

FEDERAL INSTITUTE OF SCIENCE AND TECHNOLOGY

(An Autonomous Institution)



**B. Tech
Stream-B**

Curriculum-2026

SEMESTER I to VIII

**DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING**

**Hormis Nagar, Mookkannoor, Angamaly
Kerala - 683 577**

Curriculum Structure – Stream B

Electrical Sciences

- Electronics and Communication Engineering (ECE)
- Electronics and Instrumentation Engineering (EIE)
- Electrical and Electronics Engineering (EEE)

1. Course Category

The curriculum is designed to provide a balanced and comprehensive learning experience. The courses are categorised as follows:

1. **Program Core Courses (PCC)** – Fundamental courses essential to Electrical Sciences.
2. **Program Core - Project-Based Learning (PBL)** – Hands-on learning through projects for system development.
3. **Program Elective Courses (PEC)** – Program specialised courses chosen by students based on interest.
4. **Open Elective Courses / Industry Elective Courses (OEC/IEC)** – Courses from other engineering disciplines or industry-relevant courses.
5. **Humanities and Social Sciences, including Management Courses (HMC)** – Ethics, Communication and Managerial Skills Development.
6. **Humanities and Social Sciences, including Management Elective Courses (HME)** - Specialised courses chosen by students based on interest in Ethics, Communication and Managerial Skills Development.
7. **Basic Science Courses (BSC)** – Foundational Mathematics, Physics and Chemistry courses.
8. **Engineering Science Courses (ESC)** – Courses applying Engineering principles in practice.
9. **Program Core Laboratory Courses (PCL)** - Fundamental laboratory courses essential to Electrical Sciences.
10. **Skill Enhancement Courses (SEC)** – Technical and Professional skill enhancement courses.
11. **Seminar (SMR)** – Research-based discussions and presentations.
12. **Project (PRJ)** – Capstone projects integrating knowledge in electrical sciences.
13. **Value-added Course (VAC)** - Additional courses enhancing domain expertise, including Minor (interdisciplinary subjects from other departments) and Honours (advanced courses within the student's specialisation).
14. **Internship Courses (INC/INM)** - Industry/R&D organisations/ Academic institutions of national importance/ IDEA Lab/ Centre for Future Skills (CFS) oriented experiential learning.

2. Abbreviations Used

- **L** – Lecture Hours
- **T** – Tutorial Hours
- **P** – Practical/Laboratory Hours
- **R** – Research/Project-Based Learning
- **CIA** – Continuous Internal Assessment
- **ESE** – End Semester Examination

3. Self - Study (SS) Hours calculation

$$SS = 1.5L + 0.5T + 0.5P + R$$

Self-Study (SS) hours represent the estimated time a student is expected to spend outside regular contact hours for effective learning, preparation, and reinforcement of course content. These hours are calculated based on the instructional components of the course to ensure adequate academic engagement and attainment of Course Outcomes.

FIRST SEMESTER- Stream B													
10 Days Compulsory Induction Program													
Sl. No	Slot	Course Code	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs. /Week
					L	T	P	R		CIA	ESE		
1	A	26NBCBS101	BSC	Linear Algebra, Differential Calculus and Laplace Transforms	2	1	0	0	3.5	40	60	3	3
2	B S1/ S2	26NBNBS102	BSC	Engineering Physics - B	2	0	2	0	4	40	60	3	4
		26ABNBS103		Engineering Chemistry - AB									
3	C	26ABMES101	ESC	Engineering Graphics and Computer-Aided Drawing	2	0	2	0	4	40	60	3	4
4	D	26ABNES102	ESC	Introduction to Electrical & Electronics Engineering (Part1:Electrical Engineering)	2	0	0	0	3	20	30	4	4
				Introduction to Electrical & Electronics Engineering (Part2:Electronics Engineering)	2	0	0	0	3	20	30		
5	E	26ABCES103	ESC	Algorithmic Thinking with Python	2	0	2	0	4	40	60	4	4
6	F	26ABMEL101	ESC	Basic Electrical and Electronics Engineering Workshop	0	0	2	0	1	50	50	2	2
7	G S1/ S2	26ABCHM101	HMC	Life Skills, Ethics & Wellness	1	0	1	0	2	40	60	1	2
		26ABCHM102		Universal Human Values and Constitution of India	2	0	0	0	3*	40	60		
8	S	26NLNSE10Q	SEC	Skill Enhancement Course								1	2
Total									24.5/2 5.5*			21	25

