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**SAHRDAYA** **AUTONOMOUS**  
COLLEGE OF ENGINEERING & TECHNOLOGY

A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY | MANAGED BY IRINJALAKUDA DIOCESAN EDUCATION TRUST

Approved by AICTE & Affiliated to APJ Abdul Kalam Technological University | Accredited by:



**B. Tech**

**Curriculum (2024)- Semester I to VIII**  
**Electrical and Electronics Engineering**

**Branch Code: EEE**

*(SHR/AC/Auto/Aca. Council/B.Tech/2/Curri. /EEE)*

*Recommended by BoS on 30/08/2024*

*Approved by Academic Council on 31/08/2024*

EDUCATION IS DEDICATION

## **Preface to the Curriculum**

The B.Tech Electrical and Electronics Engineering (EEE) curriculum is meticulously crafted to cultivate industry-ready professionals endowed with creativity and innovative thinking. This comprehensive curriculum includes induction programs, core and elective courses, practical courses, projects, internships, skill enhancement courses, and extracurricular activities. Designed to total 170 credits, the curriculum ensures a holistic education that prepares students for the dynamic Electrical and Electronics engineering field. Below is a detailed overview of the curriculum's salient features:

- 1. Project-Based Learning Courses:** From the first semester to the fifth semester, one course integrated with Project-Based Learning (**PBL**) empowers students with creativity, engaging them in meaningful projects to learn, explore, and investigate. PBL promotes teamwork and collaboration, essential skills for any professional, by having students work together in teams, each contributing unique skills and perspectives to achieve a common goal.
- 2. Skill Enhancement Courses:** These courses are designed to provide students with industry-relevant certifications from reputed organizations, enhancing their employability by certifying their skill sets. They are integral to the academic curriculum and offered from Semester 1 to Semester 5, each carrying one credit.
- 3. Foreign Language Courses:** To prepare students for global careers, the curriculum includes options to learn foreign languages, promoting cross-cultural communication skills and international collaboration. These courses are available in the seventh semester.
- 4. Program Electives and Micro Specializations:** Students can pursue micro-specializations by completing thematic courses, which allow them to gain in-depth knowledge in specific sub-areas of their discipline. Starting in the fourth semester, this provides an opportunity for focused learning and expertise in emerging fields in alignment with program elective courses.
- 5. Industry Elective Courses:** Offered jointly with industry partners, these courses ensure relevance and practical applicability. The academic department and industry partners develop and assess them collaboratively, without end-semester examinations, providing continuous and practical learning experiences.
- 6. Startups and Entrepreneurial Skills:** The curriculum encourages students to pursue startups, offering options to engage in product-based or service-based startups during their seventh and eighth semesters. This fosters innovation, creativity, and entrepreneurial skills, preparing students for the dynamic business environment.
- 7. Courses Embedded with Practicals:** The curriculum includes theory courses embedded with practicals and projects, ensuring students apply theoretical knowledge to real-world problems. This hands-on approach enhances learning outcomes and practical skills.

- 8. Internships:** The program includes mandatory internships, allowing students to gain industry exposure and practical experience. Students can undertake at least four to six months of internship in a recognized industry, research organization, or prestigious institution relevant to their field. This bridges the gap between academic learning and industry requirements, enhancing employability.
- 9. Community Work, Social Responsibility, and Universal Human Value Courses:** The curriculum integrates opportunities for community work and socially relevant projects, promoting civic responsibility and leadership skills. Universal Human Value courses also aim to cultivate a holistic understanding of life, enhancing physical and mental well-being and social and life skills. These courses address various dimensions of life, including individual, family, society, and the environment, promoting a healthy and harmonious lifestyle.
- 10. Activity Points:** In addition to academic credits, students must earn activity points through participation in extracurricular activities such as sports, cultural events, community service, and entrepreneurship. This holistic approach ensures the development of leadership, teamwork, and communication skills, preparing students for global challenges.
- 11. MOOC Courses:** Students selected for internships can fulfil their credit requirements in the seventh and eighth semesters through MOOC courses, providing flexibility and additional learning opportunities.
- 12. Higher Credit Elective:** These courses carry more than the standard credit weight of elective courses. They allow students pursuing honors to reduce the number of required courses by earning additional credits through higher-credit electives. Additional credits earned from higher credit electives can be credited towards the total credit requirement of the honors program, with a maximum of 12 additional credits being applied towards the honors credit requirement.

This curriculum is designed to blend theoretical knowledge with practical experience, foster interdisciplinary learning, and enhance employability through hands-on projects and internships, preparing students for successful careers in Electrical and Electronics engineering.

### **General Course Structure**

#### **1. Credit and Courses:**

Credits are a unit of measurement for coursework and are based on the number of hours of instruction required per week. One hour of classroom lecture (L) that is 60 minutes long per week carried out during all weeks of the semester, is considered one Instructional Unit or one Credit. The same goes for a tutorial (T) or a project (R) that is 60 minutes long per week and carried out during all weeks of the semester. In addition, a minimum of 120 minutes per week of laboratory session, practical or fieldwork,

training (P) or a combination of these, carried out during all weeks of the semester, is also considered one Instructional Unit or one Credit.

