BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi)

Avalahalli, Yelahanka, Bengaluru 560064

Bachelor of Engineering

Department of Electrical & Electronics Engineering

Approved in the BoS meeting held on 23.08.2024

III and IV Semester Scheme and Syllabus
2022 Scheme (2023 Batch) - Autonomous

Vision and Mission of the Department

Vision of the Department:

To emerge as one of the finest Electrical & Electronics Engineering Departments facilitating the development of competent professionals, contributing to the betterment of society.

Mission of the Department:

Create a motivating environment for learning Electrical Sciences through teaching, research, effective use of state of the art facilities and outreach activities.

Program Educational Objectives (PEOs)

Graduates of the program will,

PEO1	Have successful professional careers in Electrical Sciences, and Information Technology enabled areas and be able to pursue higher education.
PEO2	Demonstrate ability to work in multidisciplinary teams and engage in lifelong learning.
PEO3	Exhibit concern for environment and sustainable development.

After the successful completion of the course, the graduate 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	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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 modeling 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.

Program Specific Outcomes (PSOs)

The Graduates of the Program will be able to

PSO1:	**Analyze and design electrical power systems.**
PSO2:	**Analyze and design electrical machines.**
PSO3:	**Analyze and design power electronic controllers for industrial drives.**
PSO4:	**Analyze and design analog and digital electronic systems.**

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BMS Institute of Technology and Management
(An Autonomous Institution, Affiliated to VTU Belagavi)
Avalahalli, Doddaballapur Main Road, Bengaluru, Karnataka – 560064

Ref.: BMSIT&M/Exam/2023-24/ 104 **Date:** 21.09.2024

CONTINUOUS INTERNAL EVALUATION (CIE) AND SEMESTER END EXAMINATION (SEE) PATTERN

(Applicable to UG students admitted from the 2022 batch, effective from the Academic year 2024-25 onwards)

The UG students admitted from the 2022 batch onwards are hereby informed to note the following regarding Continuous Internal Evaluation and Semester End Examination pattern:

- The Weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Examination (SEE) is 50%.
- The Minimum passing mark for the CIE is 40% of the Maximum marks (i.e. 20 marks out of 50) and for the SEE minimum passing mark is 35% of the Maximum marks (i.e. 18 out of 50 marks).
- A student will be declared to have passed the course if they secure a minimum of 40% (i.e. 40 marks out of 100) in the combined total of the CIE and SEE.

The following tables summarize the CIE and SEE Patterns for the courses of various credits:

INTEGRATED PROFESSIONAL COMPETENCE COURSE (IPCC) COURSES **4 OR 3 CREDITS**						
Evaluation Type		**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Theory Component	CIE - Internal Assessment (IA) Tests	CIE – Test 1 (1.5 hr)	40	20	-	The sum of the two internal assessment tests will be **80 Marks** and the same shall be scaled down to **20 Marks**.
		CIE – Test 2 (1.5 hr)	40			
	CIE – CCA (Comprehensive Continuous Assessment)	CCA	10	10	-	Any one assessment method can be used from the list appended below.
	Total CIE Theory			**30**	**12**	
Practical Component	CIE - Practical		30	10	-	Each laboratory experiment is to be

					assessed for **30 Marks** using appropriate rubrics.
	CIE Practical Test	20	10	-	One test after all experiments to be conducted for **20 Marks**
	Total CIE Practical		**20**	**08**	
Total CIE Theory + Practical			**50**	**20**	
SEE		100	50	18	SEE exam is a theory exam, conducted for **100 Marks**, scored marks are scaled down to **50 Marks.**
CIE + SEE			**100**	**40**	
Note: The assessment of the laboratory component for the IPCC courses shall be restricted to CIE only.					

PROFESSIONAL CORE COURSES (PCC) / ENGINEERING SCIENCE COURSES (ESC) 03 OR 02 CREDITS						
Evaluation Type		**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Theory Component	CIE – IA Tests	CIE – Test 1 (1.5 hr)	40	30	-	The sum of the two internal assessment tests will be **80 Marks** and the same will be scaled down to **30 Marks**.
		CIE – Test 2 (1.5 hr)	40			
	CIE - CCAs	CCA	20	20	-	Any Two assessment methods can be used from the list. If it is project-based, one CCA shall be given.
	Total CIE Theory			**50**	**20**	
SEE			100	50	18	SEE is a theory exam, conducted for **100 Marks**, scored marks are scaled down to **50 Marks.**
CIE + SEE				**100**	**40**	

NON-IPCC COURSES **01 CREDIT – MULTIPLE CHOICE QUESTION TYPE**						
Evaluation Type		**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Continuous Internal Evaluation Component	CIE – IA Tests (MCQs)	CIE – Test 1 (1 hr)	40	40	-	The question paper pattern for this course shall be an **MCQ** of **1 or 2 Marks (s).** The questions with 2 Marks can be framed based on a higher Bloom's level. The sum of the two internal assessment tests will be **80 Marks**, and the same will be scaled down to **40 Marks**.
		CIE – Test 2 (1 hr)	40			
	CIE - CCAs	CCA	10	10	-	Any One Assessment method can be used from the list provided below.
	Total CIE			**50**	**20**	
SEE (MCQ Type)				50	18	The question paper pattern for this course shall be an **MCQ** of **1 or 2 Marks (s).** The questions with 2 Marks can be framed based on higher Bloom's level. MCQ-type question papers of 50 questions with each question of a **01 Mark**, the examination duration is 01 hour.
CIE + SEE				**100**	**40**	

PROFESSIONAL CORE COURSE LABORATORY (PCCL) /ABILITY ENHANCEMENT COURSE LABORATORY (AEC) **01 CREDIT**					
Evaluation Type	**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Continuous Internal Evaluation	CIE - Practical	30	30		Each laboratory experiment is to be evaluated for **30 Marks** using appropriate rubrics.
	CIE - Practical Test	50	20		One test after all experiments is to be conducted for **50 Marks** and to be scaled down to **20 Marks**.
	Total CIE	-	**50**	**20**	
Semester End Examination		100	50	18	SEE to be conducted for **100 Marks**.
CIE+SEE		**100**		**40**	

NON-IPCC / ABILITY ENHANCEMENT COURSE (AEC) **01 CREDIT – DESCRIPTIVE TYPE**						
Evaluation Type		**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Theory Component	CIE – IA Tests	CIE – Test 1 (1.5 hr)	40	30	-	The sum of the two internal assessment tests will be **80 Marks** and the same will be scaled down to **30 Marks**.
		CIE – Test 2 (1.5 hr)	40			
	CIE - CCAs	CCA	20	20	-	Any Two assessment methods can be used from the list. If it is project-based, one CCA shall be given.
	Total CIE Theory			**50**	**20**	

SEE	100	50	18	SEE is a theory exam, conducted for **100 Marks for 02 Hours duration**, scored marks are scaled down to **50 Marks.**
CIE + SEE		**100**	**40**	

COMPUTER AIDED ENGINEERING DRAWING (BCEDK103/BCEDK203)
3 CREDIT

Evaluation Type		Topics/ Modules	Computer Printout	Preparatory Sketch	Max Marks	Total Marks	Marks to be Scaled Down to	Min Marks to Pass
CIE	**Sketch Book and CAD Modelling**	Projection of Points	10	05	15	200	20	-
		Projection of Lines	10	10	20			
		Projection of Planes	20	15	35			
		Projection of Solids	40	20	60			
		Isometric Projections	20	15	35			
		Development of lateral surfaces	20	15	35			
	Test 1	Module 1 & 2	24	06	30	70	20	-
		Module 3	32	08	40			
	Test 2	Module 3	32	08	40	70		
		Module 4	24	06	30			
	CCA 1	Module 5	08	02	10	10	10	-
	CCA 2	Module 5	08	02	10			
CIE Total							**50**	**20**
SEE		Module 1 & 2	24	06	30	100	**50**	**18**
		Module 3	32	08	40			
		Module 4	24	06	30			
CIE + SEE							**100**	**40**

COMPUTER AIDED MODELLING FOR MANUFACTURING (BME305) **1 CREDIT**								
Evaluation Type		**Topics/ Modules**	**Computer Printout**	**Preparatory Calculations / Sketch**	**Max Marks**	**Total Marks**	**Marks to be Scaled Down to**	**Min Marks to Pass**
CIE	**Sketch Book and CAD Modelling**	Module 1	60	30	90	200	20	
		Module 2	40	20	60			
		Module 3	40	10	50			
	Test 1	Module 1	20	10	30	60	20	-
		Module 2	20	10	30			
	Test 2	Module 1	20	10	30	60		
		Module 3	20	10	30			
	CCA	Module 1	30	10	40	40	10	-
CIE Total							**50**	**20**
SEE		Module 1	30	10	40	100	**50**	**18**
		Module 2	20	10	30			
		Module 3	20	10	30			
CIE + SEE							**100**	**40**

Learning Activities for CCAs:

A faculty member may choose the following CCAs based on the needs of the course:

1. Course project
2. Literature review
3. MOOC
4. Case studies
5. Tool exploration
6. GATE-based aptitude test
7. Open book tests
8. Industry integrated learning
9. Analysis of Industry / Technical / Business reports
10. Programming assignments with higher Bloom level
11. Group discussions
12. Industrial / Social / Rural projects

CoE 21/09/2024

Dean - AA 21/09/24

21/9/2024

Principal

Copy To:

1. The Vice-Principal, Deans, HoDs, and Associate HoDs
2. All faculty members and students of 2022, 2023, and 2024 batch.
3. Examination Section

BMS INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institution Affiliated to VTU, Belagavi)

B. E. in Electrical & Electronics Engineering

Scheme of Teaching and Examinations – 2022 Scheme

Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2022-23 onwards)

