DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING
2022 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Bachelor of Electronics and Communication Engineering curriculum is designed to impart knowledge,skill and attitude on the graduates to

PEO1	To provide students with a strong foundation in mathematics, as well as basic science, and enable them to apply these skills in the field of Electronics and Communication Engineering.
PEO2	To equip the students with technical competence to solve problems in electronics and communication engineering.
PEO3	To cultivate strong leadership skills in students, enabling them to effectively contribute to interdisciplinary teams.
PEO4	To prepare students to attain ethical values and moral behavior.

Programme Outcomes(POs)

Engineering Graduates will be able to:

PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO3	**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.

PO4	**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.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**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.
PO7	**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.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**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.
PO11	**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.

PO12	**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 technical knowledge to solve real-time problems in signal processing and Digital communication engineering.
PSO2	To design embedded systems and to develop algorithms to address societal and industrial needs.

P. A. COLLEGE OF ENGINEERING
MANGALURU

LIST OF COURSES
REGULATION 2022

SI.NO	SUB.CODE	SUB.NAME
1	BMATE101	MATHEMATICS-I FOR EEE STREAMS
2	BCHES102	CHEMISTRY FOR EC
3	BCEDK103	COMPUTER AIDED ENGINEERING DRAWING
4	BESCK104B	INTRODUCTION TO ELECTRICAL ENGINEERING
5	BPLCK105B	INTRODUCTION TO PYTHON PROGRAMMING
6	BENGK106	COMMUNICATIVE ENGLISH
7	BKSKK107/BKBKK107	SAMSKRUTHIKA KANNADA/BALAKE KANNADA
8	BSFHK158	SCIENTIFIC FOUNDATION FOR HEALTH
9	BMATE201	MATHEMATICS-II FOR EC
10	BPHYS202	PHYSICS FOR EC
11	BPOPS203	PRINCIPLES OF PROGRAMMING USING C
12	BESCK204C	INTRODUCTION TO ELECTRONICS COMMUNICATION
13	BETCK205J	INTRODUCTION TO EMBEDDED SYSTEM
14	BPWSK206	PROFESSIONAL WRITING SKILLS IN ENGLISH
15	BICOK207	INDIAN CONSTITUTION
16	BIDTK258	INNOVATION AND DESIGN THINKING (IDT)

17	BMATEC301 A	AV MATHEMATICS-III FOR EC ENGINEERING
18	BEC302	DIGITAL SYSTEM DESIGN USING VERILOG
19	BEC303	ELECTRONIC PRINCIPLES AND CIRCUITS
20	BEC304	NETWORK ANALYSIS
21	BECL305	ANALOG AND DIGITAL SYSTEMS DESIGN LAB
22	BEC306C	COMPUTER ORGANIZATION AND ARCHITECTURE
23	BSCK307	SOCIAL CONNECT AND RESPONSIBILITY
24	BEC358C	C++ BASICS
25	BEC401	ELECTROMAGNETICS THEORY
26	BEC402	PRINCIPLES OF COMMUNICATION SYSTEMS
27	BEC403	CONTROL SYSTEMS
28	BECL404	COMMUNICATION LAB
29	BEC405A	MICROCONTROLLERS
30	BEC456A	MICROCONTROLLER LAB
31	BBOK407	BIOLOGY FOR ENGINEERS
32	BUHK408	UNIVERSAL HUMAN VALUES

COURSE OUTCOME FOR ELECTRONICS AND COMMUNICATION ENGINEERING

DEGREE	U.G
PROGRAMME	B.E – ELECTRONICS AND COMMUNICATION ENGINEERING
ACADEMIC YEAR	2021-22
REGULATION	2021

FIRST SEMESTER

1.Course Code and Name : BMATE101 ENGINEERING MATHEMATICS FOR ECST

CO Statements	
At the end of the course, learners will be able	
CO1	apply the knowledge of calculus to solve problems related to polar curves and learn the notion of partial differentiation to compute rate of change of multivariate
CO2	analyze the solution of linear and nonlinear ordinary differential equation
CO3	get acquainted and to apply modular arithmetic to computer algorithms
CO4	make use of matrix theory for solving the system of linear equations and compute eigenvalues and eigenvectors
CO5	familiarize with modern mathematical tools namely MATHEMATICA/MATLAB/ PYTHON/ SCILAB