Classification	Credit assigned
1 Hour Lecture [L] per week	1 Credit
1 Hour Tutorial [T] per week	1 Credit
1 Hour Project [R] per week	1 Credit
1-2 Hours Practical [P] per week	1 Credit
3-4 Hours Practical [P] per week	2 Credit

- For internship/Start-Up/Main project/Mini project, the credit weightage for equivalent hours is 50% of that for lectures/tutorials

## 2. Course Category and Credits

The B.Tech. program curriculum has a total of 168 academic credits and 2 additional pass/fail credits that can be gained through 100 activity points. The program is expected to accommodate courses from other disciplines so that students have multi-disciplinary exposure. Additionally, the program should provide sufficient opportunities for students to enhance their communication, soft, managerial, and technical skills. Depending on the program, the courses should fall under the engineering, basic science, humanities science, and management categories. The structure of the UG program should essentially have the following categories of courses with the breakup of credits as given:

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management Courses	HMC	9
2	Basic Science Courses	BSC	20
3	Engineering Science Courses	ESC	26
4	Programme (Professional) Core Courses	PCC	52
5	Programme (Professional) Core Courses-Project Based Learning	PBL	16
6	Program Elective Courses	PEC	18
7	Open Elective Courses/Industry Linked Elective	OEC/ILE	9
8	Project Work and Seminar	PS	12
9	UHV and Community Work	PW	1
10	Skill Enhancement Courses	SEC	5
11	Mandatory Student Activities.	MSA	2
<b>Total Mandatory Credits</b>		<b>170</b>	

A 10% to 15 % deviation in credits is permitted under each discipline. While developing the curriculum, the department offering the program should ensure that the students

attain the above distribution upon completing their program. Either Minor or Honors can be opted from the optional specialization.

The courses are organized into 1/2/3/4 credit courses based on the content delivery mechanism and desired depth of the course. The delivery methods include Theory-only, Theory with tutorial, Theory with practice, Theory with project etc. The L-T-P-R notation for each course signifies the allocation of hours for content delivery in terms of Lecture (L), Tutorial (T), Practical (P), and Project (R) per week, as well as the credit earned from the course. The L-T-P- R-C for each course indicates the number of credits delivered as Lecture (L), Tutorial (T), Practical (P), Project (R) and the total instructional delivery indicated as Credits (C).

$$C = L + T + [P/2] + R$$

Apart from lectures, tutorials, practical/practice and project hours, the curriculum offers Self-learning hours (S) that indicate the number of hours students are expected to spend for activities that should be completed outside the class defined by the faculty handling courses. The activities aim to support learning and should be initiated by the students themselves without guidance or direction from tutors. For each course, the self-learning hour per week is calculated as:

$$S = (L*1 + P*1 + [R/2])$$

Categories of courses included in the curriculum and their L-T-P-R-C components are given in the table below:

Sl. No.	Lecture-Tutorial-Practical-Project [L-T-P-R]	Credit [C]	Description
1.	1-0-2-0	2	Theory course without End Semester Examination [ESE]
2.	1-0-0-0	1	
3.	2-0-2-1	4	Theory course embedded with practical and project
4.	3-1-0-0	4	Theory course embedded with tutorial
5.	3-0-0-0	3	Theory course
6.	2-0-0-0	2	
7.	3-0-2-0	4	Theory course embedded with practical
8.	3-0-0-1	4	Theory course embedded with project
9.	0-0-2-0	1	Practical course without ESE
10.	0-0-3-0	2	Practical course
11.	0-0-3-0	2	Mini Project
12.	0-0-3-0	2	Seminar
13.	0-0-0-8	4	Major Project/Internship/Start-Up
14.	0-0-0-0	1	MOOC Course
<b>Mandatory Courses</b>			
15.	0-0-2-0	1	Skill Enhancement Courses

Minor/ Honors Course			
16.	4-0-0-0	4	Theory course
17.	0-0-0-4	4	Project only course

### 3. Course Code

Every course of B. Tech. The program shall take a code from the table given below.

Course category	Description
PCC	Program (Professional) Core Courses
PBL	Project Based Learning
CLT	Combined Lab Theory
PEC	Professional Elective Course
OEC	Open Elective Course
BSC	Basic Science Course
ESC	Engineering Science Course
HMC	Humanities, Social Sciences and Management course
MOOC	MOOC Course
IEL	Industry Elective Course
PW	Socially Relevant course
PS	Project Work and Seminar
SEC	Skill Enhancement Courses
HR	Honours
MR	Minor

**Structure of Course Code:** Each course will be identified by a unique Course Code consisting of eight alphanumeric characters, formatted as **24XXYABC**. The code can be interpreted as follows: "24" represents the regulation year, "XX" is the course category code, "Y" indicates the course delivery mode, "A" is the semester number (ranging from 1 to 8, with 0 indicating the course is offered in both odd and even semesters), "B" denotes the version of the course under each category, and "C" signifies the course sequence number.

For example, 24CET303 is a theory course offered by the civil engineering department in the third semester of the 2024 scheme.