III Semester

Sl. No.	Course Category	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Credits Distribution				Examination				Contact Hours/week
					L	T	P	Total	CIE Marks	SEE Marks	Total Marks	SEE Duration	
1	PCC	BEE301	Mathematics -III for EE Engineering	TD: EE PSB: EE	3	0	0	3	50	50	100	3	3
2	IPCC	BEE302	Electric Circuit Analysis		3	0	2	4	50	50	100	3	5
3	IPCC	BEE303	Analog Electronic Circuits		3	0	2	4	50	50	100	3	5
4	PCC	BEE304	Transformers and Generators		3	0	0	3	50	50	100	2	3
5	PCCL	BEEL305	Transformers and Generators lab		0	0	2	1	50	50	100	3	2
6	ESC	BEE306x	ESC/ETC/PLC		3	0	0	3	50	50	100	3	2
7	UHV	BSCK307	Social Connect and Responsibility	Any Department	0	0	2	1	100	--	100	3	2
8	AEC/ SEC	BEE358x	Ability Enhancement Course/SkillEnhancement Course - III	TD: EE PSB: EE	0	0	2	1	50	50	100	1	2
9	NCMC	BNSK359	National Service Scheme (NSS)	NSS Coordinator	0	0	2	0	100	--	100	-	2
		BPEK359	Physical Education (PE) (Sports and Athletics)	PED									
		BYOK359	Yoga	Yoga Teacher									
		BNCK359	NCC	NCC officer									
		BMUK359	Music	Music Teacher									
TOTAL								**20**	**550**	**350**	**900**		

Non-Credit Mandatory Course (NCMC) prescribed to Lateral entry Diploma Students													
10	NCMC	BENGDIP1	English Communication Skill I	HSS	0	0	0	10	100	--	100	--	2
The lateral entry diploma students admitted to III semester are required to complete the English Communication Skill 1in III semester and English Communication Skill II in IV semester. The course shall not be considered for vertical progression as well as calculation of SGPA and CGPA, but completion of the course shall be mandatory for the award of the degree.													

Engineering Science Course (ESC/ETC/PLC)	
Course Code	**Course Title**
BEE306A	Digital Logic Circuits
BEE306B	Electrical Measurements and Instrumentation
BEE306C	Electromagnetic Field Theory
BEE306D	Physics of Electronic Devices

Ability Enhancement Course -III	
Course Code	**Course Title**
BEEL358A	SCI LAB/MATLAB for Transformers and Generators
BEEL358B	555 IC Laboratory
BEEL358C	Circuit Laboratory using P Spice
BEEL358D	Electrical Hardware Laboratory

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Mathematics - III for EE Engineering (3:0:0:0)

(Effective from the academic year 2022-23)

Course Code	BMATE301	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course Objectives:

This course aims to prepare the students to:

- To acquaint the students with differential equations and their applications in electrical engineering.
- To find the association between attributes and the correlation between two variables.
- Learn to use Fourier series to represent periodical physical phenomena in engineering analysis and to enable the student to express non periodic functions to periodic function using Fourier series and Fourier transforms.
- To learn the basic ideas of the theory of probability and random signals.

Module – 1

Module-1: Ordinary Differential Equations of Higher Order:

Higher-order linear ODEs with constant coefficients - Inverse differential operator, problems. Linear differential equations with variable Coefficients-Cauchy's and Legendre's differential equations–Problems. Application of linear differential equations to L-C circuit and L-C-R circuit.

(8 Hours)

Module – 2

Curve fitting, Correlation, and Regressions:

Principles of least squares, Curve fitting by the method of least squares in the form $y = a + bx$, $y = a + bx + cx^2$, and $y = ax^b$. Correlation, Coefficient of correlation, Lines of regression, Angle between regression lines, standard error of estimate, rank correlation.

(8 Hours)

Module – 3

Fourier series:

Periodic functions, Dirichlet's condition. Fourier series expansion of functions with period 2π and with arbitrary period: periodic rectangular wave, Half-wave rectifier, rectangular pulse, Saw tooth wave. Half-range Fourier series. Triangle and half range expansions, Practical harmonic analysis, variation of periodic current.

(8 Hours)

Moule-4

Fourier transforms and Z -transforms:

Definition, Fourier sine, and cosine transform. Inverse Fourier transforms Inverse Fourier cosine and sine transforms. Problems.

Z-transforms: Definition, Standard z-transforms, Damping, and shifting rules, Problems. Inverse z-transform and applications to solve difference equations.

(8 Hours)

Moule-5

Probability Distributions:

Review of basic probability theory. Random variables (discrete and continuous), probability mass and density functions. Mathematical expectation, mean and variance. Binomial, Poisson and normal distributions- problems (derivations for mean and standard deviation for Binomial and Poisson distributions only)-Illustrative examples. Exponential distribution.

(8 Hours)

Course outcomes:

The students will be able to:

CO1: Understand that physical systems can be described by differential equations and solve such equations.

CO2: Make use of correlation and regression analysis to fit a suitable mathematical model for statistical data.

CO3: Demonstrate the Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing, and field theory.

CO4: To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations.

CO5: Apply discrete and continuous probability distributions in analyzing the probability models arising in the engineering field.

Text books:

1. **Ronald E. Walpole, Raymond H Myers, Sharon L Myers & Keying Ye** "Probability & Statistics for Engineers & Scientists", Pearson Education, 9th edition, 2017.
2. **Peter Bruce, Andrew Bruce & Peter Gedeck** "Practical Statistics for Data Scientists" O'Reilly Media, Inc., 2nd edition 2020.

Reference Books: (Name of the author/Title of the Book/ Name of the publisher/Edition and Year)

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 9 th Edition, 2006.
2. B. S. Grewal "Higher Engineering Mathematics", Khanna publishers, 44 th Ed., 2021.
3. G Haribaskaran "Probability, Queuing Theory & Reliability Engineering", Laxmi Publication, Latest Edition, 2006.
4. Irwin Miller & Marylees Miller, John E. Freund's "Mathematical Statistics with Applications" Pearson. Dorling Kindersley Pvt. Ltd. India, 8 th edition, 2014.
5. S C Gupta and V K Kapoor, "Fundamentals of Mathematical Statistics", S Chand and Company, Latest edition.
6. Robert V. Hogg, Joseph W. McKean & Allen T. Craig. "Introduction to Mathematical Statistics", Pearson Education 7 th edition, 2013.
7. Jim Pitman. Probability, Springer-Verlag, 1993.
8. Sheldon M. Ross, "Introduction to Probability Models" 11 th edition. Elsevier, 2014.
9. A.M. Yaglom and I. M. Yaglom, "Probability and Information". D. Reidel Publishing Company. Distributed by Hindustan Publishing Corporation (India) Delhi, 1983.
10. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall, (Reprint), 2003.
11. S. Ross, "A First Course in Probability", Pearson Education India, 6 th Ed., 2002.
12. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, Wiley, 3rd Ed., 1968.
13. N.P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
14. Veerarajan T, Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

Web links and Video Lectures (e-Resources):

http://nptel.ac.in/courses.php?disciplineID=111
http://www.class-central.com/subject/math(MOOCs)
http://academicearth.org/
http://www.bookstreet.in.
VTU EDUSAT PROGRAMME – 20
VTU e-Shikshana Program

Activity-Based Learning (Suggested Activities in Class)/Practical-Based Learning

- Programming Assignment
- Seminars

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Electric Circuit Analysis (3:0:2) 4

(Effective from the academic year 2022-23)

Course Code	BEE302	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:2	SEE Marks	50
Total Number of Contact Hours	40 hours Theory + 8-10 Lab slots	Exam Hours	3

Course objectives:

- To familiarize the basic laws, source transformations, theorems and the methods of analyzingelectrical circuits.
- To explain the use of network theorems and the concept of resonance.
- To familiarize the analysis of three-phase circuits, two port networks and networks with non-sinusoidal inputs.
- To explain the importance of initial conditions, their evaluation and transient analysis of R-L and R-C circuits.
- To impart basic knowledge on network analysis using Laplace transforms.

Module – 1

Basic Concepts:
Active and passive elements, Concept of ideal and practicalsources. star – delta transformation.
Analysis of networks by (i) Network reduction method using source transformation, (ii) Mesh and Node voltage methods for ac and DC circuits with independent and dependent sources. Concept of Super-Mesh and Super node analysis, Duality.

(8 hours)

Module – 2

Network Theorems: Super Position theorem, Thevenin's theorem, Norton's theorem, and Maximum power transfer theorem. (Problems with independent AC and DC sources only).

(8 hours)

Module – 3

Transient Analysis: Behavior of circuit elements under switching action, Evaluation of initial conditions. Transient analysis of RL and RC circuits under DC excitations.

(8 hours)

Moule-4

Laplace Transformation: Laplace transformation (LT), LT of Standard functions, Properties of LT, Initial and Final value theorems. Inverse Laplace Transform, LT of Basic R, L and C elements, Solution of electrical circuits using LT(with Zero Initial Conditions).

(8 hours)

Moule-5

Resonant Circuits: Analysis of simple series RLC and parallel RLC circuits under resonances.
Two Port networks: Definition, Open circuit impedance, Short circuit admittance and Hybrid parameters and their evaluation for simple circuits.

(8 hours)

Practice (Laboratory) Part

Sl. No	Experiments (to be carried out using discrete components)
1	Study of the effect of Open and Short circuits in simple circuits.
2	Determination of resonant frequency, bandwidth, and Q of a series circuit.
3	Determination of resonant frequency, bandwidth, and Q of a parallel circuit.
4	Verification of Thevenin's theorem.
5	Verification of Norton's theorem.

