CURRICULUM
2023
(Autonomous)

Version 1.0

B.TECH
ELECTRICAL AND COMPUTER ENGINEERING

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

Mar Ivanios Vidyanagar, Nalanchira, Thiruvananthapuram – 695 015

August 2023

CURRICULUM

FOR

B. TECH DEGREE PROGRAMME

IN

ELECTRICAL AND COMPUTER ENGINEERING

SEMESTERS I TO VIII

2023 SCHEME

(AUTONOMOUS)

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY
(Approved by AICTE, Autonomous Institution Affiliated to APJ Abdul Kalam Technological University)
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MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B. TECH DEGREE PROGRAMME

IN

ELECTRICAL AND COMPUTER ENGINEERING

CURRICULUM

Items	Board of Studies (BOS)	Academic Council (AC)
Date of Approval	12/07/2023	09/08/2023
Date of Approval of Revised version	09/07/2024 (Mailed)	19/06/2024

Head of Department
Chairman, Board of Studies

Principal
Chairman, Academic Council

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION AND MISSION OF THE INSTITUTION

Vision:

To be an Institution moulding globally competent professionals as epitomes of Noble Values.

Mission:

To transform the Youth as technically competent, ethically sound and socially committed professionals, by providing a vibrant learning ambience for the welfare of humanity.

VISION AND MISSION OF THE DEPARTMENT

Vision:

To be a Centre of Excellence in Electrical & Electronics Engineering Education, Research and Application of knowledge to benefit the society at large.

Mission:

To mould quality Electrical Engineers, fostering creativity and innovation to address global issues.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Engineering Graduates will have the ability:

PEO1: Graduates will succeed as Engineering Professionals in Industry or as Entrepreneurs in Electrical and Computer Engineering and the related disciplines and exhibit an urge for innovation.

PEO2: Graduates will be able to adapt to the advances in Technology by acquiring knowledge and skills manifested through continuous learning and higher qualifications.

PEO3: Graduates will be serving community as socially committed individuals, exhibiting professional ethics in addressing the technical and engineering challenges.

PROGRAMME OUTCOMES (POs)

Engineering graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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.
4. **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.
5. **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.
6. **The engineer and 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.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **Project management and 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.
12. **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.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

Engineering Graduates will have the ability:

PSO1: To apply the knowledge in Electrical Engineering and Computer Engineering for the design, development testing and operation of Power and Energy Systems in the areas of Generation, Transmission, Conversion, Distribution and Utilization systems.

PSO2: To apply the knowledge in Electrical Engineering and Computer Engineering for the design, development and operation of Industrial systems in the areas of Automation, Control, Energy Management and Economic operation.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH. PROGRAMME IN ELECTRICAL AND COMPUTER ENGINEERING

For the students admitted from 2023-24

SCHEDULING OF COURSES

i) Knowledge Segments and Credits

Every course of BTech Programme is placed in one of the nine categories as listed in table below. No semester shall have more than six lecture-based courses and two laboratory courses, and/or drawing/seminar/project courses in the curriculum.

Table 1: Credit distribution and the Knowledge Domains

Sl. No.	Category	Category Code	Proposed 2023 Curriculum
1	Humanities and Social Sciences including Management Courses	HSC	9
2	Basic Science Courses	BSC	26
3	Engineering Science Courses	ESC	24
4	Programme Core Courses,	PCC	69
5	Programme Elective Courses	PEC	18
6	Institute Elective Courses	IEC	6
7	Seminar, Mini Project, Project Work, Internship and Comprehensive Course Viva Voce	PWS	15
8	Mandatory Student Activities (P/F)	MSA	3
Total Mandatory Credits			**170**
	Value Added Courses (Optional) – Honours/Minor	VAC	15

ii) Semester-wise Credit Distribution

Semester	***I***	***II***	***III***	***IV***	***V***	***VI***	***VII***	***VIII***	***Total***
Credits for Courses	***19***	***21***	***22***	***20***	***22***	***24***	***22***	***17***	***167***
Year wise Credit	***40***		***42***		***46***		***39***		***167***
Credits for Activities	*3*								***3***
Total Credits									***170***
Value Added Courses (Optional) – Honours / Minor									***15***
Total Credits									***185***

Humanities and Social Sciences including Management Courses: Universal Human Values, Management for Engineers, Business Economics and Accountancy.

