for undertaking case study / project work under a faculty of the institution and carry out the project for minimum period of one month. In both the cases, the internship report in the prescribed format duly certified by the faculty in-charge shall be submitted to the HoD. The End Semester Examination evaluation will be done through presentation and viva by duly constituted examination panel by CoE. The course will have a weightage of one credit or as prescribed in the respective curriculum.

- 10.6** A total of maximum three students can be formed as a Team to do the design project. The individual and group performance of the team should be assessed through appropriate rubrics as prescribed by the DEC with the approval of HoD. The general guideline for assessment of for final year Project / Dissertation / comprehension / Internship, the assessment will be done on a continuous basis as given in Table 4e.

Table 4e : Assessment of Project work

No.	Review / Examination scheme	Weightage
1.	First Review	10%
2.	Second Review	20%
3.	Third Review	20%
4.	Project report and Viva – Voce (ESE)	50%

* Rubrics shall be prescribed by the DEC with the approval of HoD.

For the final year project and Viva – Voce end semester examination, the student shall submit a Project Report in the prescribed format issued by the Institution. The first three reviews will be conducted by a Committee constituted by the Head of the Department. The End semester assessment will be based on the project report and a viva on the project conducted by a Committee constituted by the Registrar / Controller of examination. This may include an external expert.

- 10.7** For Non – CGPA courses, the assessment will be graded “Satisfactory/Not Satisfactory” and grades as Pass/Fail will be awarded.

10.8 Flexibility in Assessment

The respective Departments under the approval of the Department Examination Committee (DEC) may decide the mode of assessment, based on the course requirements.

11.0 Repeat Examinations

- a. Students who fail to secure a pass (“F” grade) in their regular End semester examination in any course(s) may be provided with an opportunity to register and appear for the repeat Examinations conducted immediately after the announcement of results. The students shall submit the prescribed registration forms along with repeat examination fee as per the time line specified by COE.
- b. The students **who fail to secure a pass on being absent in their End Semester Examination for any regular course due to genuine reasons** are also permitted to appear for the Repeat Examinations.
- c. During the even semester, the Repeat Examinations will be conducted for even semester courses only and during the Odd semester it will be conducted for Odd semester courses only. However, Vice Chancellor shall permit to conduct Odd and Even semester repeat examinations together in any semester.
- d. The schedule for the Repeat Examinations will be notified through the Academic Calendar which will be published at the beginning of every academic year/semester(s) which depends on the availability of time slots in a semester and other resources. **This will not be treated as arrear (supplementary) examination.**
- e. However, it is the sole discretion of the Vice Chancellor to permit such repeat examinations.

12.0 Multiple Exit

- 12.1 The students can exit after the completion of one academic year (two semesters) with the Certificate in a discipline or a field; Diploma after the study of two academic years (four Semesters) and Regular Bachelor Degree in Science after the completion of three academic years (six Semesters). The successful completion of Four Years undergraduate Programme would lead to Bachelor Degrees in a discipline/subject.
- 12.2 The students shall be required to earn at least **fifty per cent of the credits** in the Basic science + Professional Core to apply for an exit option and Student should undergo an “Exit Programme” as recommended by the “Exit Committee” to attain the additional credits, If any, with the approval of Vice Chancellor to obtain the Certification (after First Year), Diploma (After Second Year), Degree in Science (After Third year) as Tabulated in Table 5.

Table 5: Multiple Exit

No.	Exit	Year	Minimum Credit Requirements	Eligibility for Exit
1.	Certification	After First Year	40	50% of credits from (Basic Science + Professional Core) + Additional Completion on Successful completion of “Exit Programme”
2.	Diploma	After Second Year	80	
3.	Degree in Science	After Third Year	120	

13.0 Maximum Duration of the Programme

A student may complete the programme at a slower pace than the regular pace, but in any case in not more than additional two years from the minimum duration of the programme excluding the semesters withdrawn as per clause 14.0.

A student completing the B.Tech. programme during the extended period than stipulated duration will not be eligible for any Institution Ranks.

14.0 Temporary Withdrawal from the Programme

- a. A student is permitted to take a break, up to a maximum of 2 semesters, during the entire programme to clear the backlog of arrears (supplementary).
- b. A student may be permitted by the Vice- Chancellor to temporary break from the entire programme for a maximum of two semesters for reasons of ill health, Start – up venture or other valid reasons as recommended by a committee consisting of Head of Department, Dean and Head (Student Affairs).

15.0 Declaration of results

15.1 A student shall secure the minimum marks as prescribed in Clause 10.0 (Table 3) in all categories of courses in all the semesters to secure a pass in that course.

15.2 Arrear (Supplementary) Examinations: If a candidate secure “F” / “RA” / “DE” / “AB” in any course as applicable, due to not satisfying the minimum passing requirement – as per clause 16.1 student shall register for Arrear (supplementary) examinations by paying the prescribed examinations fee, in the subsequent semesters whenever it is offered. During the even semester, the supplementary exams will be conducted for even semester courses and during the odd semester the supplementary exams will be conducted for odd semester courses.

Student need not attend the contact classes again. The Internal Assessment marks secured by the candidate will be retained for all such attempts. However, student under RA category must attend the contact classes and earn the required CIA and attendance.

15.3 Revaluation of Answer Scripts

Student can apply for the revaluation of End semester examination answer script (Regular / Supplementary) in a theory / theory with practical course, after the declaration of the results, on payment of a prescribed fee.

15.4 Revaluation is not permitted for Practical, Design Project / Internship / Comprehension courses. However, based on genuine grievances as approved by the Examination Grievance Committee, a student may be permitted to apply for revaluation in the above courses. **Revaluation is not permitted for repeat examinations and online examinations.**

15.5 After 5 years, i.e., completion of one year (2 semesters) from the normal duration of the programme, the internal assessment marks obtained by the student will not be considered in calculating the passing requirement. A candidate who secures 50% in the end semester examination only will be declared to have passed the course.

15.6 Student who earns required credits for the award of degree after 5 years for B.Tech. programme (on expiry of extended period of 2 semesters over and above normal duration of course) will be awarded only *second class* (Clause 18.1) irrespective of the earned CGPA. However, the period approved under temporary withdrawal, if any, from the programme (14.0) will be excluded from the maximum duration as mentioned above.

