CURRICULUM
2020 Scheme
(Autonomous)
Version 1.0

B.TECH
ELECTRICAL AND ELECTRONICS ENGINEERING

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

Mar Ivanios Vidyanagar, Nalanchira, Thiruvananthapuram – 695015

CURRICULUM

FOR

B. TECH DEGREE PROGRAMME

IN

ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTERS I TO VIII

2020 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 ELECTRONICS ENGINEERING

CURRICULUM

Items	Board of Studies (BOS)	Academic Council (AC)
Date of Approval	13.11.2020	30.12.2020
	29.01.2021	17.02.2021
	19.11.2021	22.04.2022
	22.02.2023	29.08.2022

Head of Department
Chairman, Board of Studies
Dr. NISHA G. K
Head of the Department
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Principal
Chairman, Academic Council
Dr. Abraham T. Mathew
Principal
Mar Baselios College of
Engineering & Technology
(Autonomous)
Mar Ivanios Vidyanagar
Thiruvananthapuram-695 015

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

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.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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)

PEO1: Graduates will succeed as Professionals in Industry or as Entrepreneurs in Electrical and Electronics Engineering and related disciplines.

PEO2: Graduates will be able to adapt to the advances in Technology by continuously acquiring knowledge and skills, with an urge for innovation.

PEO3: Graduates will be socially committed individuals, exhibiting professional ethics in addressing 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)

PSO1: To apply the knowledge in Electrical and Electronics Engineering for the design of Power Generation, Transmission, Distribution and Utilization systems.

PSO2: To demonstrate the knowledge required to design, develop, test, and implement Electrical & Electronics systems.

CURRICULUM

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech. Programme in Electrical and Electronics Engineering

For the students admitted from 2020-21

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	Total credits
1	Humanities and Social Sciences including Management Courses	HSC	8
2	Basic Science Courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Programme Core Courses, Comprehensive Course Work and Viva Voce	PCC	76
5	Programme Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project Work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with Grade	MNC	---
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits		**162**
	Value Added Courses (Optional) – Honours/Minor	VAC	20

ii) Semester-wise Credit Distribution

Semester	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	***Total Credits***
Credits for Courses	17	21	22	22	23	23	15	17	**160**
Activity Points (Min.)	40				60				**100**
Credits for Activities	2								**2**
Total Credits									**162**
Value Added Courses (Optional) – Honours / Minor									**20**
Total Credits									**182**

SEMESTER I						
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P**	**Hours**	**Credit**
A	BSC	MA0U10A	Linear Algebra and Calculus	3-1-0	4	4
B 1/2	BSC	PH0U10A	Engineering Physics A	3-1-0	4	4
		CY0U10A	Engineering Chemistry	3-1-0	4	4
C 1/2	ESC	ES0U10A	Engineering Mechanics	2-1-0	3	3
		ES0U10B	Engineering Graphics	2-0-2	4	3
D 1/2	ESC	ES0U10C	Basics of Civil and Mechanical Engineering	4-0-0	4	4
		ES0U10D	Basics of Electrical and Electronics Engineering	4-0-0	4	4
E	HSC	HS0U10A	Life Skills	2-0-2	4	---
S 1/2	BSC	PH0U18A	Engineering Physics Lab	0-0-2	2	1
		CY0U18A	Engineering Chemistry Lab	0-0-2	2	1
T 1/2	ESC	ES0U18A	Civil and Mechanical Workshop	0-0-2	2	1
		ES0U18B	Electrical and Electronics Workshop	0-0-2	2	1
			TOTAL		**23/24**	**17**

SEMESTER II						
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P**	**Hours**	**Credit**
A	BSC	MA0U10B	Vector Calculus, Differential Equations and Transforms	3-1-0	4	4
B 1/2	BSC	PH0U10A	Engineering Physics A	3-1-0	4	4
		CY0U10A	Engineering Chemistry	3-1-0	4	4
C 1/2	ESC	ES0U10A	Engineering Mechanics	2-1-0	3	3
		ES0U10B	Engineering Graphics	2-0-2	4	3
D 1/2	ESC	ES0U10C	Basics of Civil and Mechanical Engineering	4-0-0	4	4
		ES0U10D	Basics of Electrical and Electronics Engineering	4-0-0	4	4
E	HSC	HS0U10B	Professional Communication	2-0-2	4	---
F	ESC	ES0U10E	Programming in **C**	2-1-2	5	4
S 1/2	BSC	PH0U18A	Engineering Physics Lab	0-0-2	2	1
		CY0U18A	Engineering Chemistry Lab	0-0-2	2	1
T 1/2	ESC	ES0U18A	Civil and Mechanical Workshop	0-0-2	2	1
		ES0U18B	Electrical and Electronics Workshop	0-0-2	2	1
			TOTAL		**28/29**	**21**

