CURRICULUM
2023
(Autonomous)
Version 1.0

B.TECH
ELECTRONICS AND COMMUNICATION ENGINEERING

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

Mar IvaniosVidyanagar, Nalanchira, Thiruvananthapuram – 695 015

August 2023

CURRICULUM

FOR

B. TECH DEGREE PROGRAMME

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTERS I& 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 ELECTRONICS AND COMMUNICATION ENGINEERING

B. TECH DEGREE PROGRAMME

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

CURRICULUM

Items	Board of Studies (BoS)	Academic Council (AC)
Date of Approval	11.07.2023	09.08.2023

Sd/-
Head of Department
Chairman, Board of Studies

Sd/-
Principal
Chairman, Academic Council

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 ELECTRONICS AND COMMUNICATION ENGINEERING

Vision and Mission of the Department

Vision:

To be a Centre of Excellence in Electronics and Communication Engineering Education and Research for the service of humanity.

Mission:

To provide quality Engineering Education and to carry out Research in the field of Electronics and Communication Engineering addressing the challenges faced by the society.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: The graduates of the Programme will have a successful career as Professionals in Industry or as Entrepreneurs, encompassing a broad spectrum of areas related to Electronics and Communication Engineering.

PEO2: They will be able to adapt to the changing needs of Industry and Academia through continuous learning and professional upgrading.

PEO3: They will exhibit social responsibility in their pursuit of technical excellence.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will have the ability to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complexengineering 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 anddesign 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 researchmethods 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 modernengineering 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 assesssocietal, 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 solutionsin 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 ofthe engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineeringcommunity 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 inindependent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Design Electronic Circuits and Systems for Communication, Monitoring and Control Applications.

PSO2: Demonstrate the knowledge, in Electronics, Signal processing, Embedded Systems and Communication Engineering, required for providing technical solutions to real world problems

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.TECH. PROGRAMME IN ELECTRONICS AND COMMUNICATION 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.

Sl. No.	Category	Category Code	Total credits
1	Humanities and Social Sciences including Management Courses	HSC	**9**
2	Basic Science Courses	BSC	**26**
3	Engineering Science Courses	ESC	**19**
4	Programme Core Courses	PCC	**69**
5	Programme Elective Courses	PEC	**18**
6	Institute Elective Courses – Electives from other technical and/or emerging areas as specified in the curriculum concerned	IEC	**6**
7	Project Work Seminar and Comprehensive Viva Voce	PWS	**13**
8	Mandatory Non-credit Courses (P/F) with Grade	MNC	Non credit
9	Mandatory Student Activities (P/F)	MSA	3
	Total Mandatory Credits		**163**
	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	18	21	21	21	22	21	21	15	*160*
Credits for Activities				3					*3*
Total Credits									*163*
Value Added Courses (Optional) – Honours / Minor									*15*
Total Credits									*178*

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.

iii) 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	Cate-gory Code	Course Number	Courses	L-T-P-J	Hours	Credit
A	BSC	**23MAL10A**	Linear Algebra and Calculus	3-1-0-0	4	4
B	BSC	**23PYL10A**	Engineering Physics	3-1-0-0	4	4
D	ESC	**23ESB10D**	Problem Solving and Programming in C	2-1-2-0	5	4
E	ESC	**23ESL10J**	Basics of Electrical Engineering A	4-0-0-0	4	2
		23ESL10L	Basics of Electronics Engineering	4-0-0-0		2
G	MNC	**23NCL10A**	Environmental Science	2-0-0-0	2	---
S	BSC	**23PYP10A**	Engineering Physics Lab	0-0-2-0	2	1
T	ESC	**23ESP10B**	Electrical and ElectronicsWorkshop	0-0-2-0	2	1
TOTAL					23	18

			SEMESTER II			
Slot	**Cate-gory Code**	**Course Number**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	BSC	**23MAL10B**	Vector Calculus, Differential Equations and Transforms	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	**23ESB10G**	Python Programming	2-0-2-0	4	3
E	PCC	**23ECL10A**	Network Theory	3-1-0-0	4	4
G	MNC	**23NCJ10B**	Professional Communication	2-0-0-2	4	---
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					**29**	**21**

			SEMESTER III			
Slot	**Cate-gory**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	BSC	**23MAL20A**	Partial Differential Equation and Complex Analysis	3-1-0-0	4	4
B	PCC	**23ECL20A**	Analog Circuits	3-1-0-0	4	4
C	PCC	**23ECL20B**	Solid State Devices	2-1-0-0	3	3
D	PCC	**23ECJ20C**	Logic Circuit Design	2-1-0-1	4	4
E	ESC	**23ESL00A**	Design Engineering	2-0-0-0	2	2
G	MNC	**23NCL20A**	Professional Ethics	2-0-0-0	2	-
S	PCC	**23ECP20A**	Analog Circuits Lab	0-0-3-0	3	2
T	PCC	**23ECP20B**	Logic Circuit DesignLab	0-0-3-0	3	2
R/M/H	VAC		Remedial/ Minor Course	3-0-0-0/ 2-1-0-0	3	3
TOTAL					**25/28**	**21/23**