24BML408 - laboratory course offered by the biomedical engineering department in the fourth semester of the 2024 scheme

The detailed expansion of the abbreviation of the course code structure is listed in the table below:

XX	Y	A	B	C
Course category	Course delivery mode	Semester No	Version of the course	Serial No: of course

BM-Biomedical Engineering	T-Theory			
BT-Biotechnology	L-Laboratory			
CE – Civil Engineering	R-Theory			
CS-Computer Science Engineering	Embedded with Project			
EC-Electronics and Communication Engineering	K-Certification Course	0	1	1
EE-Electrical and Electronics Engineering	E-Elective Course	1	2	2
MA-Mathematics	G- Minor	2	3	3
CY – Chemistry	H-Honour	3	etc.	4
PH-Physics	M- MOOC	e		5
ES-Engineering Science course	O-Open Elective	t		6
HU-Humanities and Management Courses	I-Industry Elective	c		etc
SE-Skill Enhancement Courses	S-Seminar	.		.
PW-Social Science and Community work	P-Project			
	N-Internship			
	U-Start Up			
	C – Theory Embedded with practical			

**4. Allotted and Cumulative Credits**

The allotted and cumulative credits are given in the table below:

Semester	Allotted Credits	Cumulative Credits
First	21	-
Second	22	43
Third	26	69
Fourth	24	93
Fifth	24	117
Sixth	23	140
Seventh	17	157
Eighth	11	168

<b>FIRST SEMESTER (July-December)</b>												
<b>10 Days Compulsory Induction Program</b>												
Sl. No:	Slot	Course Code	Course Type	Course Title (Course Name)	Credit Structure				Total Marks		Credits	Hrs./Week
					L	T	P	R	CIA	ESE		
1	A	24MAT121	BSC	Linear Algebra, Differential Equations & Laplace transforms	3	0	0	0	40	60	3	3
2	B	24CYC012	BSC-CLT	Engineering Chemistry	3	0	2	0	50	50	4	5
3	C	24EST113	ESC	Engineering Mechanics	3	0	0	0	40	60	3	3
4	D	24EST114	ESC	Introduction to Electrical & Electronics Engineering	4	0	0	0	40	60	4	4
5	F	24ESR105	ESC-PBL	Algorithmic Thinking with Python	2	0	2	1	50	50	4	5
6	L	24ESL006	ESC	Basic Electrical and Electronics Engineering Workshop	0	0	2	0	50	---	1	2
7	I*	24HUT007	HMC	Communicative English	0	0	2	0	100	---	1	2
8	J*	24SEK10N	SEC	Skill Enhancement Course -1							1	
<b>Total</b>											<b>21</b>	<b>24</b>

<b>SECOND SEMESTER (January-June)</b>												
Sl. No:	Slot	Course Code	Course Type	Course Title (Course Name)	Credit Structure				Total Marks		Credits	Hrs./Week
					L	T	P	R	CIA	ESE		
1	A	24MAT221	BSC	Infinite series, Multiple integrals & Vector Calculus	3	0	0	0	40	60	3	3
2	B	24PHC222	BSC-CLT	Physics for Electrical Science	3	0	2	0	50	50	4	5
3	C	24EST003	ESC	Engineering Graphics	3	0	0	0	40	60	3	4
4	D	24ESC204	ESC-CLT	Programming in C	3	0	2	0	50	50	4	5
5	E	24EER205	PCC-PBL	Measurements and Instrumentation	3	0	0	1	50	50	4	4
6	I*	24HUT006	HMC	Professional Ethics and sustainable development	1	0	2	0	100	--	2	3
7	L	24ESL007	ESC	Computer Aided Drawing & Manufacturing Workshop	0	0	2	0	50	---	1	2
8	J*	24SEK10N	SEC	Skill Enhancement Course-2							1	
<b>Total</b>											<b>22</b>	<b>26</b>

\* No Grade Points will be awarded for the MOOC and I and J slot courses

The self-learning (S) hours for each course is calculated based on the formulae,  $S = (L*1+P*1+[R/2])$



<b>THIRD SEMESTER (July-December)</b>												
Sl. No:	Slot	Course Code	Course Type	Course Title (Course Name)	Credit Structure				Total Marks		Credits	Hrs./Week
					L	T	P	R	CIA	ESE		
1	A	24MAT321	BSC	Complex Analysis & Partial Differential Equations	3	0	0	0	40	60	3	3
2	B	24EET302	PCC	Circuits and Networks	3	1	0	0	40	60	4	4
3	C	24EET303	PCC	Electrical Machines I	3	1	0	0	40	60	4	4
4	D	24EER304	PCC-PBL	Analog Electronics	3	0	0	1	50	50	4	4
5	F	24HUT005	HMC	Engineering Economics	2	0	0	0	50	50	2	2
6	G	24EST306	ESC	Introduction to Artificial Intelligence and Data Science	3	1	0	0	40	60	4	4
7	L	24EEL307	PCL	Circuits and Measurements Lab	0	0	3	0	50	50	2	3
8	Q	24EEL308	PCL	Analog Electronics Lab	0	0	3	0	50	50	2	3
9	J*	24SEK10N	SEC	Skill Enhancement Course 3							1	
10	R/M	24EEG3XX	VAC	Remedial/Minor/Course	3	1	0	0	6		4*	4*
<b>Total</b>											<b>26/ 30*</b>	<b>27/ 31*</b>

