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**PERIYAR  
MANIAMMAI**  
INSTITUTE OF SCIENCE & TECHNOLOGY  
(Deemed to be University)  
Established Under Sec. 3 of UGC Act, 1956 • NAAC Accredited  
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# **Faculty of Engineering and Technology**

## **Department of Electronics and Communication Engineering**

### **B.Tech. Electronics and Communication Engineering with Specialization in Artificial Intelligence and Machine Learning**

# **Curriculum Regulations 2024**

**PERIYAR MANIAMMAI INSTITUTE OF SCIENCE &  
TECHNOLOGY**

**Vallam, Thanjavur – 613 403**

**PERIYAR MANIAMMAI INSTITUTE OF SCIENCE & TECHNOLOGY**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**DEPARTMENT OF**  
**ELECTRONICS AND COMMUNICATION ENGINEERING**  
**B.Tech. Electronics and Communication Engineering with Specialization in**  
**Artificial Intelligence and Machine Learning**  
**CURRICULUM – REGULATIONS 2024**

Category of courses and minimum credit requirement for B.Tech. Electronics and Communication Engineering with specialization in Artificial Intelligence and Machine Learning programme as per Regulations 2024 are outlined below:

Sl. No.	Category of Courses	Credits
1.	<b>Foundation Courses</b> (Humanities and Social Sciences including Management Courses, Basic Science and Engineering Science Courses)	60
2.	<b>Professional Core Courses</b>	60
3.	<b>Professional Elective Courses</b>	18
4.	<b>Open Elective Courses</b>	09
5.	<b>Online Courses</b>	06
6.	<b>Employability Enhancement Courses</b> (Value-added, Community Engagement and Social Responsibility, Skill Development Courses, Soft and Managerial Skills, Internship, Mini-projects, and Capstone project)	27
7.	<b>Audit Courses*</b>	---
8.	<b>Courses Lead to Specialization / Minor / Honors</b>	20
	<b>Total Credits</b>	<b>200</b>

**\*Note:** Audit Courses such as Life Science, Environmental Science, Indian History etc., shall be introduced as they mandate the requirement of Outcome Based Education.

**SEMESTER I**

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Theory</b>						
1	U24EN101	Technical English	3	0	0	3
2	U24MA101	Matrices and Differential Calculus	3	1	0	4
3	U24CH151	Engineering Chemistry	3	0	0	3
4	U24GE101	Principles of Engineering	3	0	0	3
5	U24GE152	Engineering Graphics	2	1	0	3
6	U24EM101	Coding Techniques	3	0	0	3
<b>Practical</b>						
7	U24MA102	Mathematics Laboratory	0	0	2	1
8	U24CH152	Engineering Chemistry Laboratory	0	0	2	1
9	U24EM102	Coding Techniques Laboratory	0	0	2	1
Total			17	2	6	22

## SEMESTER II

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Theory</b>						
1	U24EN151	Technical Communication Skill Development	2	0	2	3
2	U24MA151	Vector Calculus and Laplace Transforms	3	1	0	4
3	U24PH101	Engineering Physics	3	0	0	3
4	U24GE151	Design Thinking	3	0	0	3
5	U24GE102	Biology for Engineers	3	0	0	3
6	U24EM151	Programming in Practice	3	0	0	3
<b>Practical</b>						
7	U24PH102	Engineering Physics Laboratory	0	0	2	1
8	U24GE153	Design Thinking Laboratory	0	0	4	2
9	U24GE154	Engineering Practices	0	0	2	1
10	U24EM152	Programming in Practice Laboratory	0	0	2	1
<b>Total</b>			17	1	12	24

### SEMESTER III

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Theory</b>						
1	U24MA202	Fourier Transforms and Partial Differential Equations	3	1	0	4
2	U24SH201	Universal Human Values	2	1	0	3
3	U24EC201	Digital System Design	3	0	0	3
4	U24EC202	Electronic Devices	3	0	0	3
5	U24EC203	Sensors and Actuators	3	0	2	4
6	U24EC204	Signals and Systems	3	1	0	4
<b>Practical</b>						
7	U24EC205	Digital System Design Laboratory	0	0	2	1
8	U24EC206	Electronic Devices Laboratory	0	0	2	1
<b>Audit Course</b>						
9	U24AUXXX	Audit Course - I	-	-	-	-
<b>Courses Lead to Specialization / Minor / Honors</b>						
10	U24EC604	Foundations of Artificial Intelligence	3	0	2	4
Total			20	3	8	27