SECOND SEMESTER- Stream B													
Sl. No	Slot	Course Code	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs. /Week
					L	T	P	R		CIA	ESE		
1	A	26NBCBS201	BSC	Integral Calculus and Fourier Series	2	1	0	0	3.5	40	60	3	3
2	B S1/ S2	26NBNBS102	BSC	Engineering Physics -B	2	0	2	0	4	40	60	3	4
		26ABNBS103		Engineering Chemistry-AB									
3	C	26ABNES201	ESC	Introduction to Computing Systems and Web Design	2	0	2	0	4	40	60	4	4
4	D	26ABNES202	ESC	Programming in C	2	1	0	0	3.5	40	60	3	4
5	E	26NLNPC201	PCC	Logic System Design	2	1	0	0	3.5	40	60	3	3
6	F	26ABCHM201	HMC	Professional Communication	1	0	1	0	2	40	60	2	2
7	G S1/ S2	26ABCHM101	HMC	Life Skills, Ethics & Wellness	1	0	1	0	2	40	60	1	2
		26ABCHM102		Universal Human Values and Constitution of India	2	0	0	0	3*	40	60		
8	H	26ABNEL201	ESC	C Programming Lab	0	0	2	0	1	50	50	2	2
9	S	26NLNSE20Q	SEC	Skill Enhancement Course								1	2
Total									23.5/ 24.5*			22	26

THIRD SEMESTER- Stream B													
Sl. No	Slot	Course Code	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs. /Week
					L	T	P	R		CIA	ESE		
1	A	26NBCBS301	BSC	Calculus of Complex Functions and Fourier Transforms	2	1	0	0	3.5	40	60	3	3
2	B	26NLNPC301	PCC	Electrical Measurements and Measuring Instruments	2	1	0	0	3.5	40	60	3	3
3	C	26NLNPC302	PCC	Circuit Analysis	2	1	0	0	3.5	40	60	3	3
4	D	26NLNPB301	PBL	Analog Electronics	3	0	0	1	5.5	60	40	4	4
5	E	26NBCES301	ESC	Introduction to Artificial Intelligence and Data Science	3	0	0	0	4.5	40	60	3	3
6	F S3/S4	26ABCES302	ESC	Disaster Management and Sustainable Development	2	0	0	0	3	40	60	2	2
		26ABCES303		Design Thinking and Product Development									
7	G	26NLNLC301	PCL	Circuits and Measurements Lab	0	0	3	0	1.5	50	50	2	3
8	H	26NLNLC302	PCL	Analog Electronics Lab	0	0	3	0	1.5	50	50	2	3
9	M	26NLNVM301	VAC	MINOR	3	0	0	0	4.5*	40	60	4*	3*
	REMEDIAL												
10	S	26NLNSE30Q	SEC	Skill Enhancement Course								1	2
Total									26.5/31*			23/27*	26/29*

- ❖ Starting from the third semester, students may choose to enroll in Minor courses. Each department will offer one Minor Basket, consisting of five carefully curated subjects designed for students from other disciplines to gain interdisciplinary knowledge and skills.
- ❖ Students who do not opt for either Minor or Honour courses shall be offered remedial classes or enrichment activities, as decided by the department based on the student's learning needs to strengthen foundational knowledge and improve academic performance.

