BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institute affiliated to VTU)

Scheme of Teaching and Examination: Effective from AY 2021– 22 Choice Based Credit System (CBCS)

UG PROGRAM: ELECTRICAL & ELECTRONICS ENGINEERING (EEE) — **Semester: III**

Sl. No	Course Category	Course Code	Course Title	Teaching Dept.	Teaching Hours /Week				Credits	Examination			
					L	T	P	PW		Duration in Hours	CIE Marks	SEE Marks	Total Marks
1	BS	21MTA31	Fourier series, Numerical methods, statistics and Probability	MAT	3	1	1	0	4	3	50	50	100
2	HS	21KSK32	Samskrutika Kannada	HS	1	0	0	0	1	1	50	50	100
		21KBK32	Balake Kannada										
3	UHV	21UHV33	Universal Human Values-I	HS	1	0	0	0	1	1	50	50	100
4	INT	21INT34	Internship-I	EEE	0	0	0	4	2	3	100	--	100
5	PC	21EE35	Electrical Circuit Analysis	EEE	2	2	0	0	3	3	50	50	100
6	PC	21EE36	Electrical Machines-I	EEE	2	2	0	0	3	3	50	50	100
7	PC	21EE37	Analog Electronic Circuits	EEE	2	2	0	0	3	3	50	50	100
8	PC	21EEL38A	Electrical Machines Laboratory - I	EEE	0	1	2	0	1	3	50	50	100
9	PC	21EEL38B	Analog Electronics Laboratory	EEE	0	1	2	0	1	3	50	50	100
10	PC	21EEL38C	Electrical Simulation Laboratory	EEE	0	1	2	0	1	3	50	50	100
TOTAL					**11**	**10**	**7**	**4**	**20**		**550**	**450**	**1000**

Course prescribed to Lateral entry Diploma holders admitted to III Semester B.E.													
1	NCMC	21DIP31A	Diploma Mathematics-I	MAT	3	0	0	0	--	3	100	--	100

- The Lateral entry students have to undergo Internship-I during the intervening vacation of III and IV semesters.
- The Assessment Pattern for 1/2/3 credit courses shall be done as per the VTU guidelines.
- BS-MTX (X-Variable) Eg: Core branches: ME, CV, EEE, ETE, ECE-**MTA**, Digital branches: CSE, ISE, AIML- **MTB** .
- Additional Mathematics I and II shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.
- Successful completion of the course Additional Mathematics-II shall be indicated as satisfactory in the grade card. Non completion of the same shall be indicated as unsatisfactory.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Fourier Series, Numerical Methods, Statistics and Probability (3:1:1) 4

(Common to ECE, ETE, EEE, MECH & CIVIL Branches)

(Effective from the academic year 2021-22)

Course Code	21MTA31	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:1:1	SEE Marks	50
Total Number of Contact Hours	50	Exam Hours	3

Course Objectives:

This course will enable students to:

1. Apply the concepts of Fourier series, Fourier transforms, Difference equations and Z-transforms in the field of engineering.
2. Apply the concept of Numerical Techniques, and probability distribution to analyze problems arising in Science and Engineering field.
3. Apply the knowledge of interpolation/extrapolation and Numerical Integration technique whenever analytical methods fail or very complicated to offer solutions.

Module – I

Introduction: Understanding of Transform Calculus, Numerical methods & their applications in Engineering, Economics and Statistics.

Statistical Methods: Correlation-Karl Pearson's coefficient of correlation – problems, Regression lines, lines of regression (without proof) –Problems.

Curve fitting: Curve fitting by the method of least squares- fitting of the curves of the form, $y = ax + b, y = ax^2 + bx + c$ and $y = ae^{bx}$.

Calculus of variation: Variation of a function and a functional, Extremal of a functional, Euler's equation, Standard variational problems.

Self-Learning Component: Fitting of the curves $y = a\,x^b$ and $y = a\,b^x$.

Lab Session 1:

1. Determination of polynomial using method of Least Square Curve Fitting.
2. Relation between variables: correlation, Regression. (10 Hours)

Module – II

Finite Differences: Forward and backward differences, Newton's forward and backward interpolation formulae, Divided differences- Newton's divided difference formula, Lagrange's interpolation formula and inverse interpolation formula (all formulae without proof) - problems.