15.7 Semester Exchange Programme:

Students who are allowed to undergo internship or Training in Industries in India or abroad during their course work or attend any **National** / International Institution(s) under semester abroad programme (SAP) up to a maximum of 2 semesters will be granted credit transfer for the Course Work/project work done by them in the Industry /Foreign Institution as per the recommendations of the credit transfer committee. The leave period of the students for International internships / Semester Abroad programme etc., will be accounted for attendance. The students may have to pay the additional fee to the institution as applicable.

15.8 Twinning, Dual, Integrated Programmes

The Twinning, Dual, Integrated Programmes shall have separate regulations as approved by statutory authorities of the Institution.

16.0 Grading

16.1 A grading system as shown in Table 6 will be followed.

Table 6: Grading system

Range of Marks	Letter Grade	Grade Points	Remarks
90 – 100	S	10	Outstanding
80-89	A+	09	Excellent
70-79	A	08	Very Good
60-69	B+	07	Good
55-59	B	06	Above Average
50-54	C	05	Average
45-49 (Theory, Theory with Practical)	P	04	Pass
<45 (Theory, Theory with Practical)	F	--	To Reappear for end-semester examination
< 50 (Practical Course, Design Project, Comprehension, Internship, Project and Viva Voce)	F	--	To Reappear for end-semester examination
--	F / AB	--	Absent for the End Semester Examination
--	F / RA	--	Repeat the course due to Lack of minimum attendance (below 75%) in regular course (Clause 9.3)
--	F / DE	--	DETAINED (DE) “RA” in all theory courses except Non Department Elective (NE) of a semester. The student is detained and has to repeat the entire semester as per the Clause 9.3 d - Detention

16.2 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 and successfully completed 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, in any semester, considering all the courses enrolled from the first semester onwards. CGPA/ GPA will be rounded to first decimal point.

16.3 The Grade card will not include the computation of GPA and CGPA for courses with letter grade **F, RA, AB** and **DE** until those grades are converted to the regular grades.

16.4 A course successfully completed cannot be repeated.

17.0 Grade Sheet

17.1 Letter grade

Based on the performance, each student is awarded a final letter grade at the end of the semester in each course. The letter grades and corresponding grade points are given in Table 10.

17.2 Student is considered to have completed a course successfully and earned credits if student secures a letter grade other than “**F**”, “**RA**” “**AB**” and “**DE**” in that course.

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

- a. Program and discipline for which the student has enrolled.
- b. Semester of registration.
- c. The course code, name of the course, category of course and the credits for each course registered in that semester
- d. The letter grade obtained in each course
- e. Semester Grade Point Average (GPA)
- f. The total number of credits earned by the student up to the end of that semester in each of the course categories.
- g. The Cumulative Grade Point Average (CGPA) of all the courses taken from the first semester.
- h. Credits earned under Non CGPA courses.
- i. Additional credits earned for B. Tech (Hons.) and B. Tech with Minor specialization.

18.0 Class/Division

18.1 Classification is based on CGPA and is as follows:

$\text{CGPA} \geq 8.0$: First **Class with distinction**

$6.5 \leq \text{CGPA} < 8.0$: **First Class**

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

- 18.2 (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 with effect from II semester, 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 5 years for the students admitted in first year, 4 years for for the students admitted in second year, 3 years for for the students admitted in third year, 2 years for the students admitted in fourth year**
- (iii) The period of authorized break of the programme (vide clause 14.0) will not be counted for the purpose of the above classification.
- (iv) To be eligible for award of **B. Tech (Hons.)** the student must have earned additional 12 credits in the relevant Engineering courses offered by the Departments of the respective Schools, thereby a total of **181 credits (165 regular credits + 12 additional credits + 4 Non CGPA credits)**.
- (v) To be eligible for award of **B. Tech with Minor Specialization**, the student must have earned additional 9 credits in the relevant courses offered by other than the parent department and has successfully earned **178 credits (165 regular credits + 9 Additional credits + 4 Non CGPA Credits)**.

19.0 Academic Bank of Credits

19.1. The Academic Bank of Credits (ABC), a national-level facility is adopted to promote the flexibility of the curriculum framework and interdisciplinary/multidisciplinary academic mobility of students across the Higher Education Institutions (HEIs) in the country with appropriate "credit transfer" mechanism.

- 19.2** Student who have completed a portion of courses in other approved Institutions of repute and earned required credits under ABC shall be admitted to the appropriate admission level of the programme (vide Clause: 2) based on the recommendation of the credit transfer committee on a case to case basis and approved by the Vice Chancellor. The credit transfer committee shall suggest additional credits as required for admission in to the appropriate level of admission in the programme.

The validity of credits earned will be for a maximum period of seven years or as specified by the Academic Bank of Credits (ABC). The procedure for depositing credits earned, its shelf life, redemption of credits, would be as per UGC (Establishment and Operationalization of ABC scheme in Higher Education) Regulations, 2021

19.3 Admission norms for working Professional:

Separate admission guidelines are available for working / experienced professionals for candidates with the industrial / research experience who desire to upgrade their qualification as per recommendation of Credit Transfer Committee and the Academic Council, in line with Statutory Regulating Authorities.

20.0 Eligibility for Award of the B.Tech. /B. Tech (Hons)/ B. Tech with Minor Specialization Degree

- 20.1** Student shall be declared to be eligible for award of B. Tech. /B. Tech (Hons) / B. Tech degree with Minor specialization if student has satisfied the prescribed academic requirements. There shall not be any fee due to the institution and not having pending disciplinary action.
- 20.2** Each B.Tech. Student during the course of study shall compulsorily publish one paper minimum in Scopus or WOS indexed journal / conference paper / filing of patent as part of the programme requirement to become eligible for award of degree. All such conference / journal publication(s) should be affiliated with Hindustan Institute of Technology and Science. The patent should be filed with Hindustan Institute of Technology and Science as an applicant. A communication from the Publishing agency that the paper is accepted for publication in a Journal / Conference Proceedings (Scopus Indexed) would suffice if the paper is yet to be published. The award of the degree shall be recommended by the Academic Council and approved by the Board of Management of the Institution.

21.0 Change of Discipline

- 21.1** If the number of students in any discipline of B.Tech. programme as on the last instructional day of the First semester is less than the sanctioned strength, then the vacancies in the said disciplines can be filled by transferring students from other disciplines subject to eligibility. All such transfers will be allowed on the basis of merit of the students. The decision of the Vice-Chancellor shall be final while considering such requests.
- 21.2** All students who have successfully completed the first semester of the course will be eligible for consideration for change of discipline subject to the availability of vacancies and as per norms.