FOURTH SEMESTER- Stream B													
Sl. No	Slot	Course Code	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs. /Week
					L	T	P	R		CIA	ESE		
1	A	26NBNS401	BSC	Probability Distributions, Random Process and Numerical Methods	2	1	0	0	3.5	40	60	3	3
2	B	26NLNPC401	PCC	Signals and Systems	2	1	0	0	3.5	40	60	3	3
3	C	26NLNPC402	PCC	Power Systems - I	2	1	0	0	3.5	40	60	3	3
4	D	26NLNPC403	PCC	DC Machines and Transformers	2	1	0	0	3.5	40	60	3	3
5	E	26NLNPB401	PBL	Embedded Systems	3	0	0	1	5.5	60	40	4	4
6	F S3/S4	26ABCES302	ESC	Disaster Management and Sustainable Development	2	0	0	0	3	40	60	2	2
		26ABCES303		Design Thinking and Product Development									
7	G	26NLNLC401	PCL	Digital Circuits & Embedded Systems Lab	0	0	3	0	1.5	50	50	2	3
8	H	26NLNLC402	PCL	DC Machines and Transformers Lab	0	0	3	0	1.5	50	50	2	3
9	M	26NLNVM401	VAC	MINOR	3	0	0	0	4.5*	40	60	4*	3*
	U	26NLNVH4Q1		HONORS	3	0	0	0	4.5*			4*	3*
	REMEDIAL												
10	S	26NLNSE40Q	SEC	Skill Enhancement Course								1	2
Total									25.5/34.5*			23/31*	26/32*

- ❖ Disaster Management and Sustainable Development and Design Thinking and Product Development shall be offered in both Semester 3 (S3) and Semester 4 (S4). Half of the branches in the institution will be offered Disaster Management and Sustainable Development in S3 and Design Thinking and Product Development in S4, while the remaining branches will follow the reverse sequence.
- ❖ After completing the fourth or fifth semester, during the semester break, every student shall undergo a mandatory internship of a minimum duration of two weeks with industry, R&D organisations, Academic institutions of national importance, IDEA Lab, Centre for Future Skills (CFS), NGOs, government organisations, or micro, small, and medium enterprises (MSMEs) to gain experiential and industry-oriented exposure. The internship committee shall coordinate and monitor all internship activities with members from the department and sister departments.
- ❖ Starting from the fourth semester, students may opt to enrol in Honors courses. Three distinct Honors course baskets will be offered, from which a student may choose one basket to pursue. Each Honors basket consists of five carefully curated subjects aimed at providing advanced knowledge and skills in the respective discipline.

FIFTH SEMESTER- Stream B													
Sl. No	Slot	Course Code	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs. /Week
					L	T	P	R		CIA	ESE		
1	A	26NLNPC501	PCC	Linear Control Systems	2	1	0	0	3.5	40	60	3	3
2	B	26NLNPC502	PCC	Engineering Electromagnetics	2	1	0	0	3.5	40	60	3	3
3	C	26NLNPC503	PCC	Power Systems - II	2	1	0	0	3.5	40	60	3	3
4	D	26NLNPB501	PBL	Power Electronics	3	0	0	1	5.5	60	40	4	4
5	E	26NLNPE51Q	PEC	PEC-1	3	0	0	0	4.5	40	60	3	3
6	F S5/ S6	26ABCHM501	HMC	Engineering Entrepreneurship & IPR	2	0	0	0	3	40	60	3	2
		26ABCHM502		Economics For Engineers									
7	G	26NLNLC501	PCL	Power Electronics Lab	0	0	3	0	1.5	50	50	2	3
8	H	26NLNLC502	PCL	Power Systems Lab	0	0	3	0	1.5	50	50	2	3
9	M	26NLNVM501	VAC	MINOR	3	0	0	0	4.5*	40	60	4*	3*
	U	26NLNVH5Q1		HONORS	3	0	0	0	4.5*	40	60	4*	3*
	REMEDIAL												
10	S	26NLNSE50Q	SEC	Skill Enhancement Course								1	2
	S5/ S6	Industrial Visit (Maximum 5 Days are permitted, Not Exceeding more than 3 Working Days)											
Total									26.5/ 35.5*			24/32*	26/32*