Numerical Integration: Simpson's $(1/3)^{rd}$ and $(3/8)^{th}$ rules, Weddle's rule (without proof) – problems.

Self-Learning Component: Trapezoidal rule.

Lab Session 2:

1. Numerical solution using Newton's Forward / Backward interpolation formula.
2. Numerical integration using Simpson's One-third rule. (10 Hours)

Module – III

Fourier Series: Dirichlet's conditions, Fourier Series of periodic functions of period 2π and arbitrary period. Half range Fourier Series, Practical harmonic analysis over the period 2π.

Self-Learning Component: Complex Fourier Series.

Lab Session 3:

1. Obtain the Fourier series of a function.
2. Finding Fourier series by practical Harmonic Analysis. (10 Hours)

Module – IV

Fourier Transforms: Infinite Fourier transforms, Fourier Sine and Cosine transforms. Inverse Fourier transforms - problems.

Z-transforms: Difference equations, basic definition, Z-transform-definition, Standard Z-transforms (only formula), Damping rule, Shifting rule (without proof) and problems, Inverse Z-transforms – problems, Solution of Difference equations using Z transforms.

Self-Learning Component: Proofs of Z-transformation of standard functions.

Lab Session 4:

1. Obtain the Fourier Transform of a function.
2. Obtain the solution of difference equation using Z Transforms. (10 Hours)

Module – V

Probability Distributions: Random variables (discrete and continuous), probability mass/density functions. Binomial distribution, Poisson distribution. Exponential and Normal distributions, problems.

Self-Learning Component: Uniform distribution.

Lab Session 5:

1. Compute Pdf/Pmf for given data.
2. Compute and plot the probability density function for Normal Distribution, Binomial Distribution, Exponential Distribution, Poisson Distribution.

Recap/Summary of the Course. (10 Hours)

Course Outcomes:

The students will be able to:

CO1: Make use of the concepts of method of least squares, correlation and regression analysis to fit a suitable mathematical model for the statistical data and calculus of variation to evaluate extremal of a functional.

CO2: Apply the knowledge of Numerical Methods in the modeling of various physical and engineering phenomena.

CO3: Apply Fourier series to study the behavior of periodic functions and Fourier transforms and Z-transforms to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.

CO4: Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering.

Question paper pattern:

SEE will be conducted for 100 marks.

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.

CIE will be conducted for 100 marks.

- Three Unit Tests each of **20 Marks** (Duration 01 hour).

- Two assignments each of 10 Marks.
- Two alternate assessment tools (AATs) from the list shall be planned to attain the COs and POs for **20 Marks** (duration 01 hours).
- The sum of three tests, two assignments, and AATs will be out of 100 marks and will be scaled down to 50 marks.

Textbooks:

1. B.S. Grewal, "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, 2015.
2. E. Kreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons, 2015.
3. B.V. Ramana, "Higher Engineering Mathematics", 6th Edition, Tata McGraw-Hill, 2010.

References:

1. N.P. Bali, Manish Goyal, "A Text Book of Engineering Mathematics", Laxmi Publishers, 2014.
2. H.K. Dass, Er. Rajnish Verma, "Higher Engineering Mathematics", 3rd Edition, S. Chand publishers, 2014.
3. P. Kandasamy, K. Thilagavathi, K. Gunavathi, "Engineering Mathematics", Vol. III, 2001.
4. S.S. Sastry, "Introductory Methods of Numerical Analysis", 4th Edition, Prentice Hall of India, 2010.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ **Samskrutika Kannada (1:0:0):1**

(Effective from the academic year 2021-2022)

ವಿಷಯ ಸಂಕೇತ Course Code	**21KSK32/42**	ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ ಅಂಕಗಳು CIE Marks	**50**
ಒಂದು ವಾರಕ್ಕೆ ಬೋಧನಾ ಅವಧಿ Teaching hours/Week (L: T:P)	**1-0-0**	ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯ ಅಂಕಗಳು SEE Marks	**50**
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ Total Number of contact hours	**13**	ಪರೀಕ್ಷೆಯ ಅವಧಿ Exam Hours	**01**

ಸಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯದ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು

1. ವೃತ್ತಿಪರ ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿವಾಗಿ ಪರಿಚಯಿಸಿ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಢಿಸುವುದು.
3. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳು ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.