22.0 Intellectual Property Rights

Any product of human intellect which is unique, novel and non-obvious and which qualifies for protection under relevant acts of the government governing patent, copyright etc. and developed at HITS belongs to the Institute. HITS shall be the owner of the work, including software created by HITS personnel with significant use of HITS resources, HITS shall have sole ownership of all intellectual property created by a student during his/her course of study in the Institute.

23.0 Power to modify

Notwithstanding all that has been stated above, the Academic Council is vested with powers to modify any or all of the above regulations from time to time, if required, subject to the approval by the Board of Management.

----End of the regulations ----



**Curriculum and Syllabi for B.Tech./ B.Tech.(Hons.)
& B.Tech.(Minors) Degree Programme**

Applicable for Students admitted from Academic Year 2022 Onwards

VISION AND MISSION OF THE INSTITUTE

Motto:

To Make Every Man a Success and No Man a Failure

Vision:

To be an International Institute of Excellence, providing a conducive environment for education with a strong emphasis on innovation, quality, research and strategic partnership blended with values and commitment to society.

Mission:

- *To create an ecosystem that promotes learning and world class research.*
- *To nurture creativity and innovation.*
- *To instil highest ethical standards and values.*
- *To pursue activities for the development of the Society.*
- *To develop national and international collaborations with institutes and industries of eminence.*
- *To enable graduates to become future leaders and innovators.*

Value Statement

Integrity, Innovation, Internationalization

VISION, MISSION OF THE DEPARTMENT

Vision

To excel in innovation and collaborative research, promoting technical and Entrepreneurial skills.

Mission

The Mechanical Engineering program continuously strives,

- M1.** To provide a conducive academic environment with contemporary and innovative curricula imparting high quality education
- M2.** To offer state of the art laboratory infrastructure to enhance fundamental research
- M3.** To maintain an environment to work closely with industries to materialize collaborative and applied research
- M4.** To impart technical, managerial and lifelong learning skills, embedded with ethical values and social relevance

B. Tech. Mechanical Engineering

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- PEO 1** : Successful career and adaptability to industry: Graduates will have in-depth knowledge appropriate to the discipline of Mechanical Engineering which enables them to pursue higher studies and academic research
- PEO 2** : Modern design tools and multi-disciplinary project execution: Graduates will attain professionalism and shall be industry adaptive through a degree structure that is relevant to industry, and responsive to changes in technology and the needs of the society with noble attitude and social responsibility
- PEO 3** : Contribution to mechanical field and lifelong learning: Graduates will possess multi and inter disciplinary knowledge and excel in innovation and teamwork with entrepreneurial capabilities

PROGRAMME OUTCOMES (PO's)

Engineering Graduates will be able to:

- PO1** : **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2** : **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3** : **Design Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4** : **Conduct Investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5** : **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6** : **The Engineer & Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7** : **Environment & Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- PO8** : **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9** : **Individual & Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10** : **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11** : **Project Management & Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12** : **Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

- PSO1** Apply their acquired knowledge in the field of thermal and manufacturing sciences to provide solutions for engineering problems using current technology
- PSO2** Apply the concepts of design, analysis and implementation of mechanical systems and processes to provide solutions to the real world situations

PEOs and POs:

B.Tech Mechanical Engineering Program Outcomes (POs) leading to the achievements of the objectives (PEOs) are summarised in the following table.

Programme Educational Objectives (PEOs)	Programme Outcomes (POs)													
	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
I	2	1	2	3	3	2	1	1	3	1	2	3	2	3
II	3	2	2	3	3	1	2	2	2	1	1	2	3	2
III	2	1	3	3	3	2	1	1	2	2	2	3	2	3