SEMESTER III						
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P**	**Hours**	**Credit**
A	BSC	MA0U20A	Partial Differential Equations and Complex Analysis	3-1-0	4	4
B	PCC	EE1U20A	Circuits and Networks	2-2-0	4	4
C	PCC	EE1U20B	Measurements and Instrumentation	3-1-0	4	4
D	PCC	EE1U20C	Analog Electronics	3-1-0	4	4
E 1/2	ESC	ES0U20A	Design and Engineering	2-0-0	2	2
	HSC	HS0U20A	Professional Ethics	2-0-0	2	2
F	MNC	NC0U20A	Sustainable Engineering	2-0-0	2	---
S	PCC	EE1U28A	Circuits and Measurements Lab	0-0-3	3	2
T	PCC	EE1U28B	Analog Electronics Lab	0-0-3	3	2
R/M	VAC		Remedial/Minor Course	3-1-0/ 4-0-0	4	4
			TOTAL		**26/30**	**22/26**

SEMESTER IV						
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P**	**Hours**	**Credit**
A	BSC	MA0U20C	Probability, Random Processes and Numerical Methods	3-1-0	4	4
B	PCC	EE1U20D	DC Machines and Transformers	2-2-0	4	4
C	PCC	EE1U20E	Electromagnetic Theory	3-1-0	4	4
D	PCC	EE1U20F	Digital Electronics	3-1-0	4	4
E 1/2	ESC	ES0U20A	Design and Engineering	2-0-0	2	2
	HSC	HS0U20A	Professional Ethics	2-0-0	2	2
F	MNC	NC0U20B	Constitution of India	2-0-0	2	-
S	PCC	EE1U28C	Electrical Machines Lab I	0-0-3	3	2
T	PCC	EE1U28D	Digital Electronics Lab	0-0-3	3	2
R/M/H	VAC		Remedial/Minor/Honours Course	3-1-0/ 4-0-0	4	4
			TOTAL		**26/30**	**22/26**

SEMESTER V						
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P**	**Hours**	**Credit**
A	PCC	EE1U30A	Power Systems I	3-1-0	4	4
B	PCC	EE1U30B	Microprocessors and Microcontrollers	3-1-0	4	4
C	PCC	EE1U30C	Signals and Systems	3-1-0	4	4
D	PCC	EE1U30D	Synchronous and Induction Machines	3-1-0	4	4
E 1/2	HSC	HS0U30A	Industrial Economics & Foreign Trade	3-0-0	3	3
		HS0U30B	Management for Engineers	3-0-0	3	3
F	MNC	NC0U30A	Disaster Management	2-0-0	2	-
S	PCC	EE1U38A	Microprocessors and Microcontrollers Lab	0-0-3	3	2
T	PCC	EE1U38B	Electrical Machines Lab II	0-0-3	3	2
R/M/H	VAC		Remedial/Minor/Honours Course	3-1-0/ 4-0-0	4	4
TOTAL					**27/31**	**23/27**

SEMESTER VI						
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P**	**Hours**	**Credit**
A	PCC	EE1U30E	Linear Control Systems	2-2-0	4	4
B	PCC	EE1U30F	Power Systems II	3-1-0	4	4
C	PCC	EE1U30G	Power Electronics	3-1-0	4	4
D	PEC	EE1UXXX	Program Elective I	3-0-0	3	3
E 1/2	HSC	HS0U30A	Industrial Economics & Foreign Trade	3-0-0	3	3
		HS0U30B	Management for Engineers	3-0-0	3	3
F	PCC	EE1U30H	Comprehensive Course work	1-0-0	1	1
S	PCC	EE1U38C	Power Systems Lab	0-0-3	3	2
T	PCC	EE1U38D	Power Electronics Lab	0-0-3	3	2
R/M/H	VAC		Remedial/Minor/Honours Course	3-1-0/ 4-0-0	4	4
TOTAL					**25/29**	**23/27**