6	Verification of Superposition theorem.
7	Verification of Maximum Power transfer theorem.
8	Measurement of power in 3phase Circuits using **one watt meter** in Star and Delta Connection.
9	Measurement of time constant of an RC circuit.
10	Measurement of power in three phase Circuits using two watt meter method.

Course outcomes

At the end of the course, the student will be able to:

1. Examine the open circuit and short circuit condition in an electric circuit.
2. Determine the power in three phase circuits
3. Discuss the resonance in series and parallel circuits and solve electric circuits using two port parameters.
1. Apply Laplace transformation and Inverse Laplace Transformation techniques to solve electric circuits.
5. Analyze DC and AC networks using basic network reduction techniques, Mesh Current and Node Voltage analysis Methods and Network Theorems.
6. Analyze electrical circuits under Transients, with initial conditions.

Text Books:

1. Engineering Circuit Analysis, William H Hayt et al, Mc Graw Hill,8th Edition,2014.
2. Network Analysis, M.E. Vanvalkenburg, Pearson, 3rd Edition,2014.
3. Fundamentals of Electric Circuits, Charles K Alexander Matthew N O Sadiku, Mc Graw Hill, 5thEdition, 2013.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity Based Learning, Quizzes, Seminars.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Analog Electronic Circuits (3:0:2) 4

(Effective from the academic year 2022-23)

Course Code	BEE303	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:2	SEE Marks	50
Total Number of Contact Hours	40 hours Theory + 8-10 Lab slots	Exam Hours	3

Course objectives:

- To familiarize the basic laws, source transformations, theorems and the methods of analyzingelectrical circuits.
- To explain the use of network theorems and the concept of resonance.
- To familiarize the analysis of three-phase circuits, two port networks and networks with non-sinusoidal inputs.
- To explain the importance of initial conditions, their evaluation and transient analysis of R-L and R-Ccircuits.
- To impart basic knowledge on network analysis using Laplace transforms.

Module – 1

Diode Circuits: Diode clipping, clamping circuits and voltage doublers.

Transistor Biasing and Stabilization:

The operating point, load line analysis, DC analysis and design of fixed bias circuit, emitter stabilized bias circuit, collector to base bias circuit, voltage divider bias circuit. Bias stabilization and stability factors for voltage divider bias circuit, bias compensation, Transistor switching circuits.

(8 hours)

Module – 2

Transistor at Low Frequencies:

Hybrid model, h-parameters for CE, CC and CB modes, mid-band analysis of single stage amplifier, simplified hybrid model, analysis for CE, CB and CC (emitter voltage follower circuit) modes, Millers Theorem and its dual, analysis for collector to base bias circuit and CE with un bypassed and unbypassed emitter resistance.

Transistor frequency response:

General frequency considerations, effect of various capacitors on frequency response, , high frequency response, hybrid - pi model, CE short circuit current gain using hybrid pi model, multistage frequency effects.

(8 hours)

Module – 3

Multistage amplifiers:

Transistor Ampliers, Cascade and Cascade connections, Darlington circuits, analysis and design. Cascade connection, analysis for CE-CC mode, CE-CE mode, CASCODE stage-un-bypassed and bypassedemitter resistance modes, Darlington connection using h-parameter model.

Feedback Amplifiers:

Classification of feedback amplifiers, concept of feedback, general characteristics of negative feedbackamplifiers, Input and output resistance with feedback of various feedback amplifiers, analysis of different practical feedback amplifier circuits.

(8 hours)

Moule-4

Power Amplifiers:

Classification of power amplifiers, Analysis of class A, Class B, amplifiers, Distortion in power amplifiers, second harmonic distortion, harmonic distortion in Class B amplifiers, cross over

distortion and elimination of cross over distortion.

Oscillators:

Concept of positive feedback, frequency of oscillation for RC phase oscillator, Wien Bridge oscillator, Tuned oscillator circuits, Hartley oscillator, Colpitt's oscillator, crystal oscillator and its types.

(8 hours)

Moule-5

FETs:

Construction, working and characteristics of JFET and MOSFE T (enhance and Depletion type), Biasing of JFET and MOSFET. Fixed bias configuration, self-bias configuration, voltage divider biasing. Analysis and design of JFET (only common source configuration with fixed bias) and MOSFET amplifiers.

(8 hours)

PRACTICAL COMPONENT OF IPCC

Sl. No	Experiments (to be carried out using discrete components)
1	Experiments on series, shunt and double ended clippers and clampers.
2	Design, simulation and Testing of Full wave – centre tapped transformer type and Bridge type rectifier circuits with and without Capacitor filter. Determination of ripple factor, regulationand efficiency.
3	Static Transistor characteristics for CE, CB and CC modes and determination of h parameters.
4	Frequency response of single stage BJT and FET RC coupled amplifier and determination of half power points, bandwidth, input and output impedances.
5	Design and testing of BJT -RC phase shift oscillator for given frequency of oscillation.
6	Design, simulation (MATLAB/SPICE) and testing of Wien bridge oscillator for given frequency of oscillation
7	Design and testing of Hartley and Colpitts's oscillator for given frequency of oscillation
8	Determination of gain, input and output impedance of BJT Darlington emitter follower with and without bootstrapping.
9	Design and testing of Class A and Class B power amplifier and to determine conversion Efficiency.
10	Design and simulation of Full wave – centre tapped transformer type and Bridge type rectifier circuits with and without Capacitor filter using MATLAB/SPICE. Determination of ripple factor,regulation and efficiency.

Course outcomes

At the end of the course, the student will be able to:

1. Illustrate the concepts of diode and transistor circuits.
2. Design and test wave shaping circuits using diodes.
3. Analyze amplifier circuits with transistors.
4. Build simulation and hardware electronics circuits based on the application.
5. Design and test transistor circuitry as amplifiers and oscillators.

Text Books

1. Electronic Devices and Circuit Theory, Robert L Boylestad Louis Nashelsky, Pearson, 11th Edition, 2015
2. Electronic Devices and Circuits, Millman and Halkias, Mc Graw Hill, 4th Edition, 2015
3. Electronic Devices and Circuits, David A Bell, Oxford University Press, 5th Edition, 2008

Reference Books

1. Microelectronics Circuits Analysis and Design, Muhammad Rashid, Cengage Learning, 2nd Edition, 2014
2. A Text Book of Electrical Technology, Electronic Devices and Circuits, B.L. Theraja, A.K. Theraja, S. Chand, Reprint, 2013
3. Electronic Devices and Circuits, Anil K. Maini, ,VashaAgarval, Wiley, 1st Edition, 2009
4. Electronic Devices and Circuits, S. Salivahanan, Suresh, Mc Graw Hill, 3rd Edition, 2013

Fundamentals of Analog Circuits, Thomas L Floyd, Pearson, 2nd Edition, 2012

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Transformers and Generators (3:0:0) 3

(Effective from the academic year 2022-23)

Course Code	BEE304	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

This course will enable students to:

- To acquaint the students with differential equations and their applications in electrical engineering
- To find the association between attributes and the correlation between two variables
- Learn to use Fourier series to represent periodical physical phenomena in engineering analysis and to enable the student to express non periodic functions to periodic function using Fourier series and Fourier transforms.
- To learn the basic ideas of the theory of probability and random signals.

Module – 1

Transformers: Necessity of transformer, Classification (Power Transformers, Distribution Transformers, Measurement Transformers, Indoor Transformers, Outdoor Transformers). Standard ratings, Difference between Power Transformers, Distribution Transformers, Advantages and Disadvantages of transformers, Practical application in daily usage.

Generators: Standard ratings, Difference between AC and DC generator, Advantages, Practical application in daily usage, Portable vs. Standby Generator.

(8 hours)

Module – 2

Single phase Transformers: Principle of operation, Types and construction, EMF equation, equivalent circuit, Operation of practical transformer under no-load and on-load with phasor diagrams. Losses and methods of reducing losses, efficiency and condition for maximum efficiency. Polarity test, Sumpner's test. Open circuit and Short circuit tests, calculation of equivalent circuit parameters. Predetermination of efficiency, voltage regulation and its significance. Numerical.

(8 hours)

Module – 3

Three-phase Transformers: Introduction, Constructional features of three-phase transformers. Transformer connection for three phase operation– star/star, delta/delta and star/delta, comparative features. Labelling of three-phase transformer terminals.

Parallel Operation of Transformers: Necessity of Parallel operation, conditions for parallel operation– Single phase and three phase. Load sharing in case of similar and dissimilar transformers. Numerical.

Auto transformers and Tap changing transformers: Introduction to autotransformer-copper economy, equivalent circuit, no load and on load tap changing transformers. Numerical.

(8 hours)

Moule-4

Synchronous Generators: Construction, working, Armature windings, winding factors, EMF equation. Harmonics–causes, reduction and elimination. Armature reaction, Synchronous reactance, Equivalent circuit.

Synchronous Generators Analysis: Open circuit and short circuit characteristics, Assessment of reactance-short circuit ratio, Alternator on load. Voltage regulation. Voltage regulation by EMF and MMF methods. Excitation control for constant terminal voltage. Numerical.

(8 hours)

Moule-5

Synchronous Generators (Salient Pole): Effects of saliency, two-reaction theory, Parallel operation of generators and load sharing. Methods of Synchronization, Synchronizing power.
Performance of Synchronous Generators: Power angle characteristic (salient and non-salient pole), power angle diagram, reluctance power, Capability curve for large turbo generators. Hunting and damper windings. Numerical.

(8 hours)

Course outcome (Course Skill Set)

At the end of the course, the student will be able to:

CO1: Describe the operational principles of transformers and synchronous generators.
CO2: Analyse the performance of single phase, three phase transformer for different loading conditions.
CO3: Analyse the performance of synchronous generator when in parallel operation and evaluate the regulation by different methods.