PROGRAM OUTCOMES																	
Year	Semester	Sl No	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Year 1	Semester 1	1	Matrices and Calculus	3.0	3.0	1.4	0.6	1.0	-	-	-	-	-	-	1.4	-	2
		2	Engineering Physics	3.0	3.0	-	0.8	1.4	-	-	-	3.0	-	-	3.0	1.0	1
		3	Communication Skills	-	-	-	-	-	-	-	0.8	0.4	3.0	1.0	2.0	1.0	1.0
		4	Engineering Graphics and Computer Aided Design	2.4	1.0	0.8	-	3.0	-	-	-	-	-	-	2.0	3.0	2.0
		5	Design Thinking	1.4	1.2	1.6	-	1.8	2.8	2.8	2.0	2.4	2.4	0.8	2.0	2.4	2.6
		6	Engineering Practices Lab	3.0	2.0	-	2.0	-	1.0	-	-	-	-	-	-	2.3	1.3
		7	Outreach (NCC / NSS,Y's Men, Rotaract) – Level I	-	-	-	-	-	3.0	3.0	3.0	3.0	3.0	1.0	1.0	-	-
		8	Universal Human Values	-	-	-	-	1.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	-	-
		9	Tamil Culture and Technology	-	-	-	-	-	-	0.4	0.4	0.8	3.0	0.8	0.6	-	-
Year 1	Semester 2	1	Analytical Mathematics	3.0	2.6	1.6	0.6	1.2	-	-	-	-	-	-	1.4	1.6	1.6
		2	Engineering Materials	3.0	2.0	1.0	-	-	-	1.8	-	-	-	-	1.8	1.6	1.4
		3	Personality Development and soft skills	-	-	-	-	2.0	3.0	0.4	1.2	2.0	3.0	2.0	0.6	1.0	1.0
		4	Programming in Python	3.0	2.3	2.8	0.8	3.0	-	-	0.3	0.5	0.5	0.5	0.5	1.0	1.0
		5	Engineering Mechanics	2.0	2.6	2.6	1.6	-	-	-	1.0	-	1.6	-	2.0	-	2.2
		6	Fab Lab for Core Engineering	3.0	3.0	3.0	2.0	3.0	-	-	-	-	-	-	1.0	1.0	1.0
		7	Outreach (NCC / NSS,Y's Men, Rotaract) – Level II	-	-	-	-	-	3.0	3.0	3.0	3.0	3.0	1.0	1.0	-	-
		8	Regional Languages or Foreign Languages	-	-	-	-	-	-	0.4	0.4	0.8	3.0	0.8	0.6	-	-
		9	Mandatory Course #1 is a Non-credit course (Student shall select one course from the list given under Mandatory Course I)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Year 2	Semester 3	1	Partial Differential Equations and Transforms	3.0	3.0	2.0	2.0	2.0	-	-	-	-	-	-	2.0	2.0	-
		2	Advanced Academic Writing	-	0.4	1.8	1.6	0.4	-	0.4	2.4	1.8	3.0	1.8	3.0	-	-
		3	Thermal Engineering	3.0	3.0	3.0	1.0	2.0	-	-	1.0	2.0	1.0	-	1.0	1.0	-
		4	Machine Drawing	3.0	2.2	-	2.2	1.6	1.2	-	1.2	-	1.0	-	2.0	-	2.0
		5	Manufacturing Technology	3.0	2.6	1.0	-	2.0	1.0	-	1.2	1.2	1.8	-	2.0	1.0	-
		6	Departmental Elective 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7	Environmental Science and Sustainable Development	2.0	2.0	2.0	-	-	1.0	3.0	-	-	-	-	2.0	-	-
		8	Design Project – 1	3.0	2.8	3.0	1.4	1.8	1.0	1.0	1.0	3.0	1.0	1.0	3.0	2.0	3.0
		9	Internship -1 (To be carried out in summer after 2 nd semester and evaluated in 3 rd semester)	1.0	1.0	-	-	2.0	0.7	-	1.0	1.7	1.7	1.7	0.7	0.7	1.0
		10	Mandatory Course #2 is a Non-credit course (Student shall select one course from the list given under Mandatory Course II)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Year 2	Semester 4	1	Probability and Statistics	3.0	3.0	1.2	0.8	-	-	-	-	-	1.0	-	2.0	1.0	1.0
		2	Professional editing and project writing	-	-	-	2.0	-	-	-	-	1.0	3.0	-	2.0	-	-
		3	Strength of Materials	3.0	3.0	3.0	3.0	2.0	-	-	-	-	1.0	-	1.0	-	3.0
		4	Fluid Mechanics and Machinery	3.0	3.0	3.0	3.0	2.0	-	-	-	-	1.0	-	1.0	-	3.0
		5	Mechanical Measurements (Industry Collaborated Course)	3.0	1.8	1.8	1.8	1.4	-	-	1.0	1.8	2.0	1.4	2.4	1.8	1.8
		6	Departmental Elective 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7	Non-Departmental Elective 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8	Design Project – 2	3.0	2.8	3.0	1.4	1.8	1.0	1.0	1.0	3.0	1.0	1.0	3.0	2.0	3.0
		9	Mandatory Course #3 is a Non-credit course (Student shall select one course from the list given under Mandatory Course III)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Year 3	Semester 5	1	Public speaking	-	-	-	-	-	-	-	-	1.2	3.0	-	2.0	-	-
		2	Mechanics of Machines	3.0	2.8	-	1.8	0.4	0.8	0.6	-	1.0	-	-	0.4	-	1.6
		3	Applied Machine Design	3.0	3.0	3.0	3.0	2.0	-	-	-	-	1.0	-	1.0	-	3.0
		4	Composites and Smart Materials	2.0	2.6	2.6	1.6	-	-	-	1.0	-	1.8	-	2.0	-	2.2
		5	Departmental Elective 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		6	Non-Departmental Elective 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7	Design Project – 3	3.0	2.8	3.0	1.4	1.8	1.0	1.0	1.0	3.0	3.0	1.0	3.0	2.0	3.0
		8	Entrepreneurship	-	-	-	1.0	-	2.8	2.8	2.8	2.8	-	2.0	3.0	-	-
		9	Internship -2 (to be evaluated in 5 th semester. To be carried out in summer after 4 th semester))	1.0	1.0	-	-	2.0	0.7	0.7	2.7	2.3	1.7	1.7	0.7	0.7	1.0
Year 3	Semester 6	1	English for Competitive Examinations	-	-	-	-	-	-	0.4	0.4	1.4	3.0	0.8	-	-	-
		2	Computer Aided Design and Manufacturing	2.0	2.0	1.0	1.6	1.8	-	-	-	1.8	1.2	-	2.0	1.4	2.4
		3	Robotics and Automation	3.0	2.0	1.8	1.0	1.8	-	2.4	1.0	2.0	-	-	2.4	-	1.8
		4	Mechatronics and Pneumatics	2.0	2.0	2.2	1.4	0.8	-	-	1.0	-	-	-	2.0	1.0	1.8
		5	Departmental Elective 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		6	Non-Departmental Elective 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7	Product study	3.0	3.0	3.0	3.0	2.0	-	1.0	-	2.0	3.0	3.0	1.6	2.0	2.0
		8	Design Project – 4	3.0	2.8	3.0	1.4	1.8	1.0	1.0	1.0	3.0	1.0	1.0	3.0	2.0	3.0
Year 4	Semester 7	1	Verbal Reasoning and Interview Skills	-	2.0	1.0	1.0	-	2.0	-	-	1.6	3.0	1.0	3.0	-	-
		2	Heat and Mass Transfer	3.0	3.0	3.0	3.0	2.0	-	-	-	-	1.0	-	1.0	3.0	-
		3	Finite Element Methods	2.2	2.8	2.0	3.0	2.8	-	-	-	-	-	-	1.8	-	2.0
		4	Smart Manufacturing	2.0	2.0	1.0	1.4	1.8	-	-	1.0	-	1.0	-	1.8	1.8	-
		5	Departmental Elective 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		6	Non-Departmental Elective 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7	Research Methodology & IPR	2.2	2.0	2.0	1.6	-	1.2	-	1.0	0.2	1.6	-	2.0	1.8	2.2
		8	Project Phase 1	3.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Year 4	Semester 8	1	Project Phase 2	3.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

DEPARTMENT ELECTIVE COURSES: VERTICALS

	Vertical 1	Vertical 2	Vertical 3	Vertical 4
SEM	Product Design	Sustainable Energy systems	Material Science and Testing	Digital Manufacturing and Industry 4.0
III	EME51501-New Product Design and Development	EME51502-Green Energy for Buildings	EME51503-Mechanical Metallurgy	EME51504-Micro Manufacturing
IV	EME51505- Maintenance Engineering and Condition Monitoring	EME51506- Electric Vehicle Technology	EME51507- Powder Metallurgy	EME51508- Micro Electro Mechanical Systems
V	EME51509- Tribology in Design	EME51510-Carbon Neutralization	EME51511- Nano Technology	EME51512- AI in Manufacturing
VI	EME51513- Machine Dynamics and Control	EME51514- Thermal Turbo Machines	EME51515- Characterization of Materials	EME51516- Data Science for Mechanical Engineers
VII	EME51517- Reverse Engineering	EME51518- Gas Dynamics and Jet Propulsion	EME51519-Non-Destructive Testing	EME51520- IOT and Machine Learning