Program Elective Courses (PEC-1)			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNPE511	Renewable Energy Systems	NIL
2	26NLNPE512	Power Quality	NIL
3	26NLNPE513	Electric and Hybrid Vehicles	NIL
4	26NLNPE514	Computer Networks	NIL
5	26NLNPE515	Computer Organisation	NIL

SIXTH SEMESTER- Steam B													
Sl. No	Slot	Course Code	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs. /Week
					L	T	P	R		CIA	ESE		
1	A	26NLNPC601	PCC	AC Machines	2	1	0	0	3.5	40	60	3	3
2	B	26NLNPC602	PCC	Electric Drives	2	1	0	0	3.5	40	60	3	3
3	C	26NLNPC603	PCC	Advanced Control and Instrumentation	2	1	0	0	3.5	40	60	3	3
4	D	26NLNPB601	PBL	Electrical System Design and Estimation	3	0	0	1	5.5	60	40	4	4
5	E	26NLNPE62Q	PEC	PEC-2	3	0	0	0	4.5	40	60	3	3
6	F S5/ S6	26ABCHM501	HMC	Engineering Entrepreneurship & IPR	2	0	0	0	3	40	60	3	2
		26ABCHM502		Economics For Engineers									
7	G	26NLNLC601	PCL	Control Systems Lab	0	0	3	0	1.5	50	50	2	3
8	H	26NLNLC602	PCL	AC Machines and Drives Lab	0	0	3	0	1.5	50	50	2	3
9	M	26NLNVM601	VAC	MINOR	3	0	0	0	4.5*	40	60	3*	3*
	U	26NLNVH6Q1		HONORS	3	0	0	0	4.5*	40	60	4*	3*
	REMEDIAL												
10	S	26NLNSE60Q	SEC	Skill Enhancement Course								1	2
	S5/ S6	Industrial Visit (Maximum 5 Days are permitted, Not Exceeding more than 3 Working Days)											
11		26ABCIN601	INM	Mandatory Internship - Evaluation by a Committee								1	
Total									26.5/ 35.5*			25/32*	26/32*

- ❖ Engineering Entrepreneurship & IPR and Engineering Economics shall be offered in both Semester 5 (S5) and Semester 6 (S6). Half of the branches in the institution shall be offered Engineering Entrepreneurship & IPR in S5 and Engineering Economics in S6, while the remaining branches shall be offered Engineering Economics in S5 and Engineering Entrepreneurship & IPR in S6.

Elective Courses (PE-2)			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNPE621	Digital Protection of Power Systems	NIL
2	26NLNPE622	Magnetics for Power Electronic Converters	NIL
3	26NLNPE623	Energy Storage and Conversions in EV	NIL
4	26NLNPE624	Embedded Programming	NIL
5	26NLNPE625	Machine Learning and Image Processing	NIL

SEVENTH SEMESTER- Stream B													
Sl. No	Slot	Course Code	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs. /Week
					L	T	P	R		CIA	ESE		
1	A	26NLNPE73Q	PEC	PEC-3 (Internship Students: Self Study/MOOC Approved by the college/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	B	26NLNPE74Q	PEC	PEC-4 (Internship Students: Self Study/MOOC Approved by the college/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	C	26NLNOE71Q/ 26NLNIE71Q	OEC/ IEC	OEC-1 / IEC-1 (Internship Students: Self Study/MOOC Approved by the college /Online Classes)	3	0	0	0	4.5	40	60	3	3
4	D	26ABCHE71Q	HME	HME-1 (Internship Students: Self Study/MOOC Approved by the college/Online Classes)	2	0	0	0	3	40	60	1	2
5	S	26NLNSM701	SMR	Seminar	0	0	3	0	1.5	50	0	2	3
6	P	26NLNPR701 /26NLNIN701	PRJ /INC	Major Project Phase-I/Internship	0	0	0	8	8	100	0	4	8
7	U	26NLNVH7Q1	VAC	HONORS	3	0	0	0	4.5*	40	60	3*	3*
	REMEDIAL												
8	S	26NLNSE70Q	SEC	Skill Enhancement Course								1	2
Total									26/ 30.5*			17/20*	24/27*