Suggested Learning Resources:

Textbooks

1. Electric Machines, D. P. Kothari, et al, 4th Edition, 2011.
2. Electric Machines, Ashfaq Hussain, Dhanpat Rai & Co, 2nd Edition, 2013.
3. A Text Book Of Electrical Technology, B L Theraja, A K Theraja

Reference Books

1. Electric Machines, Mulukuntla S. Sarma, at el, Cengage, 1st Edition, 2009.
2. Electrical Machines, Drives and Power systems, Theodore Wildi, Pearson, 6th Edition, 2014.
3. Principals of Electrical Machines, V.K Mehta, Rohit Mehta, S Chand, 2nd edition, 2009

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Transformer and Generator Laboratory (0:0:2) 1

(Effective from the academic year 2022-23)

Course Code	BEEL305	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

This course enables students to:

- To conduct various tests on transformers and synchronous machines and evaluate their performance.
- To perform the parallel operation on two single phase transformers.
- To study and verify the performance of synchronous generator.
- To calculate the voltage regulation of an alternator using different methods for comparison.

List of Experiments

Sl.NO	Experiments
1	Open Circuit and Short circuit tests on single phase step up or step down transformer andpre- determination of (i) Efficiency and regulation (ii) Calculation of parameters for equivalent circuit.
2	Sumpner's test on similar transformers and determination of combined and individual transformer efficiency.
3	Parallel operation of two dissimilar single-phase transformers of different kVA and determination of load.
4	Polarity test and connection of 3 single-phase transformers in star – delta and determination of efficiency and regulation under balanced resistive load.
5	Comparison of performance of 3 single-phase transformers in delta – delta and V – V (open delta)connection under load.
6	Separation of hysteresis and eddy current losses in single phase transformer.
7	Determine quadrature axis and direct axis reactance using slip test.
8	Voltage regulation of an alternator by EMF and MMF methods.
9	Power angle curve of synchronous generator or Direct load test on three phase synchronous generator to determine efficiency and regulation.
10	Performance of synchronous generator connected to infinite bus, under constant power and variable excitation & vice - versa.
11	Model transformer in Simscape for Automatic Voltage Regulation.
12	Simulate power angle curve of generator in MATLAB.

Course outcomes :

At the end of the course the student will be able to:

1. Conduct various tests on transformers and synchronous machines and evaluate their performance.
2. Perform the parallel operation on two single phase transformers.
3. Verify the performance of synchronous generator.
4. Calculate the voltage regulation of an alternator using different methods for comparison.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Digital Logic Circuits (3:0:0) 3

(Effective from the academic year 2022-23)

Course Code	**BEE306A**	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

- To illustrate simplification of algebraic equations using Karnaugh Maps and Quine-McClusky methods
- To design decoders, encoders, digital multiplexer, adders, subtractors and binary comparators
- To explain latches and flip-flops, registers and counters
- To analyze Melay and Moore Models
- To develop state diagrams synchronous sequential circuits
- To understand the applications of sequential circuits
- To provide the basic language features of Verilog HDL and the role of HDL in digital logic design

Module – 1

Principles of Combinational Logic:

Definition of combinational logic, canonical forms, Generation of switching equations from truth tables, Karnaugh maps-3,4,5 variables, Incompletely specified functions (Don‘t care terms) Simplifying Max term equations, Quine-McCluskey minimization technique, Quine- McCluskey using don‘t care terms, Reduced prime implicants Tables.

(8 hours)

Module – 2

Analysis and Design of Combinational logic: General approach to combinational logic design, Decoders, BCD decoders, Encoders, digital multiplexers, Using multiplexers as Boolean function generators, Adders and subtractors, Cascading full adders, Look ahead carry, Binary comparators.

(8 hours)

Module – 3

Flip-Flops: Basic Bistable elements, Latches, Timing considerations, The master-slave flip-flops (pulse triggered flip-flops): SR flip-flops, JK flip-flops, Edge triggered flip- flops, Characteristic equations

(8 hours)

Moule-4

Flip-Flops Applications: Registers, binary ripple counters, synchronous binary counters, Counters based on shift registers, Design of a synchronous counter, Design of a synchronous mod-n counter using clocked T, JK, D and SR flip-flops.

(8 hours)

Moule-5

Sequential Circuit Design: Mealy and Moore models, State machine notation, Synchronous Sequential circuit analysis, Construction of state diagrams, counter design.

Introduction to Verilog: Structure of Verilog module, Operators, Data Types, Styles of Description.

(8 hours)

Course outcome (Course Skill Set)

CO1: Apply the knowledge of simplification and optimization of combinational logic circuits

CO2: Design and analyze combinational logic circuits

CO3: Design and analyze the Flipflops and its applications

CO4: Design Sequential circuits, develop Mealy/Moore models and state diagrams.

CO5: Understand the Concepts of Verilog.

Text Books:

1) John M Yarbrough , Digital logic applications and design, Thomson Learning,

2001.2)Donald D Givone, Digital Principles and design, MC Graw Hill 2002

3)Charles H Roth Jr, Larry L Kinney, Fundamentals of logic design , Cengage Learning, 7th Edition

Reference books:

1)D.P.Kothari and J S Dhillon, -Digital circuits and design, Pearson,

20162)Morris Mano, Digital Design, PHI, 3rd edition

3)K.A. Navas, Electronics Lab Manual, Vol.1, PHI 5th edition, 2015.

4) Nazeih M Botros, HDL Programming VHDL and Verilog, Dreamtech Press , 2006

Online Courses:

1. https://nptel.ac.in/courses/108105113/
2. https://nptel.ac.in/courses/Verilog fundamentals

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Electrical Measurements and Instrumentation (3:0:0) 3

(Effective from the academic year 2022-23)

Course Code	BEE306B	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

- To understand the significance and methods of Measurements, elements of generalizedmeasurement system and errors in measurements.
- To measure resistance, inductance, capacitance by use of different bridges.
- To study the construction, working and characteristics of various instrument transformers.
- To have the working knowledge of electronic instruments and display devices.

Module – 1

Measurements and Measurement systems:

Introduction, significance and methods of Measurements, Instruments and measurement systems, Mechanical, electrical and electronic instruments. Classification of instruments. Functions and applications of Measurement systems. Types of Instrumentation systems, information and signal processing. Elements of generalized measurement system. Input-output configurations of measuring instruments and measurement systems. Methods of correction for interfering and modifying inputs, errors in measurements, Accuracy and precision.

(8 hours)

Module – 2

Measurement of Resistance: Wheatstone's bridge, sensitivity, limitations. Kelvin's double bridge. Earth resistance measurement by fall of potential method and by using Megger.

Measurement of Inductance and Capacitance: Sources and detectors, Maxwell's inductance and capacitance bridge, Hay's bridge, Anderson's bridge, Desauty's bridge, Schering bridge. Shielding of bridges. (Derivations and Numerical as applicable).

(8 hours)

Module – 3

Instrument Transformers: Introduction, Use of Instrument transformers. Burden on Instrumenttransformer.

Current transformer (CT): Relationships in CT, Errors in CT, characteristics of CT, causes and reduction of errors in CT, Construction and theory of CT (No derivations).

Potential transformer (PT): Difference between CT and PT, Relationships in PT, Errors in PT characteristics of PT, reduction of errors in PT (No derivations).

Magnetic measurements: Introduction, measurement of flux/ flux density, magnetizing force and leakage factor.

(8 hours)

Moule-4

Electronic and Digital Instruments: Introduction. Essentials of electronic instruments, Advantages of electronic instruments. True RMS reading voltmeter. Electronic mustimeters. Digital voltmeters (DVM) - Ramp type DVM, Integrating type DVM and Successive - approximation DVM. Q meter. Principle of working of electronic energy meter (with block diagram), extra features offered by present day meters and their significance in billing.

(8 hours)

Moule-5

Display Devices: Introduction, character formats, segment displays, Dot matrix displays, Bar graph displays. Cathode ray tubes, Light emitting diodes, Liquid crystal displays, Nixes, Incandescent, Fluorescent, Liquid vapor and Visual displays.

Recording Devices: Introduction, Strip chart recorders, Galvanometer recorders, Null balance recorders, Potentiometer type recorders, Bridge type recorders, LVDT type recorders, Circular chart and x-y recorders. Digital tape recording, Ultraviolet recorders. Electro Cardio Graph (ECG).

(8 hours)

Course Outcomes:

At the end of the course, the student will be able to:

1. Explain the working of various recording and display devices
2. Apply the bridge measurement techniques for unknown values of passive elements such as resistance, inductance and capacitance.
3. Use an appropriate measuring instrument to measure the important electrical parameters such as voltage, current, Power, Energy, Power Factor and Frequency

Text Books

1. Electrical and Electronic Measurements and Instrumentation, A.K. Sawhney, Dhanpat Rai & Co,10th Edition
2. A Course in Electronics and Electrical Measurements and Instrumentation, J. B. Gupta, Katson Books, 2013

Reference Books

1. Electrical and Electronic Measurements and Instrumentation, R.K. Rajput, S Chand, 5th Edition, 2012
2. Electrical Measuring Instruments and Measurements, S.C. Bhargava, BS Publications, 2013
3. Modern Electronic Instrumentation and Measuring Techniques, Cooper D and A.D. Heifrick, Pearson, First Edition, 2015
4. Electronic Instrumentation and Measurements, David A Bell, Oxford University, 3rd Edition, 2013
5. Electronic Instrumentation, H.S.Kalsi, Mc Graw Hill, 3rd Edition,2010

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

ELECTROMAGNETIC FIELD THEORY (3:0:0) 3

(Effective from the academic year 2022-23)

Course Code	BEE306C	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

- To understand Scalars, Vectors, Cartesian co-ordinate system, relation between different coordinate systems, Coulomb's law, Electric field intensity and its evaluation for different charge conditions.
- To understand potential field of a point charge, Potential gradient, Energy density in the electrostatic field and conductor's properties and boundary conditions.
- To understand Poisson's and Laplace Equations, Biot - Savart's law, Ampere's circuital law and Stokes theorem.
- To understand Magnetic force, Force between differential current elements. Force and torque on a closed circuit, Nature of magnetic materials and Magnetic boundary conditions.
- To understand Faraday's law, Displacement current. Maxwell's equations, Wave propagation in free space and in dielectrics.