## SEMESTER IV

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Theory</b>						
1	U24MA254	Probability Theory and Stochastic Processes	3	1	0	4
2	U24EC251	Analog Circuits	3	0	0	3
3	U24EC252	Digital Signal Processing	3	1	0	4
4	U24EC253	Electromagnetic Waves	3	0	0	3
5	U24EC254	Network Theory	3	0	0	3
6	U24EC751	Ancient Concepts and Applications in Engineering	3	0	0	3
<b>Practical</b>						
7	U24EC255	Analog Circuits Laboratory	0	0	2	1
8	U24EC256	Digital Signal Processing Laboratory	0	0	4	2
9	U24EM2XX	Internship / Practical Training / Value Added Course(s)	2	0	2	3
<b>Audit Course</b>						
10	U24AUXXX	Audit Course - II	-	-	-	-
<b>Courses Lead to Specialization / Minor / Honors</b>						
11	U24EC653	Prompt Engineering	3	0	2	4
Total			23	2	10	30

## SEMESTER V

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Theory</b>						
1	U24MA302	Numerical Techniques and Optimization	3	0	0	3
2	U24EC301	Communication Theory	3	0	0	3
3	U24EC302	Microprocessors and Microcontrollers	3	0	0	3
4	U24EC7XX	Open Elective - II	3	0	0	3
5	U24EC9XX	Professional Elective - I	3	0	0	3
6	U24EC9XX	Professional Elective - II	3	0	0	3
7	U24EM301	Value Added Course – Community Engagement and Social Responsibility	1	0	2	2
<b>Practical</b>						
8	U24EC303	Analog Communication Laboratory	0	0	2	1
9	U24EC304	Microprocessors and Microcontrollers Laboratory	0	0	4	2
<b>Audit Course</b>						
10	U24AUXXX	Audit Course - III	-	-	-	-
<b>Courses Lead to Specialization / Minor / Honors</b>						
11	U24EC605	Foundations of Machine Learning	3	0	2	4
Total			22	0	10	27

## SEMESTER VI

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Theory</b>						
1	U24EC351	Antennas and Propagation	3	0	0	3
2	U24EC352	Control Systems	3	0	0	3
3	U24EC353	Digital Communication	3	0	0	3
4	U24EC7XX	Open Elective - III	3	0	0	3
5	U24EC8XX	Online Course - I	3	0	0	3
6	U24EC9XX	Professional Elective - III	3	0	0	3
7	U24EC9XX	Professional Elective - IV	3	0	0	3
<b>Practical</b>						
8	U24EC354	Digital Communication Laboratory	0	0	4	2
9	U24EM3XX	Skill Enhancement / Value Added Course(s)	1	0	2	2
<b>Audit Course</b>						
10	U24AUXXX	Audit Course - IV	-	-	-	-
<b>Courses Lead to Specialization / Minor / Honors</b>						
11	U24EC654	AI For Signal and Image Processing	3	0	2	4
Total			25	0	8	29

**SEMESTER VII**

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Theory</b>						
1	U24GE401	Professional Ethics	3	0	0	3
2	U24EC401	Embedded Systems	3	0	0	3
3	U24EC402	Microwave Engineering	3	0	0	3
4	U24EC403	VLSI Design	3	0	0	3
5	U24EC9XX	Professional Elective - V	3	0	0	3
6	U24EC9XX	Professional Elective - VI	3	0	0	3
<b>Practical</b>						
7	U24EC404	Microwave Engineering Laboratory	0	0	4	2
8	U24EC405	VLSI Design and Embedded Systems Laboratory	0	0	4	2
9	U24EM401	Project Phase - I	0	0	8	4
<b>Courses Lead to Specialization / Minor / Honors</b>						
10	U24EC606	AI in Wireless Communication	3	0	2	4
Total			21	0	18	30

## SEMESTER VIII

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Theory</b>						
1	U24EC8XX	Online Course - II	3	0	0	3
<b>Practical</b>						
2	U24EM451	Project Phase - II	0	0	16	8
Total			3	0	16	11

The number of credits in each semester is summarized as follows:

Programme	I	II	III	IV	V	VI	VII	VIII
B.Tech. Electronics and Communication Engineering with Specialization in Artificial Intelligence and Machine Learning	22	24	27	30	27	29	30	11