ಘಟಕ–1

ಲೇಖನಗಳು:

ಕರ್ನಾಟಕ ಏಕೀಕರಣ: ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ–ಜಿ.ವೆಂಕಟಸುಬ್ಬಯ್ಯ

ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ–ಡಾ.ಎಲ್.ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ.ವಿ.ಕೇಶವಮೂರ್ತಿ **2 ಗಂಟೆಗಳು**

ಘಟಕ–2

ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ:

ವಚನಗಳು–ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ

ಕೀರ್ತನೆಗಳು–ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ–ಪುರಂದರದಾಸರು

ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ–ಕನಕದಾಸರು **3 ಗಂಟೆಗಳು**

ಘಟಕ–3

ಆಧುನಿಕ ಕಾವ್ಯ ಭಾಗ:

ಡಿ.ವಿ.ಜಿ.ಯವರ ಮಂಕು ತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು.

ಹೊಸ ಬಾಳಿನ ಗೀತೆ: ಕುವೆಂಪು **2 ಗಂಟೆಗಳು**

ಘಟಕ–4

ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ, ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ:

ಡಾ.ಸರ್.ಎಂ.ವಿಶ್ವೇಶ್ವರಯ್ಯ:ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ–ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್

ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ–ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ **4 ಗಂಟೆಗಳು**

ಘಟಕ–5

ಪ್ರವಾಸ ಕಥನ:

ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ **2 ಗಂಟೆಗಳು**

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು: **Course outcomes**

1. **ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯವಾಗುತ್ತದೆ.**
2. **ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳು ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಆಸಕ್ತಿಯು ಮೂಡುತ್ತದೆ.**
3. **ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವಾಗುತ್ತದೆ.**
4. **ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ, ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳ ಪರಿಚಯವಾಗುತ್ತದೆ**

Assessment Details (both CIE and SEE): Kannada, Constitution of India and Professional Ethics and Universal Human Values

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum mark which is 20 marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE and SEE taken together

Continuous Internal Evaluation:

Three Tests each of **20 Marks.** (duration 01 hour)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Two alternate assessment tools (AATs) from the list shall be planned to attain the COs and POs for **20 Marks**

6. At the end of the 13th week of the semester

The sum of three tests, two assignments and AATs will be out of 100 marks and will be scaled down to 50 marks.

CIE methods/question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination (SEE):

SEE will be conducted as per the scheduled timetable, with common question papers for the subject.

- The question paper will have 50 questions. Each question is set for 01 mark.
- SEE Pattern will be in MCQ Model (Multiple Choice Questions) for 50 marks. The duration of the examination is 01 Hour.

Textbook:

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ.ಹಿ.ಚಿ ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಸಾರಾಂಗ ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ

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SEMESTER – III

ಬಳಕೆ ಕನ್ನಡ Balake Kannada (1:0:0):1

(Common to all Branches)

(Effective from the academic year 2021-22)

ವಿಷಯ ಸಂಕೇತ Course Code	**21KBK32/42**	ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ ಅಂಕಗಳು CIE Marks	**50**
ಒಂದು ವಾರಕ್ಕೆ ಬೋಧನಾ ಅವಧಿ Teaching hours/Week (L: T:P)	**1-0-0**	ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯ ಅಂಕಗಳು SEE Marks	**50**
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ Total Number of contact hours	**13**	ಪರೀಕ್ಷೆಯ ಅವಧಿ Exam Hours	**01**

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು Course Learning Objectives:

- To Create awareness regarding the necessity of learning local language for comfortable and healthy life.
- To enable learners to Listen and understand the Kannada language properly.
- To speak, read and write Kannada language as per requirement.
- To train the learners for correct and polite conversation.

Module-1

Introduction, Necessity of learning a local language. Methods to learn the Kannada language. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities

Key to Transcription.

ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು

Personal Pronouns, Possessive Forms, Interrogative words **3 Hours**

Module-2

ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು

Possessive forms of nouns, dubitive question and Relative nouns

ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative, Quantitative and Color Adjectives, Numerals

ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು – ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ (ಅ, ಅದು, ಅವು, ಅಲ್ಲಿ) Predictive Forms, Locative Case **3 Hours**

Module-3

ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು Dative cases and Numerals

ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು Ordinal numerals and Plural makers

ನ್ಯೂನ/ನಿಷೇದಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ಮತ್ತು ವರ್ಣ ಗುಣವಾಚಕಗಳು Defective /Negative Verbs and Colour Adjectives **3 Hours**

Module-4

ಅಪ್ಪಣೆ/ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಅರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು Permission, Commands, encouraging and urging words (Imperative words and sentences)

ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು Accusative Cases and Potential Forms used in General Communication **2 Hours**

Module-5

"ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು Helping verbs "iru and iralla" Corresponding Future and Negation Verbs
ಹೋಲಿಕೆ(ತರತಮ), ಸಂಬಂಧಸೂಚಕ ಮತ್ತು ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇದಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ
Comparitive, Relationship, Identification and Negation words **2 Hours**

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು: Course outcomes

At the end of the Course, The Students will be able

1. To understand the necessity of learning of local language for comfortable life.
2. To Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To communicate (converse) in Kannada language in their daily life with kannada speakers.
5. To speak in polite conversation.

Assessment Details (both CIE and SEE): Kannada, Constitution of India and Professional Ethics and Universal Human Values

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum mark which is 20 marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE and SEE taken together

Continuous Internal Evaluation:

Three Tests each of **20 Marks.** (duration 01 hour)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Two alternate assessment tools (AATs) from the list shall be planned to attain the COs and POs for **20 Marks**

6. At the end of the 13th week of the semester

The sum of three tests, two assignments and AATs will be out of 100 marks and will be scaled down to 50 marks.

CIE methods/question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination (SEE):

SEE will be conducted as per the scheduled timetable, with common question papers for the subject.

The question paper will have 50 questions. Each question is set for 01 mark.

SEE Pattern will be in MCQ Model (Multiple Choice Questions) for 50 marks. The duration of the examination is 01 Hour.

Textbook:

ಬಳಕೆ ಕನ್ನಡ

ಲೇಖಕರು: ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Universal Human Values- I (1:0:0) 1

(Effective from the academic year 2021-2022)

Course Code	21UHV33	CIE Marks	50
Teaching Hours/Week (L: T:P)	1-0-0	SEE Marks	50
Total Number of Lecture Hours	13	Exam Hours	01

Course objectives:

This introductory course is intended to

1. Develop a holistic perspective based on self-exploration about themselves (human being).
2. Understand harmony in the human being.
3. Strengthening of self-reflection.
4. Develop commitment and courage to act.

Module – 1

Preamble: Significance and Scope of the course, Importance of the course in societal, political and economic growth of the nation.

Introduction to Value Education: Understanding Value Education; Need and Basic guidelines for Value Education; Scope and Process.

Self-exploration as the Process for Value Education: What is self- exploration; Process of self-exploration.

Case study and Group Discussion **2 Hours**

Module – 2

Basic Human Aspirations: Continuous happiness and prosperity; Exploring happiness and prosperity; Methods to Fulfill the Basic Human Aspirations; Need for right understanding; Relationship and Physical Facilities.

Case study and Group Discussion **2 Hours**

Module – 3

Understanding human being as co-existence of the self and the Body: Understanding and distinguishing between the Needs of the Self and the Body- Quantitative, Qualitative, Knowing, Assuming, Recognizing and fulfilling in self and in body.

Case study and Group Discussion **3 Hours**

Module – 4

Harmony in self: Understanding self; Activities in self; Power of expectation, thought and desire; Conflicts or contradictions in self as a result of pre-conditioned desire; Realisation and Understanding.

Case study and Group Discussion 3 Hours

Module – 5

Harmony with Body: Harmony of self with the body-Sanyama and Svasthya; Understanding and living with Sanyama; Nurturing of the body; Protection of the body; Right utilization of the body; Correct appraisal of our physical needs.