PROGRAMME ELECTIVE I

Slot	Category Code	Course Number	Courses	L-T-P	Hours	Credit
D	PEC	EE1U31A	Biomedical Instrumentation	3-0-0	3	3
		EE1U31B	Renewable Energy Sources	3-0-0	3	3
		EE1U31C	Computer Organization	3-0-0	3	3
		EE1U31D	High Voltage Engineering	3-0-0	3	3
		EE1U31E	Object Oriented Programming	3-0-0	3	3
		EE1U31F	Material Science	3-0-0	3	3
		EE1U31G	Soft Computing	3-0-0	3	3

SEMESTER VII						
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P**	**Hours**	**Credit**
A	PCC	EE1U40A	Advanced Control Systems	2-1-0	3	3
B	PEC	EE1UXXX	Program Elective II	2-1-0/ 3-0-0	3	3
C	OEC	EE0UXXX	Open Elective	2-1-0/ 3-0-0	3	3
D	MNC	NC0U40A	Industrial Safety Engineering	2-1-0	3	-
S	PCC	EE1U48A	Control Systems Lab	0-0-3	3	2
T	PWS	EE1U49A	Seminar	0-0-3	3	2
U	PWS	EE1U49B	Project Phase I	0-0-6	6	2
R/M/H	VAC		Remedial/Minor/Honours Course	0-1-6/ 3-1-0/ 4-0-0	7/4	4
			TOTAL		**24/(31/28)**	**15/19**

PROGRAMME ELECTIVE II

Slot	Category Code	Course Number	Courses	L-T-P	Hours	Credit
B	PEC	EE1U41A	Electric Drives	2-1-0	3	3
		EE1U41B	Digital Control Systems	2-1-0	3	3
		EE1U41C	Modern Operating Systems	3-0-0	3	3
		EE1U41D	Data Structures	2-1-0	3	3
		EE1U41E	Digital Signal Processing	2-1-0	3	3
		EE1U41F	Illumination Technology	2-1-0	3	3
		EE1U41G	Digital Protection of Power Systems	3-0-0	3	3

OPEN ELECTIVE

Slot	Category Code	Course Number	Courses	L-T-P	Hours	Credit
C	OEC	EE0U41A	Control Systems Engineering	2-1-0	3	3
		EE0U41B	Introduction to Power Processing	2-1-0	3	3
		EE0U41C	Renewable Energy Systems	3-0-0	3	3
		EE0U41D	Electric Vehicles	2-1-0	3	3
		EE0U41E	Energy Management	3-0-0	3	3

SEMESTER VIII						
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P**	**Hours**	**Credit**
A	PCC	EE1U40B	Electrical System Design and Estimation	2-1-0	3	3
B	PEC	EE1UXXX	Program Elective III	2-1-0/ 3-0-0	3	3
C	PEC	EE1UXXX	Program Elective IV	2-1-0/ 3-0-0	3	3
D	PEC	EE1UXXX	Program Elective V	2-1-0/ 3-0-0	3	3
T	PCC	EE1U40C	Comprehensive Course Viva	1-0-0	1	1
U	PWS	EE1U49C	Project Phase II	0-0-12	12	4
R/M/H	VAC		Remedial/Minor/Honours Course	0-1-6	7	4
TOTAL					**25/32**	**17/21**

PROGRAMME ELECTIVE III

Slot	Category Code	Course Number	Courses	L-T-P	Hours	Credit
B	PEC	EE1U42A	Robotics	2-1-0	3	3
		EE1U42B	Energy Management	3-0-0	3	3
		EE1U42C	Smart Grid Technologies	2-1-0	3	3
		EE1U42D	Electrical Machine Design	2-1-0	3	3
		EE1U42E	Switch Mode Power Converters	3-0-0	3	3
		EE1U42F	Computer Aided Power System Analysis	2-1-0	3	3
		EE1U42G	Machine Learning	3-0-0	3	3

PROGRAMME ELECTIVE IV

Slot	Category Code	Course Number	Courses	L-T-P	Hours	Credit
C	PEC	EE1U43A	Nonlinear Systems	2-1-0	3	3
		EE1U43B	Special Electrical Machines	3-0-0	3	3
		EE1U43C	Power Quality	3-0-0	3	3
		EE1U43D	Computer Networks	3-0-0	3	3
		EE1U43E	Design of Power Electronic Systems	2-1-0	3	3
		EE1U43F	HVDC & FACTS	3-0-0	3	3
		EE1U43G	Advanced Electronic Design	2-1-0	3	3