- ❖ No Grade Points will be awarded for the D slot courses.
- ❖ Open Electives are courses offered by departments other than the student's own, allowing interdisciplinary learning and broader knowledge acquisition.
- ❖ Students who opt for an internship must present a seminar before a committee, which will assess their performance.

HME 1		
Sl. No:	Course Code	Name of the Subject
1	26ABCHE711	Organizational Behavior and Business Communication
2	26ABCHE712	Introduction to Indian Languages and Culture
3	26ABCHE713	Proficiency course in French (B1 level) / MOOC
4	26ABCHE714	Proficiency Course in German(B1 Level) / MOOC
5	26ABCHE715	Proficiency Course in Spanish(B1 Level) / MOOC
6	26ABCHE716	Introduction to Japanese Language and Culture (N5 level) / MOOC

Elective Courses (PE-3)			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNPE731	Smart Grid Technologies	NIL
2	26NLNPE732	Dynamics of Electrical Machines	NIL
3	26NLNPE733	Electric Vehicle Systems, Drives and Infrastructure	NIL
4	26NLNPE734	IoT in Smart Grid Systems	NIL
5	26NLNPE735	Energy Storage Systems	NIL

Elective Courses (PE-4)			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNPE741	Power System Planning and Reliability	NIL
2	26NLNPE742	Utility Applications of Power Electronics	NIL
3	26NLNPE743	Electrical Machines and Drives in EVs	NIL
4	26NLNPE744	Real-Time Operating Systems (RTOS) and Applications	NIL
5	26NLNPE745	Material Science	NIL

OEC-1 / IEC-1 Courses (VAC)			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNOE711	Introduction to Control Systems	NIL
2	26NLNOE712	Renewable Energy Technologies	NIL
3	26NLNOE713	Electric Vehicle Technology	NIL
4	26NLNOE714	Illumination Engineering	NIL
5	26NLNOE715	Utilization of Electric Power	NIL

EIGHTH SEMESTER- Stream B													
Sl. No	Slot	Course Code	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs. /Week
					L	T	P	R		CIA	ESE		
1	A	26NLNPE85Q	PEC	PEC-5 (Internship Students: Self Study/MOOC Approved by the College/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	B	26NLNOE82Q/ 26NLNIE82Q	OEC/IEC	OEC-2 / IEC-2 (Internship Students: Self Study/MOOC Approved by the College/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	C	26ABCHE71Q	HME1	HME-1 (Internship Students: Self Study/MOOC Approved by the college/Online Classes)	2	0	0	0	3	40	60	1	2
4	P	26NLNPR801 / 26NLNJP801/ 26NLNIN801	PRJ/INC	Major Project Phase-II / Major Project / Internship	0	0	0	8	8	100	0	6	8
Total									20			13	16

Elective Courses (PE-5)			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNPE851	Energy Management and Auditing	NIL
2	26NLNPE852	Special Electrical Machines & Drives	NIL
3	26NLNPE853	Energy Management and Control Strategies for Electric Vehicles	NIL
4	26NLNPE854	Digital Signal Processing	NIL
5	26NLNPE855	Illumination Technology	NIL

OEC-2 / IEC-2 Courses			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNOE821	Energy Storage Technologies	NIL
2	26NLNOE822	Design of Photovoltaic Systems	NIL
3	26NLNOE823	Energy Management	NIL
4	26NLNOE824	Smart Grids and Future Energy Systems	NIL
5	26NLNOE825	Home and Building Electrical Systems	NIL