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<b>FOURTH SEMESTER (January-June)</b>												
Sl. No:	Slot	Course Code	Course Type	Course Title (Course Name)	Credit Structure				Total Marks		Credits	Hrs./Week
					L	T	P	R	CIA	ESE		
1	A	24MAT421	BSC	Probability Distributions, Numerical Methods and Transforms	3	0	0	0	40	60	3	3
2	B	24EET402	PCC	Electrical Machines - 2	3	1	0	0	40	60	4	4
3	C	24EET403	PCC	Electromagnetic Theory	3	1	0	0	40	60	4	4
4	D	24EER404	PCC-PBL	Digital Electronics	3	0	0	1	50	50	4	4
5	E	24EEE41N	PE	PE-1	3	0	0	0	40	60	3	3
6	L	24EEL406	PCL	Digital Electronics Lab	0	0	3	0	50	50	2	3
7	Q	24EEL407	PCL	Electrical Machines Lab - I	0	0	3	0	50	50	2	3
8	I*	24PWT008	PW	UHV II, Life Skills & Community Work	1	0	0	0	100	--	1	2
9	J*	24SEK10N	SEC	Skill Enhancement Course 4							1	
10	R/M	24EEG4XX/ 24EEH4XX	VAC	Remedial/Minor/ Honors Course							4*	4*
<b>Total</b>											<b>24/ 28*</b>	<b>26/ 30*</b>

**PROGRAM ELECTIVE I: 24EEE41N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
E	24EEE411	Electronic Instrumentation	3-0-0-0	3	3
	24EEE412	Electrical Material Science	3-0-0-0		3
	24EEE413	Solid State Devices	3-0-0-0		3
	24EEE414	Mathematics for Machine Learning	3-0-0-0		3
	24EEE415	Computer Organization	3-0-0-0		3
	24EEE416	Advanced Electronic Design#	3-0-3-0	6	5

**# Higher Credit Elective**

<b>FIFTH SEMESTER (July-December)</b>												
Sl. No :	Slot	Course Code	Course Type	Course Title (Course Name)	Credit Structure				Total Marks		Credits	Hrs./Week
					L	T	P	R	CIA	ESE		
1	A	24EET501	PCC	Power System I	3	1	0	0	40	60	4	4
2	B	24EET502	PCC	Power Electronics	3	1	0	0	40	60	4	4
3	C	24EET503	PCC	Signals and Systems	3	0	0	0	40	60	3	3
4	D	24EER504	PCC-PBL	Microprocessors and Embedded Systems	3	0	0	1	50	50	4	4
5	E	24EEE51N	PE	PE-2	3	0	0	0	40	60	3	3
6	I*	24HUM506	HMC	Constitution of India (MOOC)	-	-	-	-	-	-	1	-
7	L	24EEL507	PCL	Electrical Machines Lab 2	0	0	3	0	50	50	2	3
8	Q	24EEL508	PCL	Power Electronics Lab	0	0	3	0	50	50	2	3
9	J*	24SEJ10N	SEC	Skill Enhancement Course 5							1	
10	R/M	24EEG5XX/ 24EEH5XX	VAC	Remedial/Minor/ Honors Course							4*	4*
	S5/ S6	Industrial Visit (Maximum 10 Days are permitted, Not Exceedingly more than 5 Working Days) /Industrial Training										
<b>Total</b>											<b>24/ 28*</b>	<b>24/2 8*</b>

**PROGRAM ELECTIVE 2: 24EEE52N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
C	24EEE521	Energy Storage Systems	3-0-0-0	3	3
	24EEE522	Renewable Energy Sources	3-0-0-0		3
	24EEE523	Dynamics of Electric Machines	3-0-0-0		3
	24EEE524	Introduction to Machine Learning	3-0-0-0		3
	24EEE525	Power Semiconductor Devices and Modelling	3-0-0-0		3
	24EEE526	Computer-Aided Electrical Machine Design <sup>#</sup>	3-0-3-0	6	5

**# Higher Credit Elective**

SIXTH SEMESTER (January-June)												
Sl. No:	Slot	Course Code	Course Type	Course Title (Course Name)	Credit Structure				Total Marks		Credits	Hrs./Week
					L	T	P	R	CIA	ESE		
1	A	24EET601	PCC	Control Systems	3	1	0	0	40	60	4	4
2	B	24EET602	PCC	Electrical System Design	3	0	0	0	40	60	3	3
3	C	24EEE63N	PE	PE-3	3	0	0	0	40	60	3	3
4	D	24EEC604	PCC-CLT	Power System 2	3	0	2	0	50	50	4	4
5	F	24EST605	ESC	Design Thinking and Product Development	2	0	0	0	40	60	2	2
6	O	24XX061N/ 24XXI61N	OE/ILE	OE/ILE-1	3	0	0	0	40	60	3	3
7	L	24EEL607	PCL	Embedded Systems and Control Lab	0	0	3	0	50	50	2	3
8	P	24EEP608	PS	Mini Project	0	0	3	0	100	--	2	3
10	R/M	24EEG6XX/ 24EEH6XX	VAC	Remedial/Minor/ Honors Course							4*	4*
S5/S6	Industrial Visit (Maximum 10 Days are permitted, Not Exceedingly more than 5 Working Days) /Industrial Training											
<b>Total</b>										<b>23/ 27*</b>	<b>25/ 29*</b>	

Note: Open Electives are such courses which other departments will offer.