**Semester wise Credit Distribution (in all categories of courses)**

<b>Sl. No.</b>	<b>Category of Courses</b>	<b>Credits</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>	<b>VI</b>	<b>VII</b>	<b>VIII</b>
1.	<b>Foundation Courses</b>	55	18	20	7	4	3	-	3	-
2.	<b>Professional Core Courses</b>	65	-	-	16	16	9	11	13	-
3.	<b>Professional Elective Courses</b>	18	-	-	-	-	6	6	6	-
4.	<b>Open Elective Courses</b>	9	-	-	-	3	3	3	-	-
5.	<b>Employability Enhancement Courses</b>	27	4	4	-	3	2	2	4	8
6.	<b>Online Courses</b>	6	-	-	-	-	-	3	-	3
7.	<b>Audit Courses</b>	--	-	-	-	-	-	-	-	-
8.	<b>Courses Lead to Specialization / Minor / Honors</b>	20	-	-	4	4	4	4	4	-
<b>Total</b>		200	22	24	27	30	27	29	30	11

## Suggested List of Professional Elective Courses

### Professional Elective – I

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC901	High Speed Electronics	3	0	0	3
2	U24EC902	Computer Organization and Architecture	3	0	0	3
3	U24EC903	Fundamentals of MEMS	3	0	0	3
4	U24EC904	Bio Signal Processing	3	0	0	3
5	U24EC905	Cloud Computing	3	0	0	3

### Professional Elective – II

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC906	Biomedical Electronics	3	0	0	3
2	U24EC907	Data Structures	3	0	0	3
3	U24EC908	Nano Electronics	3	0	0	3
4	U24EC909	Speech Processing	3	0	0	3
5	U24EC910	Smart Grid	3	0	0	3

**Professional Elective – III**

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC951	Power Electronics for Electric Vehicle	3	0	0	3
2	U24EC952	Operating Systems	3	0	0	3
3	U24EC953	Satellite Communication	3	0	0	3
4	U24EC954	Computer Networks	3	0	0	3
5	U24EC955	Block Chain Technologies	3	0	0	3

**Professional Elective – IV**

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC956	MEMS for Wireless Communication	3	0	0	3
2	U24EC957	Data Science Essentials	3	0	0	3
3	U24EC958	Wireless Communications	3	0	0	3
4	U24EC959	Digital Image Processing	3	0	0	3
5	U24EC960	Prompt Engineering	3	0	0	3

**Professional Elective – V**

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC911	Quantum and Photonic Technology	3	0	0	3
2	U24EC912	Fundamentals of Kotlin Programming	3	0	0	3
3	U24EC913	Fundamentals of 5G Technologies	3	0	0	3
4	U24EC914	Software-Defined Wide Area Networking (SD-WAN)	3	0	0	3
5	U24EC915	Digital Twin	3	0	0	3

**Professional Elective – VI**

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC916	Fiber Optic Communication	3	0	0	3
2	U24EC917	Edge Computing	3	0	0	3
3	U24EC918	MIMO Communication	3	0	0	3
4	U24EC919	Information theory and Coding	3	0	0	3
5	U24EC920	Generative AI Models	3	0	0	3

## List of Courses under each Category

### Foundation Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
<b>Humanities &amp; Social Sciences including Management Courses</b>						
1	U24EN101	Technical English	3	0	0	3
2	U24EN151	Technical Communication Skill Development	2	0	2	3
3	U24SH201	Universal Human Values	2	1	0	3
<b>Basic Science Courses</b>						
4	U24MA101	Matrices and Differential Calculus	3	1	0	4
5	U24PH101	Engineering Physics	3	0	0	3
6	U24MA102	Mathematics Laboratory	0	0	2	1
7	U24PH102	Engineering Physics Laboratory	0	0	2	1
8	U24MA151	Vector Calculus and Laplace Transforms	3	1	0	4
9	U24CH151	Engineering Chemistry	3	0	0	3
10	U24CH152	Engineering Chemistry Laboratory	0	0	2	1
11	U24MA202	Fourier Transforms and Partial Differential Equations	3	1	0	4
12	U24MA254	Probability Theory and Stochastic Processes	3	1	0	4
13	U24MA304	Numerical Techniques and Optimization	3	0	0	3
<b>Engineering Science Courses</b>						
14	U24GE101	Principles of Engineering	3	0	0	3
15	U24GE102	Biology for Engineers	3	0	0	3
16	U24GE151	Design Thinking	3	0	0	3
17	U24GE152	Engineering Graphics	2	1	0	3

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
18	U24GE153	Design Thinking Laboratory	0	0	4	2
19	U24GE154	Engineering Practices	0	0	2	1
20	U24GE401	Professional Ethics	3	0	0	3
Total			42	6	14	55