Case study and Group Discussion **3 Hours**

Course outcomes: The students will be able to:

1. Understand the role of value education, self-exploration and harmony in self and with body.
2. Distinguish between values and skills, Self and the Body, Intention and Competence of an individual.

Assessment Details (both CIE and SEE): Kannada, Constitution of India and Professional Ethics and Universal Human Values

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum mark which is 20 marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE and SEE taken together

Continuous Internal Evaluation:

Three Tests each of **20 Marks.** (duration 01 hour)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Two alternate assessment tools (AATs) from the list shall be planned to attain the COs and POs for **20 Marks**

6. At the end of the 13th week of the semester

The sum of three tests, two assignments and AATs will be out of 100 marks and will be scaled down to 50 marks.

CIE methods/question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination (SEE):

SEE will be conducted as per the scheduled timetable, with common question papers for the subject.

The question paper will have 50 questions. Each question is set for 01 mark.

SEE Pattern will be in MCQ Model (Multiple Choice Questions) for 50 marks. The duration of the examination is 01 Hour.

Textbooks

1. The Textbook *A Foundation Course in Human Values and Professional Ethics*, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN978-93-87034-47-1

2. The Teacher's Manual for *A Foundation Course in Human Values and Professional Ethics*, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, NewDelhi, 2019. ISBN 978-93-87034-53-2

References

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. Slow is Beautiful - Cecile Andrews
4. Vivekananda - Romain Rolland (English)

Relevant websites, documentaries

1. Value Education websites, http://uhv.ac.in,
2. Story of Stuff, *http://www.storyofstuff.com*

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)
SEMESTER – III

Inter/Intra-Institutional Internship
(Effective from the academic year 2021-22)

Credits: 2	**Course Code: 21INT34**	**CIE:100 Marks**
Duration: 3 Weeks		**SEE: NA**

Schedule:

- During the intervening vacation of II and III semester for students admitted to I semester.
- During the intervening vacation of III and IV semester for lateral entry diploma studentsadmitted to III semester.

Course Outcomes: students will be able to

CO1. Acquire academic/ career/ personal overall skill/ knowledge development.
CO2. Perceive ample opportunities for professional growth and achievement with relevance tosociety and environment.
CO3. Expose to real job world environment and gain practical knowledge with experience.
CO4. Build leadership qualities, teamwork, collaborations, cooperation, and facility in using virtual workspace.
CO5. Intensify creativity, artistry, curiosity, imagination, innovation and personal expression.
CO6. Write report in technical work/ project with presentation.

Rubrics for Internal Evaluation (Total Marks: 100)

Indicator	**Poor**	**Average**	**Good**	**Excellent**
Acquired skills or knowledge (10 Marks) (CO1)	Not gained any skill / knowledge. OR Attended a few sessions. 0-1 Marks	Partial skill/Knowledge gained. Only Block Diagram/Notes/ Description. 2-4 Marks	Average skill/knowledge gained. Lack of Technical/ Knowledge. 5-7 Marks	Complete skill/knowledge gained. All Skills Acquired. 8-10 Marks
Weekly report (10 Marks) (CO6)	Weekly report not submitted. OR Few days report was submitted. 0-1 Marks	One Weekly report submitted. 2-4 Marks	Two weekly reports submitted. 5-7 Marks	All three weekly reports submitted. 8-10 Marks