Basic Science Courses: Mathematics, Engineering Physics, Engineering Chemistry, Engineering Physics and Chemistry Labs.

Engineering Science Courses: Basics of Electrical and Electronics Engineering, Engineering Mechanics, Engineering Graphics, Design Engineering, Programming in Python, Problem Solving and programming in C, Manufacturing and Construction Practices B, Electrical and Electronics Workshop.

Mandatory Non-credit Courses: Environmental Science, Professional Communication, Professional Ethics, Industrial Safety Engineering.

v) General Guidelines

Four hours are kept exclusively for the Remedial / Minor/ Honours courses from third to seventh semester. For the mini project of Minor or Honours in S7/S8, 7 hours are allotted. If a student does not opt for Minor/Honours courses, he/she can be given remedial classes.

SEMESTER I						
Slot	**Category Code**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	BSC	23MAL10A	Linear Algebra and Calculus	3-1-0-0	4	4
B	BSC	23CYL10A	Engineering Chemistry	3-1-0-0	4	4
C	ESC	23ESB10A	Engineering Graphics	2-0-2-0	4	3
D	ESC	23ESB10D	Problem Solving and Programming in C	2-1-2-0	5	4
G	ESC	23ESL1NA	Environmental Science	2-0-0-0	2	1*
S	BSC	23CYP10A	Engineering Chemistry Lab	0-0-2-0	2	1
T	ESC	23ESB10P	Manufacturing and Construction Practices B	1-0-2-0	3	2
TOTAL					**24**	**19**

* Not to be considered for Grade/GPA/CGPA. Pass or Fail only.

SEMESTER II						
Slot	**Category Code**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	BSC	23MAL10B	Vector Calculus, Differential Equations and Transforms	3-1-0-0	4	4
B	BSC	23PYL10A	Engineering Physics	3-1-0-0	4	4
C	ESC	23ESL10C	Engineering Mechanics	2-1-0-0	3	3
D	ESC	23ESB10G	Python Programming	2-0-2-0	4	3
E	ESC	23ESL10J	Basics of Electrical Engineering A	2-0-0-0	4	2
		23ESL10L	Basics of Electronics Engineering	2-0-0-0		2
G	HSC	23HSJ1NB	Professional Communication	2-0-0-2	4	1*
S	BSC	23PYP10A	Engineering Physics Lab	0-0-2-0	2	1
T	ESC	23ESP10B	Electrical and Electronics Workshop	0-0-2-0	2	1
TOTAL					**27**	**21**

* Not to be considered for Grade/GPA/CGPA. Pass or Fail only.

SEMESTER III						
Slot	**Category Code**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	BSC	23MAL20B	Discrete Mathematical Structures	3-1-0-0	4	4
B	PCC	23ELL20A	Instrumentation Systems	3-1-0-0	4	4
C	PCC	23ELL20B	Data Structures	3-1-0-0	4	4
D	PCC	23EEL20C	Electric Circuit Analysis	3-1-0-0	4	4
E	ESC	23ESL00A	Design Engineering	2-0-0-0	2	2
G	HSC	23HSL2NA	Professional Ethics	2-0-0-0	2	1*
S	PCC	23ELP20A	Data Structures Lab	0-0-3-0	3	2
T	PCC	23ELP20B	Instrumentation Lab	0-0-3-0	3	2
R/M	VAC		Remedial/Minor Course	3-0-0-0/ 2-1-0-0	3	3
TOTAL					**26/29**	**23/26**

* Not to be considered for Grade/GPA/CGPA. Pass or Fail only.