VERTICAL 1: PRODUCT DESIGN

Sl. No	COURSE NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
1	EME51501-New Product Design and Development	3.0	1.0	1.8	2.4	1.0	-	-	-	3.0	2.4	-	1.0	-	1.8
2	EME51505- Maintenance Engineering and Condition Monitoring	2.0	2.0	2.2	2.4	2.4	-	-	-	-	1.0	-	2.0	1.6	0.0
3	EME51509- Tribology in Design	1.6	1.6	1.8	1.6	1.8	-	-	-	-	-	-	1.8	-	-
4	EME51513- Machine Dynamics and Control	2.6	1.8	1.8	1.8	2.0	-	-	-	-	1.0	0.0	2.0	-	1.6
5	EME51517- Reverse Engineering	1.6	2.0	1.8	1.6	1.8	-	-	-	-	1.0	0.0	1.8	-	2.6

VERTICAL 2: SUSTAINABLE ENERGY SYSTEMS

Sl. No	COURSE NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
1	EME51502-Green Energy for Buildings	2.2	1.4	1.2	-	0.6	2.0	3.0	1.0	-	-	-	1.0	1.2	1.4
2	EME51506- Electric Vehicle Technology	2.0	2.2	-	1.2	1.6	1.0	1.8	0.0	1.6	1.4	-	-	-	1.6
3	EME51510-Carbon Neutralization	1.0	1.6	-	1.6	-	2.0	3.0	1.0	-	1.0	1.0	-	1.0	2.0
4	EME51514- Thermal Turbo Machines	2.6	1.8	1.8	1.8	2.0	-	-	-	-	1.0	-	2.0	-	1.6
5	EME51518- Gas Dynamics and Jet Propulsion	2.0	2.6	2.6	1.6	-	-	-	1.0	-	1.6	-	2.0	2.2	-

VERTICAL 3: MATERIAL SCIENCE AND TESTING

Sl. No	COURSE NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
1	EME51503-Mechanical Metallurgy	2.8	2.0	1.6	1.8	1.6	-	-	-	-	1.0	-	2.0	1.0	-
2	EME51507- Powder Metallurgy	2.0	1.8	1.6	1.8	1.4	-	-	-	-	1.0	-	2.0	1.4	-
3	EME51511- Nano Technology	2.0	1.4	1.4	1.6	1.2	-	1.0	-	-	-	-	1.6	1.4	-
4	EME51515- Characterization of Materials	2.0	1.8	1.6	1.8	1.4	-	-	-	-	1.0	-	2.0	1.4	-
5	EME51519-Non-Destructive Testing	2.0	2.0	2.2	2.4	2.4	-	-	-	2.0	1.0	1.0	2.0	1.6	-

VERTICAL 4: DIGITAL MANUFACTURING AND INDUSTRY 4.0

Sl. No	COURSE NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
1	EME51504-Micro Manufacturing	2.0	2.0	2.2	2.4	2.2	-	-	-	-	1.0	-	2.0	2.6	-
2	EME51508- Micro Electro Mechanical Systems	2.6	1.8	1.8	1.8	1.4	1.4	1.0	1.0	-	2.0	-	2.0	1.0	1.8
3	EME51512- AI in Manufacturing	1.6	1.8	1.8	1.8	2.8	-	-	1.0	-	1.6	-	2.4	1.8	1.8
4	EME51516- Data Science for Mechanical Engineers	1.6	1.8	1.8	1.8	2.8	-	-	1.0	1.0	1.6	1.0	2.4	1.8	1.8
5	EME51520- IOT and Machine Learning	1.6	1.8	1.8	1.8	2.8	-	-	1.0	-	1.6	-	2.4	1.8	1.8

NON DEPARTMENT ELECTIVES

NON DEPARTMENT ELECTIVES - 1

SI No	COURSE NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PO12	PSO1	PSO2
1	Non-destructive Testing Methods	2	1	1	0.8	0.6	-	0.6	1	0.6	0.8	0.8	1.2	-	-
2	Virtual Instrumentation	1.4	1.2	0.6	2.6	1.4	1.4	1.4	-	0.8	1.6	0.4	0.4	-	-
3	Joining of Materials	3	1.2	0.8	-	0.8	0.4	1	-	-	1	0.4	1	-	-
4	Wind Energy	1	1	1	1	-	2	3	1	-	1	1	1	-	-
5	Anthropometry and Ergonomics	1.6	0	0.4	0.4	1.2	1.2	1.2	0.2	0.6	0.6	-	-	-	-

NON DEPARTMENT ELECTIVES - 2

SI No	COURSE NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PO12	PSO1	PSO2
1	Solar Energy Harness for Home and Office	1	1	1	1	-	2	3	1	-	1	1	1	-	-
2	3D Printing in Modern Manufacturing	2.2	0.2	0.4	0	1.2	-	-	-	0.2	-	-	0.2	-	-
3	Industrial Automation	1.4	1	0.6	1.8	1.4	1.2	1.6	0	0.8	1.6	0.4	0.2	-	-
4	Corrosion Engineering	3	2	1.2	2.2	1.4	0.8	0.8	0.8	0	1	0.4	1	-	-
5	Carbon Footprint and Capturing	1	1.8	0	0	0	0	3	0	0	0	0	1	-	-

NON DEPARTMENT ELECTIVES - 3

SI No	COURSE NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PO12	PSO1	PSO2
1	Digital Measurements	3	1.8	1.8	1.8	1.4	0	0	0	0	0	0	0	-	-
2	Modern Manufacturing	3	2	0.4	0.6	1.8	0.4	0.8	0.8	0	0	0	0	-	-
3	Electric and Hybrid Vehicles	2	2.2	2	1.2	0.8	1	1.2	0	1.4	1.2	0	0	-	-
4	Building Automation	1.8	1.8	1	1	1.8	0.4	0.8	1.2	0	0.8	0	1.6	-	-
5	Lean Manufacturing	2	2	0	1	0	1	1	2	0	0	0	1	-	-

NON DEPARTMENT ELECTIVES - 4

SI No	COURSE NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PO12	PSO1	PSO2
1	Materials and Applications	3	1	1	0	1	1	0	0	0	1	0	1	-	-
2	Industrial Safety and Maintenance Engineering	2	2	2	2	0	1.4	0	0	0	0	0.4	1	-	-
3	Soft Computing Techniques for Engineers	2	2.6	2.6	1.6	2.4	0	0	1	0	1.6	0	2	-	-
4	Autonomous Vehicle	2	2.2	0	1.2	0.8	1	1.2	0	1.4	1.2	0	0	-	-
5	3D Game Environment	2	2	1	1	3	0	0	0	1.6	1.8	0	2	-	-

Note : PSO1 and PSO2 pertains to the department of the student opting for this course

B. TECH. MECHANICAL ENGINEERING

GENERAL COURSE STRUCTURE & THEME

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hours Practical (P) per week	1 Credit

B. Range of Credits: In the light of the fact that a typical Model Four-year Under Graduate degree program in Engineering has about 160 credits, we have adopted 165 credits.