2.Course Code and Name : BCHES102 CHEMISTRY FOR EC

CO Statements	
At the end of the course, learners will be able	
CO1	Identify the terms processes involved in scientific and engineering and applications
CO2	Explain the phenomena of chemistry to describe the methods of engineering processes
CO3	Solve the problems in chemistry that are pertinent in engineering applications
CO4	Apply the basic concepts of chemistry to explain the chemical properties and processes
CO5	Analyze properties and multidisciplinary situations processes associated with chemical substances in engineering

3.Course Code and Name: BCEDK103 COMPUTER AIDED ENGINEERING DRAWING	
CO Statements	
At the end of the course, learners will be able	
CO1	Draw and communicate the objects with definite shape and dimensions
CO2	Recognize and Draw the shape and size of objects through different views
CO3	Develop the lateral surfaces of the object
CO4	Create a Drawing views using CAD software
CO5	Identify the interdisciplinary engineering components or systems through its graphical representation.
4.Course Code and Name: BESCK104B INTRODUCTION TO ELECTRICAL ENGINEERING	
CO Statements	
At the end of the course, learners will be able	
CO1	Understand the concepts of various energy sources and Electric circuits.
CO2	Apply the basic Electrical laws to solve circuits
CO3	Discuss the construction and operation of various Electrical Machines.
CO4	Identify suitable Electrical machine for practical implementation.
CO5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.
5.Course Code and Name: BPLCK105B INTRODUCTION TO PYTHON PROGRAMMING	
CO Statements	
At the end of the course, learners will be able	
CO1	Demonstrate proficiency in handling loops and creation of functions
CO2	Identify the methods to create and manipulate lists, tuples and dictionaries
CO3	Develop programs for string processing and file organization
CO4	Interpret the concepts of Object-Oriented Programming as used in Python.
6.Course Code and Name: BENGK106 COMMUNICATIVE ENGLISH	
CO Statements	
At the end of the course, learners will be able	
CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present

	requirement.
CO4	Understand and use all types of English vocabulary and language proficiency
CO5	Adopt the Techniques of Information Transfer through presentation

7.Course Code and Name: **BKSKK107/BKBKK107 SAMSKRUTHIKA KANNADA/BALAKE KANNADA**	
CO Statements	
At the end of the course, learners will be able	
CO1	To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
CO2	To enable learners to Listen and understand the Kannada language properly.
CO3	To speak, read and write Kannada language as per requirement.
CO4	To train the learners for correct and polite conservation
CO5	To know about Karnataka state and its language, literature and General information about this state.

8.Course Code and Name: **BSFHK158 SCIENTIFIC FOUNDATION FOR HEALTH**	
CO Statements	
At the end of the course, learners will be able	
CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

SECOND SEMESTER	

11.Course Code and Name: **BMATE201 ENGINEERING MATHEMATICS FOR EC**	
CO Statements	
At the end of the course, learners will be able	
CO1	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing area and volume.
CO2	Understand the applications of vector calculus refer to solenoidal, and irrotational vectors. Orthogonal curvilinear coordinates
CO3	Demonstrate the idea of Linear dependence and independence of sets in the vector space, and linear transformation
CO4	Apply the knowledge of numerical methods in analyzing the discrete data and solving

	the physical and engineering problems.
CO5	Get familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB /PYTHON/ SCILAB

12.Course Code and Name: BPHYS202 PHYSICS FOR EC

CO Statements

At the end of the course, learners will be able

CO1	Describe the principles of LASERS and Optical fibers and their relevant applications.
CO2	Discuss the basic principles of the Quantum Mechanics and its application in Quantum Computing.
CO3	Summarize the essential properties of superconductors and its applications in qubits.
CO4	Illustrate the application of physics in design and data analysis.
CO5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements.

13.Course Code and Name: BPOPS203 PRINCIPLES OF PROGRAMMING USING C

CO Statements

At the end of the course, learners will be able

CO1	Elucidate the basic architecture and functionalities of a computer and also recognize the hardware parts.
CO2	Apply programming constructs of C language to solve the real world problem
CO3	Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting
CO4	Explore user-defined data structures like structures, unions and pointers in implementing solutions
CO5	Design and Develop Solutions to problems using modular programming constructs using functions

14.Course Code and Name: BESCK204C INTRODUCTION TO ELECTRONICS COMMUNICATION

CO Statements

At the end of the course, learners will be able

CO1	Prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.
CO2	Equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
CO3	Professionalism & Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career.