SEMESTER IV						
Slot	**Category Code**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	BSC	23MAL20D	Probability, Statistics and Numerical Methods	3-1-0-0	4	4
B	PCC	23ELL20D	Computer Organization and Architecture	3-1-0-0	4	4
C	PCC	23ELB20E	Object Oriented Programming Using JAVA	3-0-3-0	6	5
D	PCC	23ELL20F	Digital Electronics and Logic Design	3-1-0-0	4	4
E	HSC	23HSL2NB	Universal Human Values - II	2-1-0-0	3	1
G	ESC	23ESL2NC	Industrial Safety Engineering	2-1-0-0	3	1*
S	PCC	23ELP20C	Digital Electronics and Logic Design Lab	0-0-3-0	3	2
R/M/H	VAC		Remedial/Minor Course	3-0-0-0/ 2-1-0-0	3	3
TOTAL					**27/30**	**21/24**

* Not to be considered for Grade/GPA/CGPA. Pass or Fail only.

SEMESTER V						
Slot	**Category Code**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	PCC	23ELL30A	Database Management Systems	3-1-0-0	4	4
B	PCC	23ELB30B	Microprocessors and Embedded Systems	3-1-2-0	6	5
C	PCC	23ELL30C	Electrical Machines	3-1-0-0	4	4
D	HSC	23HSL30A	Business Economics and Accountancy	3-0-0-0	3	3
E	PEC	23ELL31X	Program Elective I	3-0-0-0	3	3
S	PCC	23ELP30A	Electrical Machines Lab	0-0-2-0	2	1
T	PCC	23ELP30B	Database Management System Lab	0-0-2-0	2	1
R/M/H	VAC		Remedial/Minor/Honours Course	3-0-0-0/ 2-1-0-0	3	3
TOTAL					**24/27**	**21/24**

SEMESTER VI						
Slot	**Category Code**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	PCC	23ELL30D	Power Electronics	3-1-0-0	4	4
B	PCC	23ELL30E	Algorithm Analysis and Design	3-1-0-0	4	4
C	PCC	23ELL30F	Computer Communication and Network Security	3-0-0-0	3	3
D	PEC	23ELL32X	Program Elective II	3-0-0-0	3	3
E	IEC	23IEL31X	Institute Elective I	3-0-0-0	3	3
S	PCC	23ELP30C	Networking Lab	0-0-2-0	2	1
T	PWS	23ELS38A	Seminar	0-0-4-0	4	2
U	PWS	23ELJ38B	Mini Project	0-0-4-0	4	2
R/M/H	VAC		Remedial/Minor/Honours Course	3-0-0-0/ 2-1-0-0	3	3
TOTAL					**27/30**	**22/25**

SEMESTER VII						
Slot	**Category Code**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	PCC	23ELL40A	Control Systems	3-1-0-0	4	4
B	PCC	23ELL40B	Power System Engineering	3-1-0-0	4	4
C	PCC	23ELL40C	Internet of Things	3-0-0-0	3	3
D	PEC	23ELL43X	Program Elective III	3-0-0-0	3	3
E	IEC	23IEL42X	Institute Elective II	3-0-0-0	3	3
T	PWS	23ELV48A	Comprehensive Course Viva	1-0-0-0	1	1
U	PWS	23ELJ48A	Project	0-0-10-0	10	5
		23ELI48A	Internship*			
R/M/H	VAC		Remedial/Minor/Honours Course	0-1-4-0/ 3-0-0-0	5/3	3
TOTAL					**28/33/31**	**23/26**

SEMESTER VIII						
Slot	**Category Code**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	PEC	23ELL44X	Program Elective IV	2-1-0-0	3	3
B	PEC	23ELL45X	Program Elective V	2-1-0-0	3	3
C	PEC	23ELL46X	Program Elective VI	2-1-0-0	3	3
D	HSC	23HSL00A	Management for Engineers	3-0-0-0	3	3
U	PWS	23ELJ48B	Project	0-0-10-0	10	5
		23ELI48A	Internship*			
R/M/H	VAC		Remedial/Minor/Honours Course	0-1-4-0	5	3
TOTAL					**22/27**	**17/20**

MICRO SPECIALIZATION STREAM		
No.	**STREAM**	**CODE**
1.	Power and Energy Systems	PES
2.	Control and Instrumentation	CAI
3.	Systems and Networks	SAN
4.	Artificial Intelligence and Machine Learning	AML