**PROGRAM ELECTIVE 3: 24EEE63N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
<b>A</b>	24EEE631	Special Electrical Machines	3-0-0-0	<b>3</b>	<b>3</b>
	24EEE632	Electric Drives	3-0-0-0		<b>3</b>
	24EEE633	Digital Signal Processing	3-0-0-0		<b>3</b>
	24EEE634	Design of Solar PV Systems	3-0-0-0		<b>3</b>
	24EEE635	Data structures	3-0-0-0		<b>3</b>
	24EEE636	Design of Power Electronic Converters#	3-0-3-0	<b>6</b>	<b>5</b>

# Higher Credit Elective

**OPEN ELECTIVE 1: 24EE061N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
<b>O</b>	24EE0611	Introduction to Control Systems	3-0-0-0	<b>3</b>	<b>3</b>
	24EE0612	Illumination Technology	3-0-0-0		<b>3</b>
	24EE0613	Energy management	3-0-0-0		<b>3</b>
	24EE0614	Electric & Hybrid Vehicles	3-0-0-0		<b>3</b>

SEVENTH SEMESTER (July-December)												
Sl. No:	Slot	Course Code	Course Type	Course Title (Course Name)	Credit Structure				Total Marks		Credits	Hrs./Week
					L	T	P	R	CIA	ESE		
1	A	24EEE74N / 24EEM74N	PE	PE-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	40	60	3	3
2	B	24EEE75N / 24EEM75N	PE	PE-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	40	60	3	3
3	O	24XX072N	OE/ILE	OE/ILE-2 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	40	60	3	3
4	I*	24HUT704/ 24HUM70N	HMC	Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	50	50	2	2
5	S	24EES705	PS	Seminar	0	0	3	0	50	0	2	3
6	P	24EEP706/ 24EEN706/ 24EEU706	PS	Option 1: Major Project Option 2: Internship (4-6 Months) Option 3: Startup	0	0	0	8	100	0	4	8
7	R/M /H	24EEG7XX/ 24EEH7XX	VAC	Remedial/Minor/ Honors Course							4*	4*
<b>Total</b>											<b>17/22/26</b>	<b>21*</b>

\*The students can take the internship option either in 7<sup>th</sup> or 8<sup>th</sup> semester.

\* Option 1: Work on a Project in the institute/department under the mentorship of faculty members.

Option 2: Full semester Internship in Industry/organization (7<sup>th</sup> or 8<sup>th</sup> semester)

Option 3: Full semester startup if the startup is service-based (7<sup>th</sup> or 8<sup>th</sup> semester), Full year startup if the startup is product-based (7<sup>th</sup> & 8<sup>th</sup> semester)

**PROGRAM ELECTIVE 4: 24EEE74N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
A	24EEE741	HVDC and FACTS	3-0-0-0	3	3
	24EEE742	Energy Management and Auditing	3-0-0-0		3
	24EEE743	Internet of Things	3-0-0-0		3
	24EEE744	Advanced Control Systems	3-0-0-0		3
	24EEE745	Digital Image Processing	3-0-0-0		3
	24EEE746	Switched Mode Power Converters	3-0-0-0		3
	24EEE747	Electrical Machine Design	3-0-0-0		3
	24EEE748	Computer Aided Power System Analysis#	3-0-3-0	6	5

**PROGRAM ELECTIVE 5: 24EEE75N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
B	24EEE751	Power System Operation and Control	3-0-0-0	3	3
	24EEE752	Nonlinear Systems and Control	3-0-0-0		3
	24EEE753	Electric and Hybrid Vehicles	3-0-0-0		3
	24EEE754	Instrumentation Systems for Automotive Applications	3-0-0-0		3
	24EEE755	Control Systems for Power Electronic Systems	3-0-0-0		3
	24EEE756	Computer Networks and Systems	3-0-0-0		3
	24EEE757	PLC and Automation#	3-0-3-0	6	5

# Higher Credit Elective

**OPEN ELECTIVE 2: 24EE072N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
O	24EE0721	Design of Solar PV Systems	3-0-0-0	3	3
	24EE0722	Digital Signal Processing	3-0-0-0		3
	24EE0723	Basics of Embedded Systems	3-0-0-0		3
	24EE0724	Introduction to Energy Storage Systems	3-0-0-0		3

**HMC Elective**

SLOT	Course Code	Courses
I*	24HUT704	Project Management: Planning, Execution, Evaluation and Control
	24HUM701	Proficiency course in French (B1 level) (MOOC)
	24HUM702	Proficiency Course in German (B1 Level) (MOOC)
	24HUM703	Proficiency Course in Spanish (B1 Level) (MOOC)
	24HUM704	Introduction to Japanese Language and Culture (N5 level) (MOOC)

<b>EIGHT SEMESTER (January-June)</b>												
Sl. No:	Slot	Course Code	Course Type	Course Title (Course Name)	Credit Structure				Total Marks		Credits	Hrs./Week
					L	T	P	R	CIA	ESE		
1	A	24EEE86N/ 24EEM86N	PE	PE-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	40	60	3	3
2	O	24XX083N/ 24XXI83N/ 24XXM83N	OE/ ILE	OE/ILE-3 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	40	60	3	3
3	I*	24HUT803/ 24HUM803	HMC	Organizational Behavior and Business Communication (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	50	50	1	2
4	P	24EEP804/ 24EEN04/ 24EEJ804/ 24EEU804	PS	Option 1: Major Project Option 2: Internship (4-6 Months) Option 3: Major Project Phase -II (For the students who have not opted for internship in S7/S8)	0	0	0	8	100	0	4	8
	R/H		VAC	Project: Honors Course	0	0	0	4			4*	4*
<b>Total</b>											<b>11/ 15*</b>	<b>16/2 0*</b>