C. Structure of UG Program: The structure of UG program shall have essentially the following categories of courses with the breakup of credits as given:

S. No.	Category Code	Category	Breakup of Credits
1.	HS	Humanities & Social Science Courses	16
2.	BS	Basic Science Courses	24
3.	ES	Engineering Science Courses	15
4.	PC	Program Core Courses (Branch specific)	61
5.	DE	Professional Elective Courses (Branch specific) – Department Elective	15
6.	NE	Open Elective Courses (Cross Discipline Subjects) – Non Department Elective	12
7.	EEC	Employment Enhancement Courses (Project/ Summer Internship/ Seminar)	22
TOTAL			165

CURRICULUM COURSE DISTRIBUTION (BASED ON CREDITS)

Semester	HS	BS	ES	PC	DE	NE	EEC	Total Credits per semester
1	6	8	4	4				22
2	5	8	5	4				22
3	1	4	2	10	3		2	22
4	1	4		10	3	3	1	22
5	1		2	10	3	3	2	21

6	1			13	3	3	1	21
7	1		2	10	3	3	3	22
8							13	13
Total Credits	16	24	15	61	15	12	22	165

CURRICULUM COURSE DISTRIBUTION (BASED ON COURSE COUNT)

Semester	HS	BS	ES	PC	DE	NE	EEC	MC	Total Courses per semester
1	4	2	2	1					9
2	3	2	2	1				1	9
3	1	1	1	3	1		2	1	10
4	1	1		3	1	1	1	1	9
5	1		1	3	1	1	2		9
6	1			4	1	1	1		8
7	1		1	3	1	1	1		8
8							1		1
Total Courses	12	6	7	18	5	4	8	3	63

MC : Mandatory Course

CREDIT COUNT

Semester	Credit Count
1	22
2	22
3	22
4	22
5	21
6	21
7	22
8	13
	165

**B. TECH. MECHANICAL ENGINEERING
CURRICULUM FRAMEWORK FOR SEMESTERS I TO VIII**

FRAMEWORK OF CURRICULUM 2022 A (in line with NEP 2020)									
SEMESTER - I									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51001	Matrices and Calculus	3	0	2	4	2	5
2	BS	Any One Course to be Opted		3	0	2	4	2	5
		EPH51001	Engineering Physics						
		ECT51001	Engineering Materials						
3	HS	Any One Course to be Opted		2	0	1	2	1	3
		GGGG1001	Communication Skills						
		GGGG1002	Personality Development and soft skills						
4	ES	Any One Course to be Opted		2	0	2	3	2	4
		ECS51009	Programming Fundamentals using C						
		ECS51010	Programming in Python						
		OR							
		EME51001	Engineering Graphics and Computer Aided Design						
5	ES	EGE51002	Design Thinking	2	0	2	3	2	4
6	ES	Any One Course to be Opted		0	0	4	2	2	4
		EGE51406	Engineering Practices Lab						
		EGE51408	Fab Lab for Core Engineering						
7	HS	Any One Course to be Opted		0	0	2	1	4	2
		EGE51404	Outreach (NCC) – Level I*						
		EGE51405	Outreach(NSS,Y's Men, Rotaract) – Level I*						
8	HS	Any One Course to be Opted (Regional Languages or Foreign Languages)		2	0	0	2	2	2
		GGGG1008	Tamil (Regional Language)						
		GGGG1009	Hindi (Regional Language)						
		GGGG1010	Telugu (Regional Language)						
		GGGG1011	French (Foreign Language)						
		GGGG1012	German (Foreign Language)						
		GGGG1013	Spanish (Foreign Language)						
		GGGG1014	Korean (Foreign Language)						
		GGGG1015	Mandarin (Foreign Language)						
		GGGG1016	Japanese (Foreign Language)						
		OR							

		EGE51001	Universal Human Values						
9	HS	ELS51006	Tamil Culture and Technology	1	0	0	1	2	1
Total				15	0	15	22	19	30
* Students should choose Level – I and Level – II of the same outreach course in the semester 1 and 2 respectively									
SEMESTER – II									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51002	Analytical Mathematics	3	0	2	4	2	5
2	BS	Any One Course to be Opted		3	0	2	4	2	5
		EPH51001	Engineering Physics						
		ECT51001	Engineering Materials						
3	HS	Any One Course to be Opted		2	0	1	2	1	3
		GGGG1001	Communication Skills						
		GGGG1002	Personality Development and soft skills						
4	PC	EME51003	Engineering Mechanics	3	0	2	4	2	5
5	ES	Any One Course to be Opted		2	0	2	3	2	4
		ECS51009	Programming Fundamentals using C						
		ECS51010	Programming in Python						
		OR							
		EME51001	Engineering Graphics and Computer Aided Design						
6	ES	Any One Course to be Opted		0	0	4	2	2	4
		EGE51406	Engineering Practices Lab						
		EGE51408	Fab Lab for Core Engineering						
7	HS	Any One Course to be Opted		0	0	2	1	4	2
		EGE51410	Outreach (NCC) – Level II*						
		EGE51411	Outreach(NSS,Y’s Men, Rotaract)–Level II*						
8	HS	Any One Course to be Opted (Regional or Foreign Languages)		2	0	0	2	2	2
		GGGG1008	Tamil (Regional Language)						
		GGGG1009	Hindi (Regional Language)						
		GGGG1010	Telugu (Regional Language)						
		GGGG1011	French (Foreign Language)						
		GGGG1012	German (Foreign Language)						
		GGGG1013	Spanish (Foreign Language)						
		GGGG1014	Korean (Foreign Language)						