PROGRAMME ELECTIVE I

Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit	Stream Code
E	PEC	23ELL31A	Renewable Energy Conversions	3-0-0-0	3	3	PES
		23ELL31B	Electromagnetic Theory and Compatibility	3-0-0-0	3	3	PES
		23ELL31C	Signals and Systems	2-1-0-0	3	3	CAI
		23ELL31D	Biomedical Instrumentation	3-0-0-0	3	3	CAI
		23ELL31E	Introduction to Security in Computing	3-0-0-0	3	3	SAN
		23ELL31F	Operating Systems	3-0-0-0	3	3	SAN
		23ELL31G	Introduction to Machine Learning	3-0-0-0	3	3	AML

PROGRAMME ELECTIVE II

Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit	Stream Code
D	PEC	23ELL32A	Energy Storage Systems	3-0-0-0	3	3	PES
		23ELL32B	Modern Illumination Control	3-0-0-0	3	3	PES
		23ELL32C	Advanced Microcontrollers	3-0-0-0	3	3	CAI
		23ELL32D	Introduction to Signal Processing	3-0-0-0	3	3	CAI
		23ELL32E	Wireless Sensor Networks	3-0-0-0	3	3	SAN
		23ELL32F	Introduction to Artificial Intelligence	3-0-0-0	3	3	AML
		23ELL32G	Soft Computing Techniques	3-0-0-0	3	3	AML

PROGRAMME ELECTIVE III

Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit	Stream Code
D	PEC	23ELL43A	Electric and Hybrid Vehicles	3-0-0-0	3	3	PES
		23ELL43B	Electric Drives	3-0-0-0	3	3	PES
		23ELL43C	Introduction to Robotics	2-1-0-0	3	3	CAI
		23ELL43D	Digital Signal Processing	2-1-0-0	3	3	CAI
		23ELL43E	Software Engineering	3-0-0-0	3	3	SAN
		23ELL43F	Real Time Operating Systems	3-0-0-0	3	3	SAN
		23ELL43G	Machine Learning	3-0-0-0	3	3	AML
		23ELL43H	Web Programming	3-0-0-0	3	3	AML

PROGRAMME ELECTIVE IV

Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit	Stream Code
A	PEC	23ELL44A	Computer Aided Design of Electrical Machine	3-0-0-0	3	3	PES
		23ELL44B	Smart Grid Technologies	3-0-0-0	3	3	PES
		23ELL44C	HVDC & FACTS	3-0-0-0	3	3	PES
		23ELL44D	Digital Image Processing	3-0-0-0	3	3	CAI
		23ELL44E	Mechatronics	3-0-0-0	3	3	CAI
		23ELL44F	Programming Paradigms	3-0-0-0	3	3	SAN
		23ELL44G	Cryptography	3-0-0-0	3	3	SAN
		23ELL44H	Computer Vision	3-0-0-0	3	3	AML
		23ELL44I	Data Analytics for Electrical Engineers	3-0-0-0	3	3	AML

PROGRAMME ELECTIVE V

Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit	Stream Code
B	PEC	23ELL45A	Energy Management	3-0-0-0	3	3	PES
		23ELL45B	Solar PV Systems	3-0-0-0	3	3	PES
		23ELL45C	Power System Protection	3-0-0-0	3	3	PES
		23ELL45D	Robotics and Artificial Intelligence	3-0-0-0	3	3	CAI
		23ELL45E	Nonlinear Systems	3-0-0-0	3	3	CAI
		23ELL45F	Cloud Computing	3-0-0-0	3	3	SAN
		23ELL45G	Deep Learning	3-0-0-0	3	3	AML
		23ELL45H	Bioinformatics	3-0-0-0	3	3	AML

PROGRAMME ELECTIVE VI

Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit	Stream Code
C	PEC	23ELL46A	Special Electric Machines	3-0-0-0	3	3	PES
		23ELL46B	Computer Aided Electrical System Design	3-0-0-0	3	3	PES
		23ELL46C	Power Quality	3-0-0-0	3	3	PES
		23ELL46D	Digital Control Systems	3-0-0-0	3	3	CAI
		23ELL46E	Vehicular Networks and Communication	3-0-0-0	3	3	CAI
		23ELL46F	Software Testing	3-0-0-0	3	3	SAN
		23ELL46G	Block Chain Technologies	3-0-0-0	3	3	SAN
		23ELL46H	Data Mining	3-0-0-0	3	3	AML

