



SSN SCHOOL OF ENGINEERING

SHIV NADAR UNIVERSITY CHENNAI DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

**Master of Technology
Power Electronics and Drives**

CURRICULUM & SYLLABUS

REGULATIONS 2026

‘VISION’ AND ‘MISSION’ OF THE DEPARTMENT

VISION

To attain global eminence in Electrical and Electronics Engineering education, research, and innovation by empowering students with technological excellence, professional integrity, entrepreneurial spirit, and social responsibility

MISSION

- To impart advanced technical knowledge and hands-on competence in emerging Electrical and Electronics Engineering domains through innovative teaching, research, and industry-integrated learning.
- To promote research, innovation, and entrepreneurship through strong academia–industry collaboration, addressing global and sustainable technological challenges.
- To develop ethically responsible, career-ready graduates with lifelong learning skills and a commitment to serve society and the global community with integrity.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

- **PEO1:** Career Development: Graduates will have technical knowledge, skills and analytical ability to design, develop and test power electronic converters and drives using modern tools.
- **PEO2:** Social and ethical responsibilities: Graduates will have skills and knowledge in the field of power electronics and drives to improve the system performance and to relate social, ethical, economic and environmental dimensions.
- **PEO3:** Life-long learning: Graduates will have confidence to conduct research, take up higher studies and life-long learning in the field of power electronics and drives.

PROGRAM OUTCOMES (POs)

At the end of the programme, the graduates will achieve the following attributes:

- **PO1:** An ability to independently carry out research /investigation and development work to solve practical problems.
- **PO2:** An ability to write and present a substantial technical report/document.
- **PO3:** Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
- **PO4:** To use modern simulation tools and hardware technologies for modelling and prototyping of power electronic systems addressing societal needs.

MAPPING OF PEOs WITH POs:

PO \ PEO	PEO1	PEO2	PEO3
PO1			3
PO2		2	2
PO3	3	2	1
PO4	3	3	2

Mapping Programme Outcomes with Graduate Attributes

S.No	NBA-GA	ME PED PO
1	Scholarship of knowledge	1
2	Critical thinking	1
3	Problem solving	1
4	Research skill	2
5	Usage of modern tools	2
6	Collaborative and multidisciplinary research	2
7	Project management and finance	4
8	Communication	4
9	Life-long learning	3
10	Ethical practices and social responsibility	2
11	Independent and reflective learning	2

COURSE SUMMARY

The listed courses in the curriculum are broadly classified as per the recommendations from the UGC.

Sl. No	Broad Category of Course	Minimum Credit Requirement	Proposed Credits
1	Department Core Course (DC)	10	10
2	Major Core Course (MC)	30	30
3	Multidisciplinary Course (MD)	10	10
4	Open Elective (OE)	2	3
5	Project Dissertation (PD)	20	20
6	Research Internship (RI)	4	4
7	Skill Enhancement Course (SEC)	4	4
Total		80	81

The semester wise credit breakup of the Curriculum based on the above credit breakup proposed by the UGC is as follows:

Semester\Category	DC	MC	MD	OE	PD	RI	SEC	TOTAL
I	7	8	4	3			2	24
II	3	14	3				2	22
III		8	3		8	4		23
IV					12			12
Total	10	30	10	3	20	4	4	81

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1	26MA5001	Advanced Mathematical Methods for Optimization and Data Analysis	MD	4	3	1	0	4
2	26PE5701	Design and Analysis of Power Converters	MC	5	3	0	2	4
3		Elective 1	MC	5	3	0	2	4
4	26EN5801	English for Research Paper Writing	SEC	3	1	0	2	0
5	26PE5001	FACTS and Custom Power Devices	DC	3	3	0	0	3
6	26PE5003	Industrial Standards and Compliance	SEC	2	2	0	0	2
7	26UC5001	Research Methodology	OE	3	3	0	0	3
8	26PE5703	System Design with Microcontroller	DC	5	3	0	2	4
TOTAL				30	21	1	8	24

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1		Elective 2	MD	3	3	0	0	3
2		Electric Vehicle Technologies	DC	3	3	0	0	3
3		Solid State Drives	MC	5	3	0	2	4
4		Power Electronics for Renewable Energy Systems	MC	5	3	0	2	4
5		Elective 3	MC	3	3	0	0	3
6		Elective 4	MC	3	3	0	0	3
7		Python Programming for Machine Learning	SEC	3	0	1	2	2
TOTAL				25	18	1	6	22

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1		Multi-disciplinary Open Elective	MD	3	3	0	0	3
2		Elective 5	MC	5	3	0	2	4
3		Elective 6	MC	5	3	0	2	4
PRACTICALS								
4		Project/Dissertation Phase I	PD	16	0	0	16	8
5		Research Internship	RI		0	0	0	4
TOTAL				29	9	0	20	23