15.Course Code and Name: **BETCK205J INTRODUCTION TO EMBEDDED SYSTEM**	
CO Statements	
At the end of the course, learners will be able	
CO1	Explain characteristics of Embedded System design
CO2	Acquire knowledge about basic concepts of circuit emulators, debugging and RTOS
CO3	Analyse embedded system software and hardware requirements
CO4	Develop programming skills in embedded systems for various applications.
CO5	Design basic embedded system for real time applications

16.Course Code and Name: **BPWSK206 PROFESSIONAL WRITING SKILLS IN ENGLISH**	
CO Statements	
At the end of the course, learners will be able	
CO1	To understand and identify the Common Errors in Writing and Speaking.
CO2	To Achieve better Technical writing and Presentation skills.
CO3	To read Technical proposals properly and make them to Write good technical reports
CO4	Acquire Employment and Workplace communication skills
CO5	To learn about Techniques of Information Transfer through presentation in different level

17.Course Code and Name: **BICOK207 INDIAN CONSTITUTION**	
CO Statements	
At the end of the course, learners will be able	
CO1	Analyse the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	Know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

18.Course Code and Name: **BIDTK258 INNOVATION AND DESIGN THINKING (IDT)**	
CO Statements	
At the end of the course, learners will be able	
CO1	Appreciate various design process procedure
CO2	Generate and develop design ideas through different technique
CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

THIRD SEMESTER
1.Course Code and Name : BMATEC301 A AV Mathematics-III for EC Engineering

CO Statements	
At the end of the course, learners will be able	
CO1	Demonstrate the Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing,and field theory.
CO2	To use Fourier transforms to analyze problems involving continuous-timesignals
CO3	To apply Z-Transform techniques to solve difference equations
CO4	Understand that physical systems can be described by differential equations and solve such equations
CO5	Make use of correlation and regression analysis to fit a suitable mathematical model for statistical data

2.Course Code and Name : BEC302 Digital System Design using Verilog	
CO Statements	
At the end of the course, learners will be able	
CO1	Simplify Boolean functions using K-map and Quine-McCluskey minimization technique.
CO2	Analyze and design for combinational logic circuits
CO3	Analyze the concepts of Flip Flops (SR, D, T and JK) and to design the synchronous sequential circuits using Flip Flops
CO4	Model Combinational circuits (adders, subtractors, multiplexers) and sequential circuits using Verilog descriptions.

3.Course Code and Name : BEC303 Electronic Principles and Circuits	
At the end of the course, learners will be able	
CO1	Understand the characteristics of BJTs and FETs for switching and amplifier circuits.
CO2	Design and analyze amplifiers and oscillators with different circuit configurations and biasing conditions
CO3	Understand the feedback topologies and approximations in the design amplifiers and oscillators
CO4	Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters and timers.
CO5	Understand the power electronic device components and its functions for basic power electronic circuits
4.Course Code and Name : BEC304 Network Analysis	
CO Statements	
At the end of the course, learners will be able	
CO1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star- deltatransformation. 2.. 3.. 4.
CO2	Solve problems by applying Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions
CO3	Analyse the circuit parameters during switching transients and apply Laplace transform to solve the given network
CO4	Evaluate the frequency response for resonant circuits and the network parameters for two port networks
5. Course Code and Name : BECL305 Analog and Digital Systems Design Lab	
CO Statements	
At the end of the course, learners will be able	
CO1	Design and analyze the BJT/FET amplifier and oscillator circuits.
CO2	Design and test Opamp circuits to realize the mathematical computations, DAC and precision rectifiers.
CO3	Design and test the combinational logic circuits for the given specifications.
CO4	Test the sequential logic circuits for the given functionality
CO5	Demonstrate the basic circuit experiments using 555 timer.
6.Course Code and Name : BEC306C Computer Organization and Architecture	
CO Statements	
At the end of the course, learners will be able	
CO1	Explain the basic organization of a computer system.
CO2	Describe the addressing modes, instruction formats and program control statement

CO3	Explain different ways of accessing an input/ output device including interrupts.
CO4	Illustrate the organization of different types of semiconductor and other secondary storage memories
CO5	Illustrate simple processor organization based on hard wired control and micro programmed control.