INSTITUTE ELECTIVE I

Slot	Category Code	Course Code	Course	L-T-P-J	Hours	Credit
E	IEC	23IEL31A	Introduction to Flight Dynamics and Control	3-0-0-0	3	3
		23IEL31B	Introduction to Power Processing	3-0-0-0	3	3
		23IEL31C	Electrical Drives and Control for Automation	3-0-0-0	3	3
		23IEL31D	Renewable Energy Sources	3-0-0-0	3	3

INSTITUTE ELECTIVE II

Slot	Category Code	Course Code	Course	L-T-P-J	Hours	Credit
E	IEC	23IEL42A	Architectural Lighting Design and Control	2-1-0-0	3	3
		23IEL42B	Electric Vehicles	3-0-0-0	3	3
		23IEL42C	Process Control and Automation	3-0-0-0	3	3
		23IEL42D	Sustainable Energy Management	3-0-0-0	3	3

LIST OF ELECTIVE COURSES BASED ON MICRO SPECIALIZATION STREAM

CONTROL AND INSTRUMENTATION						
Category	**No.**	**Course**	**Semester**	**L-T-P-J**	**Hours**	**Credit**
PEC	1	Signals and Systems	S5	2-1-0-0	3	3
	2	Biomedical Instrumentation	S5	3-0-0-0	3	3
	3	Advanced Microcontrollers	S6	3-0-0-0	3	3
	4	Digital Image Processing	S6	3-0-0-0	3	3
	5	Introduction to Signal Processing	S6	3-0-0-0	3	3
	6	Introduction to Robotics	S7	2-1-0-0	3	3
	7	Digital Signal Processing	S7	2-1-0-0	3	3
	8	Mechatronics	S8	3-0-0-0	3	3
	9	Robotics and Artificial Intelligence	S8	2-1-0-0	3	3
	10	Non-linear Systems	S8	3-0-0-0	3	3
	11	Vehicular Networks and Communication	S8	3-0-0-0	3	3

SYSTEMS AND NETWORKS						
Category	**No.**	**Course**	**Semester**	**L-T-P-J**	**Hours**	**Credit**
PEC	1	Introduction to Security in Computing	S5	3-0-0-0	3	3
	2	Operating Systems	S5	3-0-0-0	3	3
	3	Wireless Sensor Networks	S5	3-0-0-0	3	3
	4	Software Engineering	S7	3-0-0-0	3	3
	5	Real Time Operating Systems	S7	3-0-0-0	3	3
	6	Web Programming	S7	3-0-0-0	3	3
	7	Programming Paradigms	S8	3-0-0-0	3	3
	8	Cryptography	S8	3-0-0-0	3	3
	9	Cloud Computing	S8	3-0-0-0	3	3
	10	Software Testing	S8	3-0-0-0	3	3
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING						
Category	**No.**	**Course**	**Semester**	**L-T-P-J**	**Hours**	**Credit**
PEC	1	Introduction to Machine Learning	S5	3-0-0-0	3	3
	2	Introduction to Artificial Intelligence	S6	3-0-0-0	3	3
	3	Soft Computing Techniques	S6	3-0-0-0	3	3
	4	Machine Learning	S7	3-0-0-0	3	3
	5	Computer Vision	S8	3-0-0-0	3	3
	6	Data Analytics for Electrical Engineers	S8	3-0-0-0	3	3
	7	Deep Learning	S8	3-0-0-0	3	3
	8	Data Mining	S8	3-0-0-0	3	3
POWER AND ENERGY SYSTEMS						
Category	**No.**	**Course**	**Semester**	**L-T-P-J**	**Hours**	**Credit**
PEC	1	Renewable Energy Conversions	S5	3-0-0-0	3	3
	2	Electromagnetic Theory and Compatibility	S6	3-0-0-0	3	3
	3	Energy Storage Systems	S6	3-0-0-0	3	3
	4	Modern Illumination Control	S6	3-0-0-0	3	3
	5	Electric and Hybrid Vehicles	S7	3-0-0-0	3	3
	6	Electric Drives	S7	3-0-0-0	3	3
	7	Computer Aided Design of Electrical Machine	S8	3-0-0-0	3	3
	8	Smart Grid Technologies	S8	3-0-0-0	3	3
	9	HVDC & FACTS	S8	3-0-0-0	3	3
	10	Energy Management	S8	3-0-0-0	3	3
	11	Solar PV Systems	S8	3-0-0-0	3	3
	12	Power System Protection	S8	3-0-0-0	3	3