		GGGG1015	Mandarin (Foreign Language)						
		GGGG1016	Japanese (Foreign Language)						
		OR							
		EGE51001	Universal Human Values						
9	MC	EGE5101*	Mandatory Course #1 Mandatory Course I is a Non-credit course (Student shall select one course from the list given under Mandatory Course I)	3	0	0	0	2	3
Total				18	0	15	22	19	33
* Students should choose Level – I and Level – II of the same outreach course in the semester 1 and 2 respectively									

FRAMEWORK OF CURRICULUM 2022 A(in line with NEP 2020)									
SEMESTER – III									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51003	Partial Differential Equations and Transforms	3	1	0	4	2	4
2	HS	GGGG1003	Advanced Academic Writing	1	0	1	1	1	2
3	PC	EME51004	Thermal Engineering	3	0	2	4	2	5
4	PC	EME51005	Machine Drawing	2	0	2	3	2	4
5	PC	EME51006	Manufacturing Technology	2	0	2	3	2	4
6	DE	EME515**	Departmental Elective 1	3	0	0	3	2	3
7	ES	ECT51002	Environmental Science and Sustainable Development	2	0	0	2	2	2
8	EEC	EME51800	Design Project – 1	0	0	2	1	6	2
9	EEC	EME51801	Internship -1 (To be carried out in summer after 2 nd semester and evaluated in 3 rd semester)	0	0	0	1	2	0
10	MC	EGE510**	Mandatory Course #2 Mandatory Course 2 is a Non-credit course (Student shall select one course from the list given under Mandatory Course I)	3	0	0	0	2	3
Total				19	1	9	22	23	29

SEMESTER – IV									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51007	Probability and Statistics	3	1	0	4	2	4
2	HS	GGGG1004	Professional editing and project writing	1	0	1	1	1	2
3	PC	EME51007	Strength of Materials	3	0	2	4	2	5
4	PC	EME51008	Fluid Mechanics and Machinery	2	0	2	3	2	4
5	PC	EME51009	Mechanical Measurements (Industry Collaborated Course)	2	0	2	3	2	4
6	DE	EME515**	Departmental Elective 2	3	0	0	3	2	3
7	NE	E**517**	Non-Departmental Elective 1	2	0	2	3	2	4
8	EEC	EME51802	Design Project – 2	0	0	2	1	6	2
9	MC	EGE5103*	Mandatory Course #3 Mandatory Course 2 is a Non-credit course (Student shall select one course from the list given under Mandatory Course I)	3	0	0	0	2	3
Total				19	1	11	22	21	32

FRAMEWORK OF CURRICULUM 2022 (in line with NEP 2020)									
SEMESTER – V									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	HS	GGGG1005	Public speaking	1	0	1	1	1	2
2	PC	EME51010	Mechanics of Machines	3	0	2	4	2	5
3	PC	EME51011	Applied Machine Design	2	0	2	3	2	4
4	PC	EME51012	Composites and Smart Materials	2	0	2	3	2	4
5	DE	EME515**	Departmental Elective 3	3	0	0	3	2	3
6	NE	E**517**	Non-Departmental Elective 2	2	0	2	3	2	4
7	EEC	EME51803	Design Project – 3	0	0	2	1	6	2
8	ES	EGE51004	Entrepreneurship	2	0	0	2	6	2

9	EEC	EME51804	Internship -2 (to be evaluated in 5 th semester. To be carried out in summer after 4 th semester))	0	0	0	1	0	0
Total				15	0	11	21	23	26

SEMESTER – VI									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	HS	GGGG1006	English for Competitive Examinations	1	0	1	1	1	2
2	PC	EME51013	Computer Aided Design and Manufacturing	3	0	2	4	2	5
3	PC	EME51014	Robotics and Automation	2	0	2	3	2	4
4	PC	EME51015	Mechatronics and Pneumatics	2	0	2	3	2	4
5	DE	EME515**	Departmental Elective 4	3	0	0	3	2	3
6	NE	E**517**	Non-Departmental Elective 3	2	0	2	3	2	4
7	PC	EME51016	Product study	2	0	2	3	6	4
8	EEC	EME51805	Design Project – 4	0	0	2	1	6	2
Total				15	0	13	21	23	28

FRAMEWORK OF CURRICULUM 2022 (in line with NEP 2020)									
SEMESTER – VII									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	HS	GGGG1007	Verbal Reasoning and Interview Skills	1	0	1	1	1	2
2	PC	EME51017	Heat and Mass Transfer	3	0	2	4	2	5
3	PC	EME51018	Finite Element Methods	2	0	2	3	2	4
4	PC	EME51019	Smart Manufacturing	2	0	2	3	2	4
5	DE	EME515**	Departmental Elective 5	3	0	0	3	2	3
6	NE	E**517**	Non-Departmental Elective 4	2	0	2	3	2	4
7	ES	EGE51005	Research Methodology & IPR	2	0	0	2	2	2

8	EEC	EME51806	Project Phase 1	0	0	6	3	6	6
Total				15	0	15	22	19	30

SEMESTER – VIII									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	EEC	EME51807	Project Phase 2	0	0	26	13	10	26
Total				0	0	26	13	10	26
Total Credits for the Program							165		