### Professional Core Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC201	Digital System Design	3	0	0	3
2	U24EC202	Electronic Devices	3	0	0	3
3	U24EC203	Sensors and Actuators	3	0	2	4
4	U24EC204	Signals and Systems	3	1	0	4
5	U24EC205	Digital System Design Laboratory	0	0	2	1
6	U24EC206	Electronic Devices Laboratory	0	0	2	1
7	U24EC251	Analog Circuits	3	0	0	3
8	U24EC252	Digital Signal Processing	3	1	0	4
9	U24EC253	Electromagnetic Waves	3	0	0	3
10	U24EC254	Network Theory	3	0	0	3
11	U24EC255	Analog Circuits Laboratory	0	0	2	1
12	U24EC256	Digital Signal Processing Laboratory	0	0	4	2
13	U24EC301	Communication Theory	3	0	0	3
14	U24EC302	Microprocessors and Microcontrollers	3	0	0	3

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
15	U24EC303	Analog Communication Laboratory	0	0	2	1
16	U24EC304	Microprocessors and Microcontrollers Laboratory	0	0	4	2
17	U24EC351	Antennas and Propagation	3	0	0	3
18	U24EC352	Control Systems	3	0	0	3
19	U24EC353	Digital Communication	3	0	0	3
20	U24EC354	Digital Communication Laboratory	0	0	4	2
21	U24EC401	Embedded Systems	3	0	0	3
22	U24EC402	Microwave Engineering	3	0	0	3
23	U24EC403	VLSI Design	3	0	0	3
24	U24EC404	Microwave Engineering Laboratory	0	0	4	2
25	U24EC405	VLSI Design & Embedded Systems Laboratory	0	0	4	2
Total			48	2	32	65

### Professional Elective Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC9XX	Professional Elective - I	3	0	0	3
2	U24EC9XX	Professional Elective - II	3	0	0	3
3	U24EC9XX	Professional Elective - III	3	0	0	3
4	U24EC9XX	Professional Elective - IV	3	0	0	3
5	U24EC9XX	Professional Elective - V	3	0	0	3
6	U24EC9XX	Professional Elective - VI	3	0	0	3
Total			18	0	0	18

### Open Elective Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC751	Ancient Concepts and Applications in Engineering	3	0	0	3
2	U24EC7XX	Open Elective - II	3	0	0	3
3	U24EC7XX	Open Elective - III	3	0	0	3
Total			9	0	0	9

### Employability Enhancement Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EM101	Coding Techniques	3	0	0	3
2	U24EM102	Coding Techniques Laboratory	0	0	2	1
3	U24EM151	Programming in Practice	3	0	0	3
4	U24EM152	Programming in Practice Laboratory	0	0	2	1
5	U24EM2XX	Internship / Practical Training / Value Added Course(s)	2	0	2	3
6	U24EM301	Value Added Course – Community Engagement and Social Responsibility	1	0	2	2
7	U24EM3XX	Skill Development / Value Added Course(s)	1	0	2	2
8	U24EM401	Project Phase – I	0	0	8	4
9	U24EM451	Project Phase – II	0	0	16	8
Total			10	0	34	27

### Online Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24EC8XX	Online Course – I	3	0	0	3
2	U24EC8XX	Online Course – II	3	0	0	3
Total			6	0	0	6

### Audit Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24AUXXX	Audit Course – I	-	-	-	-
2	U24AUXXX	Audit Course – II	-	-	-	-
3	U24AUXXX	Audit Course – III	-	-	-	-
4	U24AUXXX	Audit Course – IV	-	-	-	-
Total			-	-	-	-

### Suggested list of Audit Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24AU001	Disaster Management	-	-	-	-
2	U24AU003	Cyber Security	-	-	-	-
3	U24AU007	Environmental Studies	-	-	-	-
4	U24AU008	Entrepreneurship Development	-	-	-	-
5	U24AU009	Constitution of India	-	-	-	-

### Courses Lead to Specialization / Minor / Honors

Sl. No.	Semester	Course Code	Course Name	Credits			
				L	T	P	C
1	III	U24EC604	Foundations of Artificial Intelligence	3	0	2	4
2	IV	U24EC653	Prompt Engineering	3	0	2	4
3	V	U24EC605	Foundations of Machine Learning	3	0	2	4
4	VI	U24EC654	AI For Signal and Image Processing	3	0	2	4
5	VII	U24EC606	AI in Wireless Communication	3	0	2	4
Total				15	0	10	20