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
PRACTICALS								
1		Project/Dissertation Phase II	PD	24	0	0	24	12
TOTAL				24	0	0	24	12

ELECTIVE 1

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1	26PE5799	Advanced Power Semiconductor Devices	MC	5	3	0	2	4
2	26PE5797	Modelling and Analysis of Electrical Machines	MC	5	3	0	2	4
3	26PE5795	System Theory	MC	5	3	0	2	4

ELECTIVE 2

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1		Modern Rectifiers and Resonant Converters	MD	3	3	0	0	3
2		Advanced Power Converters	MD	3	3	0	0	3
3		High Power Inverters	MD	3	3	0	0	3
4		Design Techniques for SMPS	MD	3	3	0	0	3

ELECTIVE 3

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1		Technologies for Wind Energy Conversion	MC	3	3	0	0	3
2		Design of Solar Photovoltaic Systems	MC	3	3	0	0	3
3		Hydrogen and Fuel Cell Technology	MC	3	3	0	0	3
4		Energy Storage Technologies	MC	3	3	0	0	3

ELECTIVE 4

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1		High Voltage Direct Current Transmission System	MC	3	3	0	0	3
2		Energy Management Auditing	MC	3	3	0	0	3
3		Power Quality Analysis and Improvement	MC	3	3	0	0	3

ELECTIVE 5

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1		Modelling of EV Power Train	MC	5	3	0	2	4
2		Smart Grid and Microgrid Technologies	MC	5	3	0	2	4
3		Condition Monitoring of Electrical Machines	MC	5	3	0	2	4
4		IoT for Smart Systems	MC	5	3	0	2	4

ELECTIVE 6

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1		Electric Vehicle Charging Systems	MC	5	3	0	2	4
2		Grid Integration of Renewable Energy Systems	MC	5	3	0	2	4
3		Machine Learning for Power Engineering	MC	5	3	0	2	4

ELECTIVE VERTICALS

Vertical 1 – Sustainable Energy Technologies

S. No.	COURSE CODE	COURSE TITLE	ELECTIVE	Teaching and Learning Scheme (per semester)				
				CONTACT PERIODS	L	T	P	C
1		System Theory	1	5	3	0	2	4
2		Modern Rectifiers and Resonant Converters	2	3	3	0	0	3
3		Advanced Power Converters	2	3	3	0	0	3
4		High Power Inverters	2	3	3	0	0	3
5		Design Techniques for SMPS	2	3	3	0	0	3
6		Technologies for wind energy conversion	3	3	3	0	0	3
7		Design of Solar Photovoltaic Systems	3	3	3	0	0	3
8		High Voltage Direct Current Transmission System	4	3	3	0	0	3
9		Energy Management Auditing	4	3	3	0	0	3
10		Smart Grid and Microgrid Technologies	5	5	3	0	2	4
11		IoT for Smart Systems	5	5	3	0	2	4
12		Grid Integration of Renewable Energy Systems	6	5	3	0	2	4

Vertical 2 – Electric Mobility Systems

S. No.	COURSE CODE	COURSE TITLE	ELECTIVE	Teaching and Learning Scheme (per semester)				
				CONTACT PERIODS	L	T	P	C
1		Modelling and analysis of Electrical Machines	1	5	3	0	2	4
2		Advanced Power Semiconductor Devices	1	5	3	0	2	4
3		Modern Rectifiers and Resonant Converters	2	3	3	0	0	3
4		Advanced Power Converters	2	3	3	0	0	3
5		High Power Inverters	2	3	3	0	0	3
6		Design Techniques for SMPS	2	3	3	0	0	3
7		Hydrogen and Fuel Cell Technologies	3	3	3	0	0	3
8		Energy Storage Technologies	3	3	3	0	0	3
9		Power Quality Analysis and Improvement	4	3	3	0	0	3
10		Modelling of EV Power Train	5	5	3	0	2	4
11		Condition Monitoring of Electrical Machines	5	5	3	0	2	4
12		Electric Vehicle Charging Systems	6	5	3	0	2	4
13		Machine Learning for Power Engineering	6	5	3	0	2	4

MULTI-DISCIPLINARY OPEN ELECTIVE

S. No.	COURSE CODE	COURSE TITLE	COURSE	Teaching and Learning Scheme (per semester)				
			CATEGORY	CONTACT PERIODS	L	T	P	C
1		Electric and Hybrid Vehicles	MD	3	3	0	0	3
2		Energy Auditing and Management	MD	3	3	0	0	3
3		Renewable Energy Technologies	MD	3	3	0	0	3
4		Energy Storage Systems	MD	3	3	0	0	3

Note: Students from M.Tech. Power Electronics and Drives must not opt for this Open Elective.