CREDIT COUNT

Semester	Credit Count
1	22
2	22
3	22
4	22
5	21
6	21
7	22
8	13
	165

LIST OF DEPARTMENTAL ELECTIVES WITH GROUPING - SEMESTER WISE									
SEM	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
3	DE	EME51501	New Product Design and Development ¹	3	0	0	3	2	3
3	DE	EME51502	Green Energy for Buildings ²	3	0	0	3	2	3
3	DE	EME51503	Mechanical Metallurgy ³	3	0	0	3	2	3
3	DE	EME51504	Micro Manufacturing ⁴	3	0	0	3	2	3
4	DE	EME51505	Maintenance Engineering and Condition Monitoring ¹	3	0	0	3	2	3
4	DE	EME51506	Electric Vehicle Technology ²	3	0	0	3	2	3
4	DE	EME51507	Powder Metallurgy ³	3	0	0	3	2	3
4	DE	EME51508	Micro Electro Mechanical Systems ⁴	3	0	0	3	2	3
5	DE	EME51509	Tribology in Design ¹	3	0	0	3	2	3
5	DE	EME51510	Carbon Neutralization ²	3	0	0	3	2	3
5	DE	EME51511	Nano Technology ³	3	0	0	3	2	3
5	DE	EME51512	AI in Manufacturing ⁴	3	0	0	3	2	3
6	DE	EME51513	Machine Dynamics and Control ¹	3	0	0	3	2	3
6	DE	EME51514	Thermal Turbo Machines ²	3	0	0	3	2	3
6	DE	EME51515	Characterization of Materials ³	3	0	0	3	2	3
6	DE	EME51516	Data Science for Mechanical Engineers ⁴	3	0	0	3	2	3
7	DE	EME51517	Reverse Engineering ¹	3	0	0	3	2	3
7	DE	EME51518	Gas Dynamics and Jet Propulsion ²	3	0	0	3	2	3
7	DE	EME51519	Non-Destructive Testing ³	3	0	0	3	2	3
7	DE	EME51520	IOT and Machine Learning ⁴	3	0	0	3	2	3
¹ Product Design ² Sustainable Energy systems ³ Material Science and Testing ⁴ Digital Manufacturing and Industry 4.0									
L – Lecture ; T- Tutorial ; P – Practical ; C – Credit ; S – Self Study ; TCH – Total Contact Hours									

LIST OF NON-DEPARTMENTAL ELECTIVES OFFERED BY MECHANICAL ENGINEERING DEPARTMENT WITH GROUPING - SEMESTER WISE									
SEM	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
Non-Department Elective 1									
4	NE	EME51700	Non-destructive Testing Methods	2	0	2	3	2	4
4	NE	EME51701	Virtual Instrumentation	2	0	2	3	2	4
4	NE	EME51702	Joining of Materials	2	0	2	3	2	4
4	NE	EME51703	Wind Energy	2	0	2	3	2	4
4	NE	EME51704	Anthropometry and Ergonomics	2	0	2	3	2	4
Non-Department Elective 2									
5	NE	EME51705	Solar Energy Harness for Home and Office	2	0	2	3	2	4
5	NE	EME51706	3D Printing in Modern Manufacturing	2	0	2	3	2	4
5	NE	EME51707	Industrial Automation	2	0	2	3	2	4
5	NE	EME51708	Corrosion Engineering	2	0	2	3	2	4
5	NE	EME51709	Carbon Footprint and Capturing	2	0	2	3	2	4
Non-Department Elective 3									
6	NE	EME51710	Digital Measurements	2	0	2	3	2	4
6	NE	EME51711	Modern Manufacturing	2	0	2	3	2	4
6	NE	EME51712	Electric and Hybrid Vehicles	2	0	2	3	2	4
6	NE	EME51713	Building Automation	2	0	2	3	2	4
6	NE	EME51714	Lean Manufacturing	2	0	2	3	2	4
Non-Department Elective 4									
7	NE	EME51715	Materials and Applications	2	0	2	3	2	4
7	NE	EME51716	Industrial Safety and Maintenance Engineering	2	0	2	3	2	4
7	NE	EME51717	Soft Computing Techniques for Engineers	2	0	2	3	2	4
7	NE	EME51718	Autonomous Vehicle	2	0	2	3	2	4
7	NE	EME51719	3D Game Environment	2	0	2	3	2	4
L – Lecture ; T- Tutorial ; P – Practical ; C – Credit ; S – Self Study ; TCH – Total Contact Hours									

MANDATORY COURSES I							
S.No	Course Code	Course Title	Periods Per week			Total Contact Periods	Credits
			L	T	P		
1	EGE51011	Introduction to Women and Gender Studies	3	0	0	3	Non Credit Course
2	EGE51012	Public and Personal Administration	3	0	0	3	Non Credit Course
3	EGE51013	Constitution of India	3	0	0	3	Non Credit Course
4	EGE51014	Law for Engineers	3	0	0	3	Non Credit Course
5	EGE51015	Indian Knowledge System (IKS)	3	0	0	3	Non Credit Course

MANDATORY COURSES II							
S.No	Course Code	Course Title	Periods Per week			Total Contact Periods	Credits
			L	T	P		
1	EGE51021	Traditional Indian Systems of Medicine and Therapies	3	0	0	3	Non Credit Course
2	EGE51022	History of Science and Technology in India	3	0	0	3	Non Credit Course
3	EGE51023	Political and Economic Thought for a Humane Society	3	0	0	3	Non Credit Course
4	EGE51024	State, Nation-Building and Politics in India	3	0	0	3	Non Credit Course
5	EGE51025	Industrial Safety	3	0	0	3	Non Credit Course

MANDATORY COURSES III							
S.No.	Course Code	Course Title	Periods Per week			Total Contact Periods	Credits
			L	T	P		
1	EGE51031	Principles of Management	3	0	0	3	Non Credit Course
2	EGE51032	Human Resource Management	3	0	0	3	Non Credit Course
3	EGE51033	Green Technology	3	0	0	3	Non Credit Course
4	EGE51034	Industrial Management	3	0	0	3	Non Credit Course
5	EGE51035	Fintech and Financing new Business	3	0	0	3	Non Credit Course

COURSES OFFERED BY THE DEPARTMENT OF LANGUAGES				
S.NO.	COURSE CODE	COURSE TITLE	SEMESTER	CREDIT
1	G G G G 1001	Communication Skills (Improving English communication skills.)	I / II	2
2	G G G G 1002	Personality Development and Soft Skills (Enhancing the personality through English communication skills)	I / II	2
3	G G G G 1003	Advanced Academic Writing (Developing essential writing skills for academic and professional settings)	III	1
4	G G G G 1004	Professional Editing and Project Writing (Presenting the skills of creating professional documents and projects that are clear, concise, and effective)	IV	1
5	G G G G 1005	Public Speaking (Providing instruction and experience in preparation and delivery of speeches within a public setting and group discussion)	V	1
6	G G G G 1006	English for Competitive Examinations (Developing the necessary skills and knowledge to succeed in competitive exams)	VI	1

7	GGGG1007	Verbal Reasoning and Interview Skills (Enhancing the understanding of reasoning using concepts framed in words and equipping to succeed in interviews)	VII	1
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HONORS IN INDUSTRIAL DESIGN								
COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
Honors	EME51900	Computer Aided Design for Additive Manufacturing	3	0	0	3	2	3
Honors	EME51901	Integrated Product Design and Development	3	0	0	3	2	3
Honors	EME51902	Product Design and Manufacturing	3	0	0	3	2	3
Honors	EME51903	Industrial Piping Design and Stress Analysis	3	0	0	3	2	3