Module – 1

Vector Analysis:

Scalars and Vectors, Vector algebra, Cartesian co-ordinate system, Vector Components and unit vectors. Scalar field and Vector field. Dot product and Cross product, Gradient of a scalar field. Divergence and Curl of a vector field. Co – ordinate systems: cylindrical and spherical, relation between different coordinate systems. Expression for gradient, divergence and curl in rectangular, cylindrical and spherical co-ordinate systems. Numerical.

Electrostatics:

Coulomb's law, Electric field intensity and its evaluation for (i) point charge (ii) line charge (iii) surface charge (iv) volume charge distributions. Electric flux density, Gauss law and its applications. Maxwell's first equation (Electrostatics). Divergence theorem. Numerical.

(8 hours)

Module – 2

Energy and Potential:

Energy expended in moving a point charge in an electric field. The line integral. Definition of potential difference and potential. The potential field of a point charge and of a system of charges. Potential gradient. The dipole. Energy density in the electrostatic field. Numerical.

Conductor and Dielectrics:

Current and current density. Continuity of current. Metallic conductors, conductor's properties and boundary conditions. Perfect dielectric materials, capacitance calculations. Parallel plate capacitor with two dielectrics with dielectric interface parallel to the conducting plates. Numerical. **(8 hours)**

Module – 3

Poisson's and Laplace Equations:

Derivations and problems, Uniqueness theorem.

Steady magnetic fields:

Biot - Savart's law, Ampere's circuital law. The Curl. Stokes theorem. Magnetic flux and flux density. Scalar and vector magnetic potentials. Numerical.

(8 hours)

Moule-4

Magnetic forces:

Force on a moving charge and differential current element. Force between differential current elements. Force andtorque on a closed circuit. Numerical.

Magnetic Materials and Magnetism:

Nature of magnetic materials, magnetization and permeability. Magnetic boundary conditions. Magnetic circuit, inductance and mutual inductance. Numerical. **(8 hours)**

Moule-5

Time Varying Fields and Maxwell's Equations:

Faraday's law, Displacement current. Maxwell's equations in point form and integral form. Numerical.

Uniform plane wave:

Wave propagation in free space and indielectrics. Pointing vector and power considerations. Propagation in good conductors, skin effect. Numerical.

(8 hours)

Course outcomes:

At the end of the course, the student will be able to:

1. Apply the fundamental knowledge of electrostatic fields to various phenomena.
2. Understand the characteristics of electromagnetic field for various charge and current distributions.
3. Analyze and Apply the static and time varying fields of Maxwell's equations in electromagnetics.
4. Analyze and Solve problems involving different media in boundary region with uniform and non-uniform plane Wave.

Text Books

1 Engineering Electromagnetics William H Hayt et al McGraw Hill 8thEdition, 2014

2 Principles of Electromagnetics Matthew N. O. Sadiku Oxford 6th Edition, 2015

Reference books:

1. Fundamentals of Engineering Electromagnetics David K. Cheng Pearson 2014
2. Electromagnetism -Theory (Volume -1) -Applications (Volume-2) Ashutosh Pramanik PHI Learning 2014
3. Electromagnetic Field Theory Fundamentals Bhag Guru et al Cambridge 2005
4. Electromagnetic Field Theory RohitKhurana Vikas Publishing 1st Edition,2014

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

PHYSICS OF ELECTRONIC DEVICES (3:0:0) 3

(Effective from the academic year 2022-23)

Course Code	BEE306D	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

This course will enable students to

- Understand the basics of semiconductor physics and electronic devices
- Describe the mathematical models BGTs and FETs along with the constructional details
- Understand the construction and working principles of optoelectronic devices
- Understand the fabrication process of semiconductor devices and CMOS process integration

Module – 1

Semiconductors

Bonding forces in solids, energy bands, metals, semiconductors and insulators, direct and indirect semiconductors, electrons and holes, intrinsic and extrinsic materials, conductivity and mobility, drift and resistance, effects of temperature and doping on mobility, Hall effect

Text:1) 3.1.1 to 3.1.4, 3.2.1 to 3.2.4, 3.4.1 to 3.4.5

(8 Hours)

Module – 2

P-N JUNCTIONS:

Forward and reverse bias junctions, Qualitative description of current flow at a junction, reverse bias and reverse bias breakdown, Zener breakdown, avalanche breakdown, Thermal runaway. Text 1)5.3.1 to 5.3.3, 5.4, 5.4.1 to 5.4.3

Optoelectronic Devices:

Photo diodes, current and voltage in illuminated junction, solar cells, photo detectors, light emitting diode, light emitting materials. Text 1)8.1.1 to 8.1.3, 8.2, 8.2.1

(8 Hours)

Module – 3

Bipolar Junction Transistor:

Fundamentals of BJT operation, amplification with BJTs, BJT fabrication, the Coupled diode model (Ebers –Moll Model), switching operation of transistor, cutoff, saturation, switching cycle, specifications, drift in the base region, base narrowing, avalanche breakdown.

Text 1)7.1 to 7.3, 7.5.1, 7.6, 7.7.1 to 7.7.3

(8 Hours)

Moule-4

Field Effect Transistors:

Basic PN JFET operation, equivalent circuit and frequency limitation, MOSFET two terminal MOS structure, energy band diagram, ideal capacitance voltage characteristics and frequency effects, basic MOSFET operation, MOSFET structure, current-voltage characteristics

Text 2)9.1.1, 9.4, 9.6.1 - 9.6.2, 9.7.1-9.7.2, 9.8.1-9.8.2

(8 Hours)

Moule-5

Fabrication of PN junction:

Thermal oxidation, diffusion, rapid thermal processing, Ion implantation, chemical vapour deposition, photolithography, etching, metallization (Text 1)5.1

Integrated Circuits:

Background, evolution of ICs, CMOS process integration, integration of other circuit elements(Text

1)9.1-9.2, 9.3.1, 9.3.3.

(8 Hours)

Course outcome :

At the end of the course, the student will be able to:

1. Understand the principles of semiconductor physics
2. Illustrate the principles, mathematical model and characteristics of different types of semiconductor devices
3. Understand the fabrication process of semiconductor devices

Text Books:

1. Ben. G. Streetman, Sanjay Kumar Banerjee, "Solid State Electronic Devices", 7th Edition, PearsonEducation 2016, ISBN 978-93-325-5508-2
2. Donald A Neamen, Dhrubes Biswas, "Semiconductor physics and Devices", 4th Edition, MC GrawHill Education 2012, ISBN 978-0-07-107010-2

Reference Books:

1. S.M. Sze, Kwok K Ng, "Physics of semiconductor devices", 3rd edition, Wiley 2018.2)Adir Bar-Lev, "Semiconductor and electronic devices", 3rd Edition , PHI, 1993.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Social Connect and Responsibility

(Effective for 2022 Scheme)

Course Code	**BSCK307**	CIE Marks	**100**
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26 Hours	Exam Hours	**-**
Credits	01 - Credit		

Course objectives: The course will enable the students to:

1. Provide a formal platform for students to communicate and connect to the surrounding.
2. create a responsible connection with the society.
3. Understand the community in general in which they work.
4. Identify the needs and problems of the community and involve them in problem –solving.
5. Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
6. Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

Social Connect & Responsibility –All Modules Activity Based Learning

Module-1

Plantation and adoption of a tree:

Plantation of a tree that will be adopted for four years by a group of BE / B.Tech students. (ONE STUDENT ONE TREE) They will also make an excerpt either as a documentary or a photo blog describing the plant's origin, its usage in daily life, its appearance in folklore and literature - – Objectives, Visit, case study, report, outcomes.

(04 Hours)

Module-2

Heritage walk and crafts corner:

Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms - – Objectives, Visit, case study, report, outcomes.

(05 Hours)

Module-3

Organic farming and waste management:

Usefulness of organic farming, wet waste management in neighboring villages, and implementation in the campus – Objectives, Visit, case study, report, outcomes.

(06 Hours)

Module-4

Water conservation:

Knowing the present practices in the surrounding villages and implementation in the campus, documentary or photoblog presenting the current practices – Objectives, Visit, case study, report, outcomes.

(06 Hours)

Module-5

Food walk: City's culinary practices, food lore, and indigenous materials of the region used in cooking – Objectives, Visit, case study, report, outcomes.

(05 Hours)

Course outcomes (Course Skill Set): At the end of the course, the student will be able to:

CO1: Communicate and connect to the surrounding.

CO2: Create a responsible connection with 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 and community problems.

CO6: Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

ACTIVITIES: Jamming session, open mic, and poetry: Platform to connect to others. Share the stories with others. Share the experience of Social Connect. Exhibit the talent like playing instruments, singing, one-act play, art-painting, and fine art.

PEDAGOGY: The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersion with NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector?