7.Course Code and Name : BSCK307 Social Connect and Responsibility

CO Statements

At the end of the course, learners will be able

CO1	Communicate and connect to the surrounding.
CO2	Create a responsible connection with the society.
CO3	Involve in the community in general in which they work
CO4	Notice the needs and problems of the community and involve them in problem solving
CO5	Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual andcommunity problems.
CO6	Develop competence required for group-living and sharing ofresponsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

8.Course Code and Name : BEC358C C++ Basics

CO Statements

At the end of the course, learners will be able

CO1	Write C++ program to solve simple and complex problems
CO2	Apply and implement major object-oriented concepts like message passing, function overloading, operator overloading and inheritance tosolve real-world problems
CO3	Use major C++ features such as Templates for data type independent designs and File I/O to deal with large data set
CO4	Analyze, design and develop solutions to real-world problems applying OOP concepts of C++
CO5	Apply the concept of an exception handling

FOURTH SEMESTER

1.Course Code and Name : BEC401 Electromagnetics Theory

CO Statements

At the end of the course, learners will be able

CO1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.
CO2	Apply Gauss law to evaluate Electric fields due to different chargedistributions and Volume Charge distribution by using Divergence Theorem.
CO3	Determine potential and energy with respect to point charge andcapacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations
CO4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits

| CO5 | Apply Maxwell's equations for time varying fields, EM waves in freespace and conductors and Evaluate power associated with EM waves using Poynting theorem |

2.Course Code and Name : BEC402 Principles of Communication Systems	
CO Statements	
At the end of the course, learners will be able	
CO1	Understand the principles of analog communication systems and noise modelling.
CO2	Identify the schemes for analog modulation and demodulation and compare their performance
CO3	Design of PCM systems through the processes sampling, quantization and encoding
CO4	Describe the ideal condition, practical considerations of the signal representation for baseband transmission of digital signals
CO5	Identify and associate the random variables and random process in Communication system design
3.Course Code and Name : BEC403 Control Systems	
CO Statements	
At the end of the course, learners will be able	
CO1	Deduce transfer function of a given physical system, from differentialequation representation or Block Diagram representation and SFG representation.
CO2	Calculate time response specifications and analyse the stability of the system
CO3	Draw and analyse the effect of gain on system behaviour using root loc
CO4	Perform frequency response Analysis and find the stability of the system
CO5	Represent State model of the system and find the time response of the system
4.Course Code and Name : BECL404 Communication Lab	
CO Statements	
At the end of the course, learners will be able	
CO1	Illustrate the AM generation and detection using suitable electronic circuits.
CO2	Design of FM circuits for modulation, demodulation and noise suppression
CO3	Design and test the sampling, Multiplexing and pulse modulation techniques using electronic hardware.
CO4	Design and demonstrate the electronic circuits used for RF transmitters and receivers.
5.Course Code and Name : BEC405A Microcontrollers	
CO Statements	
At the end of the course, learners will be able	
CO1	Describe the difference between Microprocessor and Microcontroller, Types of Processor Architectures and Architecture of 8051Microcontroller
CO2	Discuss the types of 8051 Microcontroller Addressing modes & Instructions with Assembly Language Programs.

CO3	Explain the programming operation of Timers/Counters and Serial port of 8051 Microcontroller
CO4	Illustrate the Interrupt Structure of 8051 Microcontroller & its programming.
CO5	Develop C programs to interface I/O devices with 8051 Microcontroller.

6.Course Code and Name : BEC456A Microcontroller Lab

CO Statements

At the end of the course, learners will be able

CO1	Write a Assembly Language/C programs in 8051 for solving simple problems that manipulate input data using different instructions.
CO2	Develop Testing and experimental procedures on 8051 Microcontroller, Analyze their operation under different cases.
CO3	Develop programs for 8051Microcontroller to implement real world problems.
CO4	DevelopMicrocontrollerapplicationsusingexternalhardwareinterface.

7.Course Code and Name : BBOK407 Biology For Engineers

CO Statements

At the end of the course, learners will be able

CO1	Elucidate the basic biological concepts via relevant industrial applications and case studies
CO2	Evaluate the principles of design and development, for exploring novel bioengineering projects
CO3	Corroborate the concepts of biomimetics for specific requirements
CO4	Think critically towards exploring innovative biobased solutions for socially relevant problems

8.Course Code and Name : BUHK408 Universal human values

CO Statements

At the end of the course, learners will be able

CO1	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and humannature in mind.
CO2	They would have better critical ability.
CO3	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
CO4	It is hoped that they would be able to apply what they have learnt to theirown self in different day-to-day settings in real life, at least a beginning would be made in this direction.