**PROGRAM ELECTIVE 6: 24EEE86N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
B	24EEE861	Smart Grid Technologies	3-0-0-0	3	3
	24EEE862	Power Quality	3-0-0-0		3
	24EEE863	Electronic Communication	3-0-0-0		3
	24EEE864	Robotic Control Systems	3-0-0-0		3
	24EEE865	Biomedical Engineering	3-0-0-0		3
	24EEE866	Application of AI in Electrical Engineering	3-0-0-0		3
	24EEE867	Special Electrical machine Drives	3-0-3-0	6	5

**OPEN ELECTIVE 2: 24EE072N**

Slot	Course Code	Courses	L-T-P-R	Hours	Credit
<b>O</b>	24EE0831	Introduction to Robotic	3-0-0-0	3	3
	24EE0832	Introduction to Power processing	3-0-0-0		3
	24EE0833	PLC and Automation	3-0-0-0		3
	24EE0834	Mechatronics Systems and Control	3-0-0-0		3

**Micro Specialization**

Micro Specialization Group ID	Specialization	Courses
G-I	Computer Engineering	Computer Organization (PE1)
		Introduction to Machine Learning(PE2)
		Data structures (PE3)
		Internet of Things(PE4)
		Computer Networks and Systems (PE5)
		Application of AI in Electrical Engineering(PE6)
G-II	Electronic Systems and Communication	Electronic Instrumentation (PE1)
		Digital Signal Processing (PE3)
		Instrumentation Systems for Automotive Applications (PE4)
		Digital Image Processing (PE5)
		Electronic Communication(PE6)
G-III	Power Systems	Renewable Energy Sources (PE2)
		Design of Solar PV Systems (PE3)
		HVDC and FACTS (PE4)
		Power System Operation and Control(PE5)
		Smart Grid Technologies(PE6)
G-IV	Power Electronics	Power Semiconductor devices and Modelling (PE2)
		Electric Drives (PE3)
		Switched Mode Power Converters (PE4)
		Control Systems for Power Electronic Systems (PE5)
		Power Quality (PE6)
G-V	Electrical Machines	Dynamics of Electric Machines(SPE2)
		Special Electrical Machines (PE3)
		Electrical Machine Design (PE4)
		Electric and Hybrid Vehicles (PE5)
		Special Electrical Machine Drives (PE6)



HMC Courses				
Sl. No:	Semester	Course Code	Course Area	Credits
1	S1/S2	24HUT106	Professional Ethics and Sustainable Development	2
2		24HUT107	Communicative English	1
2	S3/S4	24HUT005	Engineering Economics	2
4	S5	24HUM506	Constitution of India. (MOOC)	1
5	S7	24HUT704/ 24HUM70N	Elective (Project Management/Foreign Languages)	2
6	S8	24HUT803/ 24HUM803	Organizational Behavior and Business Communication	1
<b>Total Credits</b>				<b>9</b>

BSC Courses				
Sl. No:	Semester	Course Code	Course Area	Credits
1	S1	24MAT121	Linear Algebra, Differential Equations Laplace Transforms	3
2	S1/S2	24CYC112	Engineering Chemistry	4
3		24PHC122	Physics for Electrical Science	4
4	S2	24MAT221	Infinite series, Multiple integrals & Vector Calculus	3
5	S3	24MAT321	Complex Analysis & Partial Differential Equations	3
6	S4	24MAT421	Probability Distributions, Numerical Methods and Transforms	3
<b>Total Credits</b>				<b>20</b>

ESC Courses				
Sl. No:	Semester	Course Code	Course Area	Credits
1	S1	24EST114	Introduction to Electrical & Electronics Engineering	4
2		24ESR105	Algorithmic Thinking with Python	4
3		24ESL006	Basic Electrical and Electronics Engineering Workshop	1
4		24EST113	Engineering Mechanics	3
5	S2	24EST003	Engineering Graphics	3
6		24ESC204	Programming in C	4
7		24ESL007	Computer Aided Drawing & Manufacturing Workshop	1
8	S3	24EST306	Introduction to Artificial Intelligence and Data Science	4
9	S6	24EST605	Design Thinking and Product Development	2
<b>Total Credits</b>				<b>26</b>

<b>PCC Courses</b>				
Sl. No:	Semester	Course Code	Course Area	Credits
1	<b>S3</b>	24EET302	Circuits and Networks	4
3		24EET303	Electrical Machines - 1	4
3		24EEL307	Circuits and Measurements Lab	2
4		24EEL308	Analog Electronics Lab	2
5	<b>S4</b>	24EET402	Electrical Machines - 2	4
6		24EET403	Electromagnetic Theory	4
7		24EEL407	Digital Electronics Lab	2
8		24EEL408	Electrical Machines Lab-1	2
9	<b>S5</b>	24EET501	Power System - 1	4
10		24EET502	Power Electronics	4
11		24EET503	Signals & Systems	3
12		24EEL507	Electrical Machines Lab- 2	2
13		24EEL508	Power Electronics Lab	2
14	<b>S6</b>	24EET601	Control Systems	4
15		24EEC604	Power System 2	4
16		24EET602	Electrical System Design	3
17		24EEL607	Embedded Systems and Control Lab	2
<b>Total Credits</b>				<b>52</b>