B.Tech (MINOR)

Semester	BASKET I				BASKET II				BASKET III				BASKET IV			
	Embedded Systems for Industrial Applications				Architectural Lighting and Electrical System Design				Clean and Sustainable Energy				Electric Vehicle Systems			
	Course Code	Course	L-T-P	Credit	Course Code	Course	L-T-P	Credit	Course Code	Course	L-T-P	Credit	Course Code	Course	L-T-P	Credit
S3	23EEL2MA	Micro Controllers and Embedded Systems	3-0-0-0	3	23EEL2MC	Basics of Illumination Science and Lighting Design	3-0-0-0	3	23EEL2ME	Sustainable Energy Systems	3-0-0-0	3	23EEL2MG	Electric Machinery	3-0-0-0	3
S4	23EEL2MB	Hardware Interfacing using Arduino-C Platform	3-0-0-0	3	23EEL2MD	Electric Power Supply and Distribution Systems	3-0-0-0	3	23EEL2MF	Renewable Energy in Power Grids	3-0-0-0	3	23EEL2MH	Power Electronics and Energy Storage Devices	3-0-0-0	3
S5	23EEL3MA	Raspberry Pi - Python Interface for Electrical Engineering	3-0-0-0	3	23EEL3MC	Energy efficiency in Buildings	3-0-0-0	3	23EEL3ME	Solar and Wind Energy Conversion Systems	2-1-0-0	3	23EEL3MG	Hybrid and Electric Vehicles	3-0-0-0	3
S6	23EEL3MB	Cloud Computing for Internet of Things	3-0-0-0	3	23EEL3MD	Electrical System Design and Building services	2-1-0-0	3	23EEL3MF	Smart Grid and Energy Storage Systems	3-0-0-0	3	23EEL3MH	Introduction to Automotive Electrical & Electronic systems	3-0-0-0	3
S7/S8	23EEL4MA	Mini Project	0-0-6-0	3	23EEL4MC	Mini Project	0-0-6-0	3	23EEL4ME	Mini Project	0-0-6-0	3	23EEL4MG	Mini Project	0-0-6-0	3

B.Tech (HONOURS)

Semester	GROUP I				GROUP II				GROUP III			
	Specialization: Control and Autonomous Systems				Specialization: Machine Learning				Specialization: Smart Grids			
	Course Code	Course	L-T-P-J	Credit	Course Code	Course	L-T-P-J	Credit	Course Code	Course	L-T-P-J	Credit
S4	23ELL2HB	Automatic Control Systems	2-1-0-0	3	23ELL2HD	Basics of Machine Learning	2-1-0-0	3	23ELL2HF	Network Communication in Smart Grid	2-1-0-0	3
S5	23ELL3HA	Process Automation	3-0-0-0	3	23ELL3HC	Mathematics for Machine Learning	3-0-0-0	3	23ELL3HE	Micro Grids	3-0-0-0	3
S6	23ELL3HB	Introduction to Navigation and Trajectory planning	2-1-0-0	3	23ELL3HD	Machine Learning Programming	2-1-0-0	3	23ELL3HF	Distributed Generation and Smart Grid	2-1-0-0	3
S7	23ELL4HA	Aircraft Dynamics & Control	3-0-0-0	3	E23ELL4C	Deep Learning	2-1-0-0	3	23ELL4HE	Operation and Control of AC/DC Smart Grids	3-0-0-0	3
S8	23ELL4HB	Mini Project	0-1-4-0	3	23ELL4HD	Mini Project	0-1-4-0	3	23ELL4HF	Mini Project	0-1-4-0	3

** **Honours Group IV of EEE** can be opted by the students of Electrical and Computer Engineering