COURSE TOPICS: The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversional will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem

Duration: A total of 26 hours engagement per semester is required for the 3rd semester of the B.E./B.Tech. program. The students will be divided into groups. Each group will be handled by faculty mentor. Faculty mentor will design the activities (particularly Jamming sessions open mic, and poetry) Faculty mentors have to design the evaluation system as per VTU guidelines of scheme & syllabus**.**

Guideline for Assessment Process: Continuous Internal Evaluation (CIE): After completion of the course, the student shall prepare with daily diary as reference, a comprehensive report in consultation with the mentor/s to indicate what he has observed and learned in the social connect period. The report should be signed by the mentor. The report shall be evaluated on the basis of the following criteria and/or other relevant criteria pertaining to the activity completed. Marks allotted for the diary are out of 50. Planning and scheduling the social connect Information/Data collected during the social connect Analysis of the information/data and report writing Considering all above points allotting the marks as mentioned below

Excellent: 80 to 100
Good: 60 to 79
Satisfactory: 40 to 59
Unsatisfactory and fail: <39

Special Note: **NO Semester End Examination (SEE) – Completely Practical and activities-based evaluation**

Pedagogy – Guidelines: It may differ depending on local resources available for the study as well as environment and climatic differences, location and time of execution.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation of the Topic
1.	**Plantation and adoption of a tree**	May be individual or team	Farmers land/ parks / Villages / roadside/ community area / College campus etc	Site selection /Proper consultation/ Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
2.	**Heritage walk and crafts corner**	May be individual or team	Temples / monumental places / Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc	Site selection /Proper consultation/ Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
3.	**Organic farming and waste management**	May be individual or team	Farmers land / parks / Villages visits / roadside/ community area / College campus etc	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
4.	**Water conservation & conservation techniques**	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers / campus etc	site selection / proper consultation/ Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty

5.	**Food walk: Practices in society**	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc	Group selection / proper consultation/ Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty

Plan of Action (Execution of Activities)

Sl.NO	Practice Session Description
1	**Lecture session in field to start activities**
2	**Students Presentation on Ideas**
3	**Commencement of activity and its progress**
4	**Execution of Activity**
5	**Execution of Activity**
6	**Execution of Activity**
7	**Execution of Activity**
8	**Case study-based Assessment, Individual performance**
9	**Sector/ Team wise study and its consolidation**
10	**Video based seminar for 10 minutes by each student At the end of semester with Report.**

- Each student should do activities according to the scheme and syllabus.
- At the end of semester student performance has to be evaluated by the faculty for the assigned activity progress and its completion.
- At last consolidated report of all activities from 1st to 5th, compiled report should be submitted as per the instructions and scheme.

Assessment Details for CIE (both CIE and SEE)

Weightage	**CIE – 100%**
Field Visit, Plan, Discussion	10 Marks
Commencement of activities and its progress	20 Marks
Case study-based Assessment Individual performance with report	20 Marks
Sector wise study & its consolidation 5*5 = 25	25 Marks
Video based seminar for 10 minutes by each student at the end of semester with Report. **Activities 1 to 5, 5*5 = 25**	25 Marks
Total marks for the course in each semester	**100 Marks**

- Implementation strategies of the project (NSS work).
- The last report should be signed by NSS Officer, the HOD and principal.
- At last report should be evaluated by the NSS officer of the institute.
- Finally, the consolidated marks sheet should be sent to the university and also to be made available at LIC visit.

For each activity, 20 marks CIE will be evaluated for IA marks at the end of semester, Report and assessment copy should be made available in the department.

Students should present the progress of the activities as per the schedule in the prescribed practical session in the field.

There should be positive progress in the vertical order for the benefit of society in general through activities.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Scilab / MATLAB for Transformers & Generators (0:0:2) 1

(Effective from the academic year 2022-23)

Course Code	**BEEL358A**	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	2

Course objectives:

This course enables students to:

- Along with prescribed hours of teaching –learning process, provide opportunity to perform the experiments/programmes at their own time, at their own pace, at any place as per their convenience and repeat any number of times to understand the concept.
- Provide unhindered access to perform whenever the students wish.
- Vary different parameters to study the behavior of the circuit without the risk of damaging equipment/device or injuring themselves.

List of Experiments

Sl. No.	Experiments
1	Open Circuit and Short circuit tests on single phase step up or step-down transformer and predetermination of (i) Efficiency and regulation (ii) Calculation of parameters of equivalent circuit.
2	Sumpner's test on similar transformers and determination of combined and individual transformer efficiency.
3	Parallel operation of two dissimilar single-phase transformers of different kVA and determination of load sharing and analytical verification given the Short circuit test data.
4	Separation of hysteresis and eddy current losses in single phase transformer.
5	Voltage regulation of an alternator by EMF and MMF methods.
6	Voltage regulation of an alternator by ZPF method.
7	Power angle curve of synchronous generator.
8	Slip test – Measurement of direct and quadrature axis reactance and predetermination of regulationof salient pole synchronous machines.

Course outcomes :

At the end of the course the student will be able to:

1. Perform the analysis of transformers and generators using Scilab/MATLAB model
2. Perform the analysis of parallel operation and losses of transformers using Scilab/MATLAB model.

B.E ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

555 IC Laboratory (0:0:2) 1

(Effective from the academic year 2022-23)

Course Code	**BEEL358B**	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	2

Course objectives:

- Along with prescribed hours of teaching –learning process, provide opportunity to perform the experiments/programmes at their own time, at their own pace, at any place as per their convenience and repeat any number of times to understand the concept.
- Provide unhindered access to perform whenever the students wish.
- Vary different parameters to study the behaviour of the circuit without the risk of damaging equipment/device or injuring themselves.

List of Experiments

Sl. No.	Experiments
1	Construct Astable Multivibrator circuit using IC-555 Timer.
2	Construct Mono-stable Multivibrator circuit using IC-555 Timer.
3	Construct and test Sequential timer using IC-555.
4	Generate Pulse Width Modulator (PWM) signal using IC-555 Timer.
5	Construct Burglar Alarm circuit using IC-555 Timer.
6	Construct and generate Frequency Shift Keying (FSK) signal using IC-555 Timer.
7	Construct and test Running LED circuit using IC-555 Timer.
8	Construct water level indicator using IC-555 Timer.
9	Construct continuity tester using IC-555 Timer.

Course outcomes :

At the end of the course the student will be able to:

CO1: Analyse the applications of IC 555.

CO2: Implement the circuits using IC 555.

B.E ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Circuit Laboratory using P-spice (0:0:2) 1

(Effective from the academic year 2022-23)

Course Code	**BEEL358C**	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	2

Course objectives:

- Along with prescribed hours of teaching –learning process, provide opportunity to perform the experiments/programs at their own time, at their own pace, at any place as per their convenience and repeat any number of times to understand the concept.
- Provide unhindered access to perform whenever the students wish.
- Vary different parameters to study the behaviour of the circuit without the risk of damaging equipment/ device or injuring themselves.

List of Experiments

Sl. NO	Experiments
1	Simulate Series RL & RC circuit and observe phase difference between waveforms of voltage and current.
2	Simulation and verification of Kirchhoff's Current Law & Kirchhoff's Voltage Law.
3	Simulation of Mesh analysis for a given circuit.
4	Simulation of Nodal analysis for a given circuit.
5	Determination of Z & Y parameters of a given two-port network.
6	Simulate and verify Super Positions theorem.
7	Simulation and verification Reciprocity theorem.
8	Simulation and verification Thevenin's and Norton's theorem.
9	Simulation and verification Maximum Power Transfer theorem.
10	Simulation and verification Millman's theorem.
11	Simulation of Series and Parallel Resonance circuit.

Course outcomes :

At the end of the course the student will be able to:

CO1: Determine two port network parameters.

CO2: Analyse the given electric circuit using network theorems.

CO3: Analyse the resonance phenomenon in a given circuit.

B.E ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

ELECTRICAL HARDWARE LABORATORY (0:0:2) 1

(Effective from the academic year 2022-23)

Course Code	**BEEL358D**	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	2

Course objectives:

(1) Along with prescribed hours of teaching –learning process, provide opportunity to perform the experiments/programmes at their own time, at their own pace, at any place as per their convenience and repeat any number of times to understand the concept.

(2) Provide unhindered access to perform whenever the students wish.

(3) Vary different parameters to study the behaviour of the circuit without the risk of damaging equipment/device or injuring themselves.

List of Experiments

Sl. NO	Experiments
1	Verification of KCL and KVL for DC Circuits.
2	Verification of KCL and KVL for AC Circuits.
3	Measurement of Current, Power and Power Factor of Incandescent Lamp, Fluorescent Lamp and LEDLamp.
4	Single Phase energy measurement using energy meter
5	Measurement of Resistance using V-I method.
6	Measurement of Resistance and Inductance of a Choke coil using three voltmeter method.
7	Determination of Phase and Line quantities in three-phase star and delta connected loads.
8	Two-Way and Three-Way Control of Lamp and Formation of Truth Table.
9	Measurement of Earth Resistance using fall of potential method.
10	Determination of fuse characteristics.

Course outcomes :

At the end of the course the student will be able to:

CO1:Verify KCL and KVL and maximum power transfer theorem for DC and AC circuits.

CO2:Compare power factors of different types of lamps.

CO3:Two Way and Three-Way Control of Lamp and Formation of Truth Table.

CO4: Measure single phase energy using energy meter.

B.E ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

NSS

(Common to all branches)

(Effective for the 2022 scheme)

Course Code	**BNSK359/459/559/659**	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of degree)

Course Objectives: National Service Scheme (NSS) will enable the students to:

1. Understand the community in general in which they work.
2. Identify the needs and problems of the community and involve them in problem solving.
3. Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
4. Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.
5. Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.

Module – 1

Introduction to NSS:

History and growth of NSS, Philosophy of NSS, Objectives of NSS, Meaning of NSS Logo, NSS Programs and activities, administrative structure of NSS, Planning of programs / activities, implementation of NSS programs / activities, National & State Awards for NSS College / Program Officer / Volunteers.