<b>Programme Core-Project Based Learning (PBL)</b>			
Semester	Course Code	Course Area	Credits
<b>S2</b>	24EER205	Measurements and Instrumentation	4
<b>S3</b>	24EER304	Analog Electronics	4
<b>S4</b>	24EER404	Digital Electronics	4
<b>S5</b>	24EER504	Microprocessor and Embedded Systems	4
<b>Total Credits</b>			<b>16</b>

<b>Programme Elective Courses (PE)</b>			
Semester	Course Code	Course Area	Credits
<b>S4</b>	24EEE41N	PE - 1	3
<b>S5</b>	24EEE51N	PE - 2	3
<b>S6</b>	24EEE61N	PE - 3	3
<b>S7</b>	24EEE74N	PE - 4	3
	24EEE75N	PE - 5	3
<b>S8</b>	24EEE86N	PE - 6	3
<b>Total Credits</b>			<b>18</b>

<b>Open Elective Courses/Industry Elective(OE/ILE)</b>			
<b>Semester</b>	<b>Course Code</b>	<b>Course Area</b>	<b>Credits</b>
<b>S6</b>	24XX061N/ 24XX161N	OE/ILE-1	3
<b>S7</b>	24XX072N	OE/ILE-2	3
<b>S8</b>	24XX083N/ 24XX183N/ 24XXM83N	OE/ILE-3	3
<b>Total Credits</b>			<b>9</b>

<b>Project Work &amp; Seminar</b>			
<b>Semester</b>	<b>Course Code</b>	<b>Course Area</b>	<b>Credits</b>
<b>S6</b>	24EEP608	Mini Project	2
<b>S7</b>	24EES705	Seminar	2
<b>S7</b>	24EEP706/ 24EE706/ 24EEU706	Major Project/Internship/Startup	4
<b>S8</b>	24EEP804/ 24EEN04/ 24EEJ804/ 24EEU804	Major Project/Internship/Startup	4
<b>Total Credits</b>			<b>12</b>

<b>UHV and Community Work</b>				
<b>Sl. No</b>	<b>Semester</b>	<b>Course Code</b>	<b>Course Area</b>	<b>Credits</b>
1	<b>S4</b>	24PWT206	UHV II, Life skills & Community work	1
<b>Total Credits</b>				<b>1</b>

<b>Skill Enhancement Course</b>				
<b>Sl. No</b>	<b>Semester</b>	<b>Course Code</b>	<b>Course Area</b>	<b>Credits</b>
1	<b>S1-S5</b>	24SEK10N	Skill Enhancement Course	5
<b>Total Credits</b>				<b>5</b>

<b>Mandatory Student Activities</b>				
<b>Sl. No</b>	<b>Semester</b>	<b>Course Code</b>	<b>Course Area</b>	<b>Credits</b>
1	-	-	Mandatory Student Activities	2
<b>Total Credits</b>				<b>2</b>

<b>Total Credits</b>			<b>170</b>
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### RULES FOR ASSIGNING ACTIVITY POINTS

Apart from technical knowledge and skills, students should have excellent soft skills, leadership qualities and team spirit to be successful as professionals. They should have entrepreneurial capabilities and societal commitment. Student activity points to be earned, covering extracurricular and co-curricular activities, have been specified to nurture these qualities. All students must earn at least 100 activity points from various activity segments listed to qualify for the B.Tech degree. Two credits are given for this on a pass/ fail basis, and it is mandatory for getting the B.Tech Degree. As no grade for these two credits is given, they are not included in the CGPA calculation. For lateral entry students joining from the third semester, the activity point requirement is 75 Points earned by the student, which will be indicated in the consolidated academic statement. In the case of NSS and NCC, points can be entered after completing a two-year Programme. All documental proof for awarding the activity points should be obtained, and the points will be consolidated. The rules for assigning activity points are given in the following sections.

The following table lists the main activity segments and the maximum points associated with each segment.

Activity Points				
Sl. No.	Group	Courses	Credits	Minimum Credit Requirements
1	I	NSS, NCC, NSO (National Sports Organization)	1 (50 Points)	2 Credits (One credit from each Group)
2		Arts/Sports/Games		
3		Union/Club Activities		
4	II	English Proficiency Certification (TOFEL, IELTS, BEC etc.)	1 (50 Points)	
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/Valid Gate Score		
6		Short Term Internship, Clinical Exposure/Training (Minimum 2 weeks), Conferences/Paper Presentation/ Workshop Activities/ Professional Body Activities/ MOOC Courses/ Entrepreneurship and Innovation		

- **75% per group for B. Tech Lateral Entry Students**
- **To obtain the 2 Activity Credits required in the curriculum, students must acquire at least 100 activity points**

The following table lists the activities under each of these segments, the expected level of achievement, activity points, the evidence needed to assign the points, and the minimum duration required for certain activities. Additional activities under these segments can be considered after approval from the Academic Council.