Minor Courses

Minor Courses (VAC)- Basket 1			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNVM301	Fundamentals of Power Engineering	NIL
2	26NLNVM401	Energy Economics and Management	NIL
3	26NLNVM501	Renewable Energy System	NIL
4	26NLNVM601	Instrumentation for Energy Systems	NIL

Honor Courses

Honors Courses (VAC) - Basket-1			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNVH411	Hydrogen & Fuel Cell Technologies	NIL
2	26NLNVH511	Sustainable Energy Storage & Emerging Technologies	NIL
3	26NLNVH611	Advanced Control Theory	NIL
4	26NLNVH711	Advanced Electric Drives & Control	NIL

Honors Courses (VAC) - Basket-II			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNVH421	Battery Technology and Management Systems	NIL
2	26NLNVH521	Electric Vehicle Charging Systems and Infrastructure	NIL
3	26NLNVH621	Grid Integration and Vehicle-to-Grid (V2G) Systems	NIL
4	26NLNVH721	Energy Management and Communication in Smart Grids	NIL

Honors Courses (VAC) - Basket-III			
Sl. No:	Course Code	Name of the Subject	Prerequisites (If Any)
1	26NLNVH431	Energy Efficiency & Green Building Technologies	NIL
2	26NLNVH531	Analysis of Power Converters	NIL
3	26NLNVH631	Energy Policy, Economics & Regulatory Frameworks	NIL
4	26NLNVH731	Power System Automation	NIL

Credit Distribution Overview

The credit allocation across S1-S8 semesters is structured based on different course types, as detailed below.

<i>Semester</i>	<i>BSC</i>	<i>ESC</i>	<i>HMC/ HME</i>	<i>SEC</i>	<i>PCC+ PCL</i>	<i>PBL</i>	<i>PEC</i>	<i>OEC/IE C</i>	<i>SMR+ PRJ/I NC</i>	<i>INM</i>	<i>Total Credits Semester wise</i>
<i>S1</i>	6	13	1	1	-	-	-	-	-	-	21
<i>S2</i>	6	9	3	1	3	-	-	-	-	-	22
<i>S3</i>	3	5	-	1	10	4	-	-	-	-	23
<i>S4</i>	3	2	-	1	13	4	-	-	-	-	23
<i>S5</i>	-	-	3	1	13	4	3	-	-	-	24
<i>S6</i>	-	-	3	1	13	4	3	-	-	1	25
<i>S7</i>	-	-	1	1	-	-	6	3	6	-	17
<i>S8</i>	-	-	1	-	-	-	3	3	6	-	13
<i>Total-Type wise /Semester wise</i>	18	29	12	7	52	16	15	6	12	1	168
<i>Additional Credits</i>											
<i>Minor Courses</i>	Minor courses are offered from the third to the sixth semester. (4+4+4+3=15 Credits)										15
<i>Honor Courses</i>	Honors courses are offered from the fourth to the seventh semester. (4+4+4+3=15 Credits)										15
<i>Activity Points Credits</i>	NSS, NCC, NSO (National Sports Organisation) /Arts/Sports/Games/Union/Club Activities - 50 Points										1
	English Proficiency Certification (TOFEL, IELTS, BEC etc) /Aptitude Proficiency Certification (GRE, CAT, GMAT etc)/Valid Gate Score/Conferences/Paper Presentation/ Workshop Activities/ Professional Body Activities/Journal Publication, Patents, Start-Up/Skilling Certificates (Approved by the College) - 50 Points										1
TOTAL CREDITS- 200											

*75 Points/group for B. Tech Lateral Entry Students

*A minimum of 100 Activity points are to be acquired for obtaining the 2 Activity Credits required in the curriculum.

Dr. Jacob Thomas V
Principal
FISAT

Dr. Archana R
Member Secretary
FISAT