(04 Hours)

Module – 2

Overview of NSS Programs

Objectives, special camping – Environment enrichment and conservation, Health, Family, Welfare and Nutrition program. Awareness for improvement of the status of women, Social Service program, production-oriented programs, Relief & Rehabilitation work during natural calamities, education and recreations, Selection of the problem to be addressed.

(**04 Hours)**

Module – 3

NSS Activities - Group Contributions to Society / community (Activity based Learning):

Organic Farming, Indian agriculture (Past, Present, Future) Connectivity for marketing, Waste management– Public, Private and Govt. organization, 5 R's. Water conservation techniques – role of different stakeholders – implementation, preparing an actionable business proposal for enhancing the village income and approach for implementation. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.

(06 Hours)

Module – 4

NSS National Level Activities for Society / Community at large (Activity based Learning):

Developing Sustainable Water management system for rural areas and implementation approaches. Contribution to any national level initiative of Government of India. Foreg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc. **(06 Hours)**

Module – 5

NSS Individual Activities for Local Voice (Activity based learning)

Govt. school Rejuvenation and helping them to achieve good infrastructure, Plantation and adoption of plants. Know your plants. Spreading public awareness under rural outreach programs, National integration and social harmony events.

(06 Hours)

Course outcomes (Course Skill Set):

At the end of the course, the student will be able to:

CO1: Understand the importance of his / her responsibilities towards society.

CO2: Analyse the environmental and societal problems/issues and will be able to design solutions for the same.

CO3: Evaluate the existing system and to propose practical solutions for the same for sustainable development.

CO4: Implement government or self-driven projects effectively in the field.

CO5: Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

Assessment Details

Weightage	**CIE – 100%**
Presentation -1 Selection of topic, PHASE-1	20 Marks
Commencement of activity and its progress – PHASE – 2	20 Marks
Case Study based Assessment – Individual performance	20 Marks
Sector wise study and its consolidation	20 Marks
Video based seminar for 10 minutes by each student at the end of the course with Report	20 Marks

Suggested Learning Resources:

Books:

1. NSS Course Manual**,** Published by NSS Cell, VTU Belagavi.
2. Government of Karnataka, NSS cell, activities reports and its manual.
3. Government of India, NSS cell, Activities reports and its manual.

B.E ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Yoga

(Common to all Branches)

(Effective for the 2022 scheme)

Course Code	**BYOK359/459/559/659**	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Course Objectives:

This course will enable students to:

6. Understand the importance of practicing yoga in day-to-day life.
7. Be aware of therapeutic and preventive value of Yoga.
8. Have a focussed, joyful and peaceful life.
9. Maintain physical, mental and spiritual fitness.
10. Develop self-confidence to take up initiatives in their lives.

Module – 1

Introduction to Yoga: Introduction, classical and scientific aspects of yoga, Importance, Types, Healthy Lifestyle, Food Habits, Brief Rules, Sithalikarana Practical classes.

(04 Hours)

Module – 2

Physical Health: Introduction, Pre-requisites, Asana-Standing, Sitting, Supine and Prone, Practical classes.

(06 Hours)

Module – 3

Psychological Health: Introduction Thought Forms, Kriya (Kapalabhati), Preparation to Meditation, Practical classes.

(06 Hours)

Module – 4

Therapeutic Yoga: Mudra Forms, Acupressure therapy, Relaxation techniques Practical classes.

(06 Hours)

Module – 5

Spirituality & Universal Mantra: Introduction, Being Human, Universal Mantra, Universal LOVE, Benefits of practice of Spirituality in day-to-day life, practical classes.

(04 Hours)

Course Outcomes:

Students will be able to:

1. Understand the requirement of practicing yoga in their day-to-day life.
2. Apply the yogic postures in therapy of psychosomatic diseases
3. Train themselves to have a focussed, joyful and peaceful life.
4. Demonstrate the fitness of Physical, Mental and Spiritual practices.
5. Develops self-confidence to take up initiatives in their lives.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

CIE: 100 Marks

- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester in which the student have to perform asanas.

Textbooks

1. George Feuerstein: The yoga Tradition (Its history, literature, philosophy and practice.)
2. Sri Ananda: The complete Book of yoga Harmony of Body and Mind. (Orient paper Backs: vision Books Pvt.Ltd., 1982.
3. B.K.S Iyenkar: Light on the Yoga sutras of patanjali (Haper Collins Publications India Pvt.,Ltd., New Delhi.)
4. Science of Divinity and Realization of Self – Vethathiri Publication, (6-11) WCSC, Erode

References:

1. Principles and Practice of Yoga in Health Care, Publisher: Handspring Publishing Limited, ISBN: 9781909141209, 9781909141209
2. Basavaraddi I V: Yoga in School Health, MDNIY New Delhi, 2009
3. Dr. HR. Nagendra: Yoga Research and applications (Vivekanda Kendra Yoga Prakashana Bangalore)
4. Dr. Shirley Telles: Glimpses of Human Body (Vivekanda Kendra Yoga Prakashana Bangalore)

Web resources

Web links and Video Lectures (e-Resources): Refer links
1. https://youtu.be/KB-TYlgd1wE
2. https://youtu.be/aa-TG0Wg1Ls

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

NCC

(Common to all Branches)

(Effective for the 2022 scheme)

Course Code	BNCK359/459/559/659	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of degree)

Course Objectives:

This course will enable students to:

- Understand the vision of NCC and its functioning.
- Understand the security set up and management of Border/Coastal areas.
- Acquire knowledge about the Armed forces and general awareness.

Module– 1

Introduction to National Cadet Corp: What is NCC, who can join NCC, benefits, Establishment, history, 3 wings, motto, core values, Aims, flag, song, pledge, cardinals, Organization, Director General NCC, Directorates, Uniform and Cadet ranks, Camps, Certificate exams, Basic aspects of drill.

National Integration: Importance of national integration**,** Factors affecting national integration, Unity in diversity**,** Role of NCC in nation building.

Disaster Management: What is a Disaster**,** Natural and Man-made disasters**,** Earthquake, Floods.

(04 Hours)

Module– 2

Indian Army: Introduction to Indian Army, Command and control, Fighting & supporting arms**,** Rank structure, Major Regiments of the Army**,** Major Wars and Battles**,** Entry to the Indian Army, Renowned leaders and Gallantry Awardees.

(02 Hours)

Module– 3

Indian Air Force: Introduction to Indian Air Force, Command and control**,** Rank structure**,** Major Aircrafts, Entry to the Indian Air Force, Renowned leaders.

Indian Navy: Introduction to Indian Navy, Command and control, Rank structure, Major Ships and Submarines**,** Entry to the Indian Navy, Renowned leaders.

(02 Hours)

Module– 4

Health and Hygiene: First Aid Protocols - CPR, Understanding Types of Bandages, Fire Fighting

Field & Battle Crafts: Field Signals using hands, Judging distance -Types of Judging Distance, Section formations-types of Section Formation

(10 Hours)

Module– 5

Drill Practicals: Savdhan, Vishram, Salute, Turning, Marching.

(08 Hours)

Course outcomes:

The students will be able to:

CO1: Develop qualities like character, comradeship, discipline, leadership, secular outlook, spirit of adventure, ethics and ideals of selfless service.

CO2: Get motivated and trained to exhibit leadership qualities in all walks of life and be always available for the service of the nation.

CO3: Familiarize on the issues related to social & community development and disaster management and equip themselves to provide solutions.

CO4: Get an insight of the defense forces and further motivate them to join the defense forces.

Teaching Practice:

- Blackboard/Multimedia Assisted Teaching.
- Class Room Discussions, Brainstorming Sessions, Debates.
- Activity: Organizing/Participation in Social Service Programs.
- On Ground: Drill training.

CIE: 100 Marks

- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester.

Textbooks:

1. NCC Cadets Handbook –Common Directorate General of NCC, New Delhi.
2. NCC Cadets Handbook –Special(A), Directorate General of NCC, New Delhi.

References:

- Chandra B. Khanduri, “Field Marshal KM Cariappa: a biographical sketch”, Dev Publications,2000.
- Gautam Sharma, “Valour and Sacrifice: Famous Regiments of the Indian Army”, Allied Publishers,1990.

B.E ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Sports

(Common to all Branches)

(Effective for the 2022 scheme)

Course Code	BPEK359/459/559/659	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	--
Total Number of Contact Hours	26	Exam Hours	--

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of degree)

Course Objectives: The course will enable students to

1. Develop a healthy life style.
2. Acquire Knowledge about various stages of sports and games.
3. Focus on modern technology in sports.

Module – 1

Introduction of the game: Aim of sports and games, Brief history of the game, Nature of the game, Terminology & Modern trends of the game, Fitness & Skill tests along with Game Performance.

(06 Hours)

Module – 2

Offensive and Defensive Techno Tactical Abilities: Fitness, Fundamentals & Techniques of the game with the implementation of Biomechanics, Tactics- Drills for the Techno Tactical abilities, Individual and Group, Miner games- to implement the Techniques, Tactics and Motor abilities.

(05 Hours)

Module – 3

Team tactics and Rules of the Game: Rules and Regulations of the Game: Game rules as well as sequence of officiating, Team tactics: Offensive and Defensive team strategies and scrimmages, Practice Matches: among the group, Analysis of Techno Tactical abilities: Correction and implementation of skills and Sports Injuries and rehabilitation: First aid, PRICE treatment,

(05 Hours)

Module – 4

Sports Training: Introduction of Sports Training, Principles of Sports performance, how to increase and sustain the sports performance, Training Load & Recovery- How to increase the training load (volume/Intensity) and means and methods for Recovery, Periodization: Shorts, Medium and Long term, Physiological changes: Changes in Lung capacity, heart beats etc…

(05 Hours)

Module – 5

Organization of Sports Event: Tournament system, Planning and preparation for the competition, Ground preparation and Equipment's, Organizing an event among the group.