**SEMESTER IV**

Slot	Cate-gory	Course Code	Courses	L-T-P-J	Hours	Credit
A	BSC	**23MAL20C**	Probability, Random Processes and Numerical Methods	3-1-0-0	4	4
B	PCC	**23ECL20D**	Linear Integrated Circuits	2-1-0-0	3	3
C	PCC	**23ECL20E**	Signals and Systems	3-1-0-0	4	4
D	PCC	**23ECJ20F**	Microcontroller based system design	2-0-3-1	6	5
E	HSC	**23HSL20A**	Universal Human Values-II	2-1-0-0	3	3
G	MNC	**23NCL20B**	Industrial Safety Engineering	2-1-0-0	3	-
S	PCC	**23ECP20C**	Linear Integrated Circuits Lab	0-0-3-0	3	2
R/M/H	VAC		Remedial/ Minor/Honours Course	3-0-0-0/ 2-1-0-0	3	3
**TOTAL**						**21/24**

**SEMESTER V**

Slot	Cate-gory	Course Code	Courses	L-T-P-J	Hours	Credit
A	PCC	**23ECL30A**	Analog and Digital Communication	3-1-0-0	4	4
B	PCC	**23ECL30B**	Digital Signal Processing	3-1-0-0	4	4
C	PCC	**23ECL30C**	Electromagnetic Field Theory	3-1-0-0	4	4
D	PEC	**23ECL31X**	Program Elective I	3-0-0-0/ 2-1-0-0/	3	3
E	HSC	**23HSL00A**	Management for Engineers	3-0-0-0	3	3
S	PCC	**23ECP30A**	Communication Lab	0-0-3-0	3	2
T	PCC	**23ECP30B**	Digital Signal Processing Lab	0-0-3-0	3	2
R/M /H	VAC		Remedial/ Minor/Honours Course	3-0-0-0/ 2-1-0-0	3	3
**TOTAL**					**24/27**	**22/28**

			SEMESTER VI			
Slot	**Cate-gory**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	PCC	**23ECL30D**	Control Systems	3-1-0-0	4	4
B	PCC	**23ECJ30E**	VLSI Circuit Design	2-1-2-0	5	4
D	PEC	**23ECL32X**	Program Elective II	3-0-0-0/ 2-1-0-0	3	3
E	IEC	**23IEL31X**	Institute Elective I	3-0-0-0	3	3
F	HSC	**23HSL30A**	Business Economics and Accountancy	3-0-0-0	3	3
T	PWS	**23ECS38A**	Seminar	0-0-4-0	4	2
U	PWS	**23ECJ38B**	Mini Project	0-0-3-0	3	2
R/M /H	VAC		Remedial/ Minor/Honours Course	3-0-0-0/ 2-1-0-0	3	3
			TOTAL		**25/28**	**21/24**

			SEMESTER VII			
Slot	**Cate-gory**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	PCC	**23ECL40A**	Information Theory and Coding	3-1-0-0	4	4
B	PCC	**23ECL40B**	Wireless Communication	3-0-0-0	3	3
C	PCC	**23ECL40C**	Computer Networks	3-0-0-0	3	3
D	PEC	**23ECL43X**	Program Elective III	3-0-0-0/ 2-1-0-0/	3	3
E	IEC	**23IEL42X**	Institute Elective II	3-0-0-0/ 2-1-0-0	3	3
T	PWS	**23ECV48A**	Comprehensive Course Viva	0-0-2-0	2	1
U	PWS	**23ECJ48B**	Project Phase I	0-0-4-0	4	2
S	PCC	**23ECP40A**	Advanced Communication Lab	0-0-3-0	3	2
R/M/ H	VAC		Remedial /Minor/Honours Course	0-1-0-6/ 3-1-0-0	7/3	3
		TOTAL			**25/ (32/28)**	**21/24**

SEMESTER VIII						
Slot	**Cate-gory**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	PEC	**23ECL44X**	Program Elective IV	3-0-0-0/ 2-1-0-0	3	3
B	PEC	**23ECL45X**	Program Elective **V**	3-0-0-0/ 2-1-0-0	3	3
C	PEC	**23ECL46X**	Program Elective VI	3-0-0-0/ 2-1-0-0	3	3
U	PWS	**23ECJ48C**	Project Phase II	0-0-12-0	12	6
R/M/ H	VAC		Remedial / Minor/Honours Course	0-0-0-6	6	3
TOTAL					**21/(27)**	**15/18**

MICRO SPECIALIZATION STREAM		
No.	**STREAM**	**CODE**
1.	Communication Systems and High Frequency systems	CS & HFSS
2.	VLSI and Embedded systems	VLSI & ES
3.	Applied Electronics	AE
4.	Signal Processing	SP
5.	Entrepreneurship and Management	EN & MN
6.	Computing	CT