Group	Activity Head	Sl. No	Activity *Level	Achievement Levels and Assigned Activity Points					** Approval Docu ment	Max. Points	Min. duration of activity	
				I	II	III	IV	V				
<b>GROUP I</b>	<b>National Initiatives Participation</b>	1.	NCC	-	-	-	-	-	a/b	50	2 Year	
		2.	NSS	-	-	-	-	-	a/b	50	2 Year	
		For a C certificate / outstanding performance supported by certification, additional marks up to 20 can be provided, subject to a maximum limit of 80 points. Best NSS Volunteer Awardee (University level) / Participation in National Integration Camp/ Pre-Republic Day Parade Camp (South India), supported by certification, additional marks up to 10 can be provided, subject to a maximum limit of 70 points. For the best NSS Volunteer Awardee (State / National level), Participation in Republic Day Parade Camp or International Youth Exchange Programme supported by certification, additional marks up to 20 can be provided, subject to a maximum limit of 80 points.										
	<b>Sports &amp; Games Participation</b>	3.	Sports	5	10	20	30	50	a	50	1 Year	
		4.	Games	5	10	20	30	50	Additional points can be provided for winning. The maximum limit for activity points is 60. However, the maximum point limit is enhanced to 80 for Level IV and V winning.	a	50	1 Year
			First Prize	8	8	8	15	15				
			Second Prize	5	5	5	12	12				
	Third Prize	3	3	3	9	9						
	<b>Cultural Events</b>	5.	Music	5	10	20	30	50	a	50	1 Year	
		6.	Performing arts	5	10	20	30	50	a	50	1 Year	
		7.	Literary arts	5	10	20	30	50	Additional points can be provided for winning. The maximum limit for activity points is 60. But for Level IV and V winning, the maximum point limit is enhanced to 80.	a	50	1 Year
			First Prize	8	8	8	15	15				
			Second Prize	5	5	5	12	12				
	Third Prize	3	3	3	9	9						
	<b>Union/Club Activities</b>			<b>Coordinator</b>	<b>Sub/joint-coordinator</b>		<b>Volunteer</b>					
		8.	Elected student representatives	25 (Chairman)	20 (Secretary)		10 (Members)		d	50	1 Year	

	9.	Hobby Clubs	10	5	3	d	30	1 Year			
	10.	Placement Activities	10	5	3	d	30	1 Year			
	11.	Student Professional Societies (IEEE, IET, ASME, SAE, NASA etc.)	10	5	3	d	30	1 Year			
	12.	Department Associations	10	5	3	d	30	1 Year			
	13.	Festival & Technical Events (College approved)	10	5	3	d	30	1 Year			
<b>GROUP II</b>	<b>14. Professional Self Initiatives</b>	<b>Activity</b>	<b>Achievement Levels and Assigned Activity Points</b>								
		<b>*Level</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>				
		14.	Tech Fest, Tech Quiz	10	20	30	40	50	a	40	
		15.	MOOC with final assessment certificate (Other than specified in the curriculum)	30					a	40	
		16.	Competitions conducted by Professional Societies - (IEEE, IEI, IET, ASME, SAE, NASA etc.)	5	10	15	20	30	a	30	
			Hackathon	5	10	15	20	30	a	30	
		17.	Additional 10 points for Winners of Smart India Hackathon (SIH)/ India Innovation Challenge Design Contest (IICDC)								
		18.	Attending Full time Conference/ Seminars / Exhibitions/ Workshop/ STTP conducted at IITs /NITs	10					a	20	
		18a	Attending Full time Conference/ Seminars / Exhibitions/ Workshop/ STTP conducted at KTU or its affiliated institutes	4					a	8	
		19.	Paper presentation/	15					a	30	

		publication at IITs/NITs				
		Additional 10 points for certificate of recognition.				
	19. a	Paper presentation/ publication at KTU or its affiliated institutes	6	a	12	
		Additional 2 points for a certificate of recognition.				
	20.	Poster Presentation at IITs /NITs	8	a	15	
		Additional 10 points for certificate of recognition.				
	20.a	Poster Presentation at KTU or its affiliated institutes	3	a	5	
		Additional 2 points for a certificate of recognition.				
<b>Entrepreneurship and Innovation</b>	21.	Industrial Training/ Internship (at least for 2 weeks)	15	a/b	15	
	22.	Industrial/ Exhibition visits	3	a/b/ d	8	
	23.	Foreign Language Skills (TOEFL/ IELTS/ BEC exams, etc.)	40	a	40	
	24.	Aptitude Proficiency Certification (GRE, CAT, GMAT, etc)/Valid Gate Score	40	a	40	
	25.	Skilling Certificates (if not considered as part of the curriculum)	25	a	25	
	26.	Start-up Company Registered Legally (if not considered as part of the curriculum)	50	d	50	
	27.	Patent-Filed	25	d	25	
	28.	Patent - Published	30	d	50	
	29.	Patent- Granted (if Grace marks are not awarded)	40	d	50	
	30.	Patent- Licensed	70	d	70	

	31.	Prototype developed and tested	50	d	50	
	32.	Awards for Products developed	50	d	50	
	33.	Innovative technologies developed and used by industries/users	50	d	50	
	34.	Got venture capital funding for innovative ideas/products.	70	d	70	
	35.	Startup Employment (Offering jobs to two persons not less than Rs. 15000/- per month)	70	d	70	
	36.	Societal innovations	40	d	40	

\*Level I College Events

\*Level II Zonal Events

\*Level III State/ University Events

\*Level IV National Events

\*Level V International Events

\*\*Approval Documents: (a) Certificate (b) Letter from Authorities (c) Appreciation recognition letter (d) Documentary evidence (e) Legal Proof (f) Others (specify)

EDUCATION IS DEDICATION