(05 Hours)

The above 5 modules are common to all the sports events / games, we are offering the following games**: 1. Baseball, 2. Kabaddi, 3. Table Tennis, and 4. Volleyball.**

Course outcomes:

The students will be able to:

1. Understand the importance of sports and games, inculcate healthy habits of daily exercise & fitness, Self-hygiene, good food habits, Create awareness of Self-assessment of fitness.
2. Develops individual and group techno tactical abilities of the game.
3. Increases the team combination and plan the strategies to play against opponents.
4. Outline the concept of sports training and how to adopt technology to attain high level performance.
5. Summarize the basic principles of organising sports events and concept of technology implemented to organise competitions in an unbiased manner.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation and video analysing.
- Practical classes in outdoor and indoor as per requirement.

CIE: 100 Marks

- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester in which the student has to give fitness and skill tests and his performance in game will be assessed.

Textbooks

1. Barbara Bushman, "ACSM's complete guide to Fitness & Health", 2011, Human Kinetics USA
2. **Pankaj Vinayak Pathak, "*Sports and Games - Rules and Regulation*", 2019, Khel Sahitya Kendra.**
3. Hardayal Singh, *"Sports Training, General Theory & Methods"*, 1984 "Netaji Subhas, National Institute of Sports".
4. Keith A. Brown, "International Handbook of Physical Education and Sports Science", 2018, (5 Volumes) Hardcover.

References

1. Tudor O Bompa," *Periodization Training for Sports*", 1999, Human Kinetics, USA
2. Michael Boyle, "New Functional Training for Sports" 2016, Human Kinetics USA
3. Michael Kjaer, Michael Rogsgaard, Peter Magnusson, Lars Engebretsen & 3 more, "Text book of Sports Medicine: Basic Science and Clinical Aspects of Sports Injury and Physical Activity", 2002, Wiley Blackwell.
4. Scott L. Delp and Thomas K. Uchida, "Biomechanics of Movement: The Science of Sports, Robotics, and Rehabilitation", 2021, The MIT Press
5. MCARDLE W.D. "Exercise Physiology Nutrition Energy And Human Performance" 2015, LWW IE (50)

B.E ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Music

(Common to all Branches)

(Effective for the 2022 scheme)

Course Code	BMUK359/459/559/659	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of the Degree)

Course Objectives:

The course will enable the students to:

1. Identify the major traditions of Indian music, both through notations and aurally.
2. Analyze the compositions with respect to musical and lyrical content.
3. Demonstrate an ability to use music technology appropriately in a variety of settings.

Module – 1

Preamble: Contents of the curriculum intend to promote music as a language to developan analytical, creative, and intuitive understanding. For this the student must experiencemusic through study and direct participation in improvisation and composition.

Origin of the Indian Music: Evolution of the Indian music system, Understanding of Shruthi, Nada, Swara, Laya, Raga, Tala, Mela. **(03 Hours)**

Module – 2

Compositions: Introduction to the types of compositions in Carnatic Music - Geethe, JathiSwara, Swarajathi, Varna, Krithi, and Thillana, Notation system.

(03 Hours)

Module – 3

Composers: Biography and contributions of Purandaradasa, Thyagaraja, Mysore Vasudevacharya. **(03 Hours)**

Module – 4

Music Instruments: Classification and construction of string instruments, wind instruments, percussion instruments, Idiophones (Ghana Vaadya), Examples of each class of Instruments

(03 Hours)

Module – 5

Abhyasa Gana: Singing the swara exercises (Sarale Varase Only), Notation writing for Sarale Varase and Suladi Saptha Tala (Only in Mayamalavagowla Raga), Singing 4 Geethein Malahari, and one Jathi Swara, One Nottu Swara OR One krithi in a Mela raga, a patriotic song

(14 Hours)

Course Outcomes (COs):

The students will be able to:

CO1: Discuss the Indian system of music and relate it to other genres (Cognitive Domain)

CO2: Experience the emotions of the composer and develop empathy (AffectiveDomain)

CO3: Respond to queries on various patterns in a composition (Psycho-Motor Domain)

Teaching Practice:

- Classroom teaching
- ICT – PowerPoint Presentation
- Audio & Video Visualization Tools

CIE: 100 Marks

- **CIE 1** for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester
- **CIE 2** for 60 marks – A practical test conducted at the end of the semester in which the student has to recite one Sarale Varase mentioned by the examiner inthree speeds. Sing / Play the Geethe in Malahari. Singing / Playing Jathi Swara /Krithi.

Textbooks:

1. Vidushi Vasantha Madhavi, "Theory of Music", Prism Publication, 2007.
2. T Sachidevi and T Sharadha (Thirumalai Sisters), Karnataka Sangeetha Dharpana - Vol. 1 (English), Shreenivaasa Prakaashana, 2018.

References:

1. Lakshminarayana Subramaniam, Viji Subramaniam, "Classical Music of India: A Practical Guide", Tranquebar 2018.
2. R. Rangaramanuja Ayyangar, "History of South Indian (Carnatic) Music", Vipanci Charitable Trust; Third edition, 2019.
3. Ethel Rosenthal, "The Story of Indian Music and Its Instruments: A Study of the Present and a Record of the Past", Pilgrims Publishing, 2007.
4. Carnatic Music, National Institute of Open Schooling, 2019.

Department of Humanities and Social Sciences
Choice Based Credit System (CBCS)
SEMESTER – III

English Communications Skill I
(Common to all Branches, for Lateral Entry Diploma students)
(Effective from the academic year 2024-2025)

Course Code	BENGDIP1	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2 - NCMC	SEE Marks	-
Total Number of Lecture Hours	26	Total Marks	100

Course objectives:

This course will enable students to

1. Familiarise with basic English Grammar and Communication Skills in general.
2. Identify the nuances of phonetics, intonation and enhance pronunciation skills
3. Enhance English vocabulary and language proficiency for better communication skills.
4. Learn about Techniques of Information Transfer through presentation

Module – 1: Fundamentals of Communication

Introduction, Communication-an overview, Definition of communication, Features of successful professional communication, Importance of communication, Purpose of professional communication, Rule of critical and creative thinking in effective communication, Role of emotions in communication, Role of Inter-Cultural Communication, Different forms of communication, Communication network in an organization, Barriers to communication, Some remedies.

Non-verbal communication: Introduction, Body language, Paralinguistic features, Proxemics/ Space distance, Haptics. **4 Hours**

Module – 2: Grammar Essentials and Phonetics

Grammar: Essentials and Applications

Introduction, Parts of Speech, Articles and Prepositions, Modals, Sentences and their types, Subject-verb, Concord, using tenses, Moods of Verbs, Active passive voice, Direct indirect speech, Clause and its types, Using non-Finites.

Basic of Phonetics: Introduction, Reasons for incorrect pronunciations, received pronunciation, Misconceptions about sounds, Transcriptions, Problems of Indian English, Syllables, Word stress, How to transcribe, Weak forms, Intonation and rhythm, Difference between British American and Indian spoken English**.** **6 Hours**

Module – 3: Reading and Listening Skills

Reading skills: Introduction, need for developing efficient reading skills, Benefits of effective reading, Speed of reading, four basic steps to effective reading, overcoming common obstacles, Types, Approaches to efficient reading, Tips for effective reading, employing different reading skills, Understanding the authors point of view, Identifying the central idea, inferring lexical and contextual meaning, employing discourse analysis, Worked out passages.

Listening skills: Introduction, Listening is an art, Listening vs hearing, Poor vs effective listening, Advantages of good listening, Process of listening, Types of listening. Intensive listening vs extensive listening, Barriers to effective listening, five steps of active listening techniques for effective listening, Listening and not taking. **8 Hours**

Module – 4: Paragraphs and Precis Writing
Introduction, precise, Summary, Abstract, Synopsis, Paraphrasing, Art of condensation, Some working principles, Seven step ladder to writing an effective precis, Writing precise for given passages, Structure of a paragraph, Construction of a paragraph, Features of a paragraph, Descriptive writing techniques, Augmentative paragraph, Analytical paragraph. **4 hours**
Module – 5: Professional Presentations and Writing
Professional Presentations: Introduction, combating stage fright, preparing PPT slides, Describing objects, Situations and people, Individual and group presentations, Delivering JAMs **Essays, Letters, Resumes:** Introduction, Types of essays, Characteristic features of an essay, Stages in essay writing, Components comprising an essay, Essay writing-guiding principles, Business letters and resumes- Importance, Elements of structure, Layout. Business letters- Elements of style, Types of business letters, Resume preparation. **4 Hours**
Course Outcomes: The students will be able to: 1. Understand and apply basic English grammar for effective communication. 2. Identify the nuances of phonetics, intonation, and enhance pronunciation skills. 3. Understand and use all types of English vocabulary and language proficiency. 4. Enhance their knowledge about techniques of information transfer through presentations.
Textbooks 1. Meenakshi Raman and Sangeeta Sharma, Technical Communication Principles and Practice, Oxford Publications, 3rd Edition, 2015 2. Sanjay Kumar and Pushpa Lata, Communication Skills, Oxford University Press, 3. A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022. References 1. Gajendra Singh Chauhan, Technical Communication Cengage Learning India Pvt Limited, Latest Revised Edition, 2019 2. Michael Swan, Practical English Usage, Oxford University Press, 2016 **3.** N.P.Sudharshana and C.Savitha, English for Engineers, Cambridge University Press, 2018