CURRICULUM 2023 (Autonomous)

Draft

Version 1.0

B.Tech
ELECTRONICS AND COMMUNICATION ENGINEERING

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

Mar Ivanios Vidyanagar, Nalanchira, Thiruvananthapuram – 695 015

August 2023

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, 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: 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

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

THIRUVANANTHAPURAM-695015

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CURRICULUM 2023 UNDER AUTONOMY STATUS (DRAFT)

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**(5.625%)
2	Basic Science Courses	BSC	**26**(16.25%)
3	Engineering Science Courses	ESC	**19**(11.875%)
4	Programme Core Courses	PCC	**69**(43.12%)
5	Programme Elective Courses	PEC	**18**(11.25%)
6	Institute Elective Courses	IEC	**6**(3.75%)
7	Project Work and Seminar, Comprehensive Course Work Viva Voce	PWS	**13** (8.12%)
8	Mandatory Non-credit Courses (P/F) with Grade	MNC	---
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***	***25***	***22***	***17***	***15***	***160***
Credits for Activities	*3*								***3***
Total Credits									***163***
Value Added Courses (Optional) – Honours / Minor									***15***
Total Credits									***178***

S1S2	**39**
S3S4	**42**
S5S6	**47**
S7S8	**32**

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
C	ESC	**23ESL10D**	Basics of Electrical Engineering	4-0-0-0	4	2
		23ESL10E	Basics of Electronics Engineering	4-0-0-0		2
D	ESC	**23ESB10B**	Problem Solving and Programming in C	2-1-2-0	5	4
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 Electronics Workshop	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	PCC	23ECL10A	Network Theory	3-1-0-0	4	4
F	ESC	23ESB10F	Python Programming	2-0-2-0	4	3
G	MNC	23NCJ10B	Professional Communication	2-0-0-J	4	---
S	BSC	23CYP10A	Engineering Chemistry Lab	0-0-2-0	2	1
T	ESC	23ESB10C	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 and 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 Design 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					**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**	Business Economics and Accountancy	3-0-0-0	3	3
F	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					**27/30**	**25/28**

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
C	PCC	**23ECL30F**	Information Theory and Coding	3-1-0-0	4	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
S	PWS	**23ECS38A**	Seminar	0-0-4-0	4	2
T	PWS	**23ECJ38A**	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					**26/29**	**22/25**

SEMESTER VII						
Slot	**Cate - gory**	**Course Code**	**Courses**	**L-T-P-J**	**Hours**	**Credit**
A	PCC	**23ECL40A**	Wireless Communication	3-0-0-0	3	3
B	PCC	**23ECL40B**	Computer Networks	3-0-0-0	3	3
C	PEC	**23ECL43X**	Program Elective III	3-0-0-0/ 2-1-0-0/	3	3
D	IEC	**23IEL42X**	Institute Elective II	3-0-0-0/ 2-1-0-0	3	3
S	PW S	**23ECV48A**	Comprehensive Course Viva	0-0-2-0	2	1
T	PW S	**23ECJ48A**	Project Phase I	0-0-4-0	4	2
U	PCC	**23ECP40A**	Advanced Communication Lab	0-0-3-0	3	2
R/M /H	VA C		Remedial /Minor/Honours Course	0-1-0-6/ 3-1-0-0	7/3	3
TOTAL					**21/ (28 / 24)**	**17/20**

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
S	PW S	**23ECJ48B**	Project Phase II	0-0-12-0	12	6
R/M /H	VA C		Remedial / Minor / Honours Course	0-0-0-6	6	3
TOTAL					**21/(27)**	**15/18**

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	Introduction to Queuing	3-0-0-0	3	3	CS & HFSS

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 Programming	2-1-0-0	3	3	CT
	23ECL32C	Embedded Systems	3-0-0-0	3	3	VLSI & ES
	23ECL32D	Bio medical Engineering	3-0-0-0	3	3	AE
	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

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

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	Introduction to MEMS	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

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	3-0-0-0	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

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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
	23ECL45B	Optimization Techniques	3-0-0-0	3	3	CT
	23ECL45C	Computer Vision	3-0-0-0	3	3	SP
	23ECL45D	Modern Communication Systems	3-0-0-0	3	3	CS & HFSS
	23ECL45E	Microwave Devices and Circuits	3-0-0-0	3	3	CS & HFSS
	23ECL45F	Nano Electronics	3-0-0-0	3	3	VLSI & ES
	23ECL45G	Instrumentation	3-0-0-0	3	3	AE

INSTITUTE ELECTIVE I

Slot	Category Code	Course Number	Courses	L-T-P-J	Hours	Credit
E	IEC	**23IEL31A**	Medical Image Processing	3-0-0-0	3	3
		23IEL31B	Biomedical Instrumentation	3-0-0-0	3	3
		23IEL31C	Introduction to MATLAB and Simulink	2-1-0-0	3	3
		23IEL31D	IoT and Applications	3-0-0-0	3	3
		23IEL31E	Soft Computing	2-1-0-0	3	3

INSTITUTE ELECTIVE II

Slot	Category Code	Course Number	Courses	L-T-P-J	Hours	Credit
C	IEC	**23IEL41A**	MEMS	3-0-0-0	3	3
		23IEL41B	Entertainment Electronics	3-0-0-0	3	3
		23IEL41C	Electronic Hardware for Engineers	3-0-0-0	3	3
		23IEL41D	Mechatronics	3-0-0-0	3	3
		23IEL41E	Rehabilitation Engineering	3-0-0-0	3	3