PROGRAMME ELECTIVE V

Slot	Category Code	Course Number	Courses	L-T-P	Hours	Credit
D	PEC	EE1U44A	Electric and Hybrid Vehicles	3-0-0	3	3
		EE1U44B	Internet of Things	3-0-0	3	3
		EE1U44C	Energy Storage Systems	3-0-0	3	3
		EE1U44D	Robust and Adaptive Control	2-1-0	3	3
		EE1U44E	Solar PV Systems	2-1-0	3	3
		EE1U44F	Industrial Instrumentation and Automation	3-0-0	3	3
		EE1U44G	Big Data Analytics	3-0-0	3	3

B.Tech (MINOR)

Semester	BASKET I Electrical Machines and Drives				BASKET II Power Systems				BASKET III Control Systems				BASKET IV Architectural Lighting and Electrical System Design			
	Course Number	Course	L-T-P	Credit	Course Number	Course	L-T-P	Credit	Course Number	Course	L-T-P	Credit	Course Number	Course	L-T-P	Credit
S3	EE0M 20A	Electric Circuits	3-1-0	4	EE0M 20B	Introduction to Power Engineering	3-1-0	4	EE0M 20C	Dynamic Circuits and Systems	4-0-0	4	EE0M 20D	Basics of Illumination Science and Lighting Design	4-0-0	4
S4	EE0M 20E	Electrical Machines	3-1-0	4	EE0M 20F	Energy Systems	4-0-0	4	EE0M 20G	Principles of Instrumentation	4-0-0	4	EE0M 20H	Electric Power Supply and Distribution Systems	4-0-0	4
S5	EE0M 30A	Solid State Power Conversion	3-1-0	4	EE0M 30B	Solar and Wind Energy Conversion Systems	3-1-0	4	EE0M 30C	Control Systems	3-1-0	4	EE0M 30D	Energy efficiency in Buildings	4-0-0	4
S6	EE0M 30E	Power Semiconductor Drives	3-1-0	4	EE0M 30F	Instrumentation and Automation of Power Plants	4-0-0	4	EE0M 30G	Digital Control	4-0-0	4	EE0M 30H	Electrical System Design and Building services	3-1-0	4
S7	EE0M 49A	Mini Project	0-1-6	4	EE0M 49A	Mini Project	0-1-6	4	EE0M 49A	Mini Project	0-1-6	4	EE0M 49A	Mini Project	0-1-6	4
S8	EE0M 49B	Mini Project	0-1-6	4	EE0M 49B	Mini Project	0-1-6	4	EE0M 49B	Mini Project	0-1-6	4	EE0M 49B	Mini Project	0-1-6	4

B.Tech (HONOURS)

Semester	GROUP I				GROUP II				GROUP III				GROUP IV			
	Course Number	Course	L-T-P	Credit	Course Number	Course	L-T-P	Credit	Course Number	Course	L-T-P	Credit	Course Number	Course	L-T-P	Credit
S4	EE1H20A	Network Analysis and Synthesis	3-1-0	4	EE1H20A	Network Analysis and Synthesis	3-1-0	4	EE1H20A	Network Analysis and Synthesis	3-1-0	4	EE1H20A	Network Analysis and Synthesis	3-1-0	4
S5	EE1H30A	Digital Simulation	4-0-0	4	EE1H30A	Digital Simulation	4-0-0	4	EE1H30A	Digital Simulation	4-0-0	4	EE1H30A	Digital Simulation	4-0-0	4
S6	EE1H30B	Generalized Machine Theory	3-1-0	4	EE1H30C	Analysis of Power Electronic Circuits	3-1-0	4	EE1H30D	Operation and Control of Power Systems	3-1-0	4	EE1H30E	Electric Vehicle Technology	4-0-0	4
S7	EE1H40A	Operation and Control of Generators	4-0-0	4	EE1H40B	Dynamics of Power Converters	3-1-0	4	EE1H40C	Control and Dynamics of Micro grids	4-0-0	4	EE1H40D	Smart Grid and Interfacing	4-0-0	4
S8	EE1H49A	Mini Project	0-1-6	4	EE1H49A	Mini Project	0-1-6	4	EE1H49A	Mini Project	0-1-6	4	EE1H49A	Mini Project	0-1-6	4