PROGRAMME ELECTIVE I

Category Code	Course Number	Courses	L-T-P-J	Hours	Credit	Stream
PEC	**23ECL31A**	Digital System Design	2-1-0-0	3	3	VLSI & ES
	23ECL31B	Power Electronics	3-0-0-0	3	3	AE
	23ECL31C	Entrepreneurship	2-1-0-0	3	3	EN & MN
	23ECL31D	DSP architectures	3-0-0-0	3	3	SP
	23ECL31E	Computer Architecture	3-0-0-0	3	3	VLSI & ES
	23ECL31F	Data Structures using C	2-1-0-0	3	3	CT
	23ECL31G	Optimization Techniques	3-0-0-0	3	3	CS & HFSS
	23ECL31H	Bio medical Engineering	3-0-0-0	3	3	AE

PROGRAMME ELECTIVE II

Category Code	Course Number	Courses	L-T-P-J	Hours	Credit	Stream
PEC	23ECL32A	Digital Image Processing	2-1-0-0	3	3	SP
	23ECL32B	Data Analysis using Python	2-1-0-0	3	3	CT
	23ECL32C	Embedded Systems	3-0-0-0	3	3	VLSI & ES
	23ECL32D	Introduction to MEMS	3-0-0-0	3	3	VLSI & ES
	23ECL32E	Mechatronics	3-0-0-0	3	3	AE
	23ECL32F	Satellite Communication	3-0-0-0	3	3	CS & HFSS
	23ECL32G	Antenna and Wave Propagation	2-1-0-0	3	3	CS & HFSS
	23ECL32H	Multirate Systems	2-1-0-0	3	3	SP

PROGRAMME ELECTIVE III

Category Code	Course Number	Courses	L-T-P-J	Hours	Credit	Stream
PEC	23ECL43A	Real Time Operating System	3-0-0-0	3	3	VLSI & ES
	23ECL43B	Assistive Technologies	3-0-0-0	3	3	AE
	23ECL43C	Microwave Engineering	3-0-0-0	3	3	CS & HFSS
	23ECL43D	Speech and Audio Processing	2-1-0-0	3	3	SP
	23ECL43E	Machine Learning	2-1-0-0	3	3	CT
	23ECL43F	Optical Fibre Communication	3-0-0-0	3	3	CS & HFSS
	23ECL43G	Quantum Computing	3-0-0-0	3	3	VLSI & ES
	23ECL43H	Wavelet Theory	2-1-0-0	3	3	SP

PROGRAMME ELECTIVE IV

Category Code	Course Number	Courses	L-T-P-J	Hours	Credit	Stream
PEC	23ECL44A	Organic Electronics	3-0-0-0	3	3	AE
	23ECL44B	Pattern Recognition	3-0-0-0	3	3	SP
	23ECL44C	RFMEMS	3-0-0-0	3	3	VLSI & ES
	23ECL44D	Secure Communication	2-1-0-0	3	3	CS & HFSS
	23ECL44E	Deep Learning	3-0-0-0	3	3	CT
	23ECL44F	Robotics	3-0-0-0	3	3	AE
	23ECL44G	Wireless Sensor Networks	3-0-0-0	3	3	CS & HFSS
	23ECL44H	Mixed Signal Circuit	2-1-0-0	3	3	VLSI & ES

PROGRAMME ELECTIVE V

Category Code	Course Number	Courses	L-T-P-J	Hours	Credit	Stream
PEC	23ECL45A	Low Power VLSI	3-0-0-0	3	3	VLSI & ES
	23ECL45B	Cyber Security	3-0-0-0	3	3	CS & HFSS
	23ECL45C	Adaptive Signal Processing	2-1-0-0	3	3	SP
	23ECL45D	IoT	3-0-0-0	3	3	VLSI & ES
	23ECL45E	RF Circuit Design	3-0-0-0	3	3	CS & HFSS
	23ECL45F	Entertainment Electronics	3-0-0-0	3	3	AE
	23ECL45G	Advanced Coding Theory	2-1-0-0	3	3	CS & HFSS
	23ECL45H	Digital Video Processing	2-1-0-0	3	3	SP

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PROGRAMME ELECTIVE VI

Category Code	Course Number	Courses	L-T-P-J	Hours	Credit	Stream
PEC	23ECL46A	Intellectual Property Rights	3-0-0-0	3	3	EN & MN
	23ECL46B	Introduction to Queuing theory	3-0-0-0	3	3	CT
	23ECL46C	Computer Vision	3-0-0-0	3	3	SP
	23ECL46D	Modern Communication Systems	3-0-0-0	3	3	CS & HFSS
	23ECL46E	Microwave Devices and Circuits	3-0-0-0	3	3	CS & HFSS
	23ECL46F	Nano Electronics	3-0-0-0	3	3	VLSI & ES
	23ECL46G	Instrumentation	3-0-0-0	3	3	AE
	23ECL46H	Analog CMOS Design	3-0-0-0	3	3	VLSI & ES