Presentation (10 Marks) (CO5)	Absence for presentation. OR Presented after the due date. 0-1 marks	Information is lacking/ unclear and communicated in such a way that the audience cannot understand the purpose of the evidence of work and internship experiences. 2-4 Marks	Information is not presented in a clear manner and many details are missing related to the evidence work and internship experiences. 5-7 Marks	Information is presented in such a way that the audience can understand the purpose of the evidence of work and internship experiences. 8-10 Marks
Practical Knowledge (10 Marks) (CO3)	Not gained any practical knowledge. OR Able to define basic concepts. 0-1 Marks	Partial practical Knowledge gained. Less hands-on experience. 2-4 Marks	Average practical knowledge gained. Only few models are exhibited. 5-7 Marks	Complete practical knowledge gained. 8-10 Marks
Societal and environmental relevance (10 Marks) (CO2)	No relevance to society or environment (At-least one relevance). 0-1 Marks	Partial relevance to society or environment. 2-4 Marks	Average relevance to society or environment. 5-7 Marks	Directly Relevant to society or environment. 8-10 Marks
Viva (10 Marks) (CO4)	Does not know any information. OR Fair leadership quality/ teamwork/ cooperation. 0-1 Marks	Provides irrelevant information for all questions. Good leadership quality/ teamwork/ cooperation. 2-4 Marks	Provides incomplete information for all questions. Better leadership quality/ teamwork/ cooperation. 5-7 Marks	Provides complete information for all questions. Outstanding leadership quality/ teamwork/ cooperation. 8-10 Marks
Report (40 Marks)	Does not submit the report.	Report submitted does not fulfill the prescribed format	Report submitted partially fulfills the prescribed format	Report submitted fulfills the prescribed format

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Electrical Circuit Analysis (2:1:0) 3

(Effective from the academic year 2021-22)

Course Code	21EE35	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

This course will enable students to :

1. Understand basic laws, source transformations, theorems and the methods of analyzing electrical circuits.
2. Use of network theorems.
3. Appreciate the importance of initial conditions, their evaluation and transient analysis of R-L and R-C circuits.
4. Analyze resonant circuits, two port networks and networks with non-sinusoidal inputs.
5. Analyze electric networks using Laplace transforms

Module – 1

Introduction: Scope of the course in Industry and Economy:

1. When Electrical Science became the Electrical Industry?
2. Direct and Indirect Market share of Electrical Industry
3. Scope of Design and Analysis of Systems
4. Percentage of Finance in Design and Analysis

Basic Concepts:

Active and Passive Elements, Concepts of Ideal and Practical sources, source transformation, source shifting, Network reduction Methods, Mesh and Node analysis with linear dependent and independent sources for DC and AC networks. Principle of duality.

(8 hours)

Module – 2

Network Theorems:

Superposition, Thevenin's, Norton's, Maximum Power transfer theorem with independent and dependent ac and dc sources

Two port networks:

Open Circuit (Z) parameters, Short Circuit (Y) parameters, Transmission (ABCD) parameters and Hybrid parameters, their inter relationship and numerical problems on simple circuits

(8 hours)

Module – 3

Transient Analysis and Initial Conditions:

Initial conditions in network, initial conditions in basic passive elements, transient response of series RL, RC and RLC circuit for DC excitation, transient response of series RL, RC and RLC circuit for AC excitation,

(8 hours)

Module – 4

Laplace Transformation and Applications:

Definition, Laplace and inverse Laplace transforms of standard functions, Properties of Laplace Transform, Waveform synthesis, initial and final value theorems. Impulse, Step, Ramp and Sinusoidal functions. Convolution theorem, synthesis of periodic waveforms

(8 hours)

Module – 5

Inverse Laplace Transform

Inverse Laplace Transform- using Convolution Integral, solving differential equations using LT, response of RL, RC and RLC series circuit to DC excitation and sinusoidal excitation. Transform of basic R, L and C elements, initial conditions in network analysis. Nodal and Mesh analysis in S-domain

(8 hours)

Recap: Network Reduction Techniques, Mesh and Node Analysis, Network theorems, ac circuit analysis for transients, use of Laplace Transformation and S-domain analysis.

Course outcomes:

The students will be able to

CO1: Apply Laplace transformation and Inverse Laplace Transformation techniques for standard functions ,

CO2: Analyze DC and AC networks using basic network reduction techniques, Mesh Current and Node Voltage analysis Methods and Network Theorems.

CO3: Analyze electrical circuits under Transients, with initial conditions and two port parameters.

CO4: Synthesise waveforms and obtain its Laplace Transform

Question paper pattern:

SEE will be conducted for 100 marks.

- The question paper will be set for 100 marks and marks scored will be proportionally scaled down to 50 marks
- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.

CIE will be conducted for 100 marks.

- Three Unit Tests each of **20 Marks** (Duration 01 hour).
- Two assignments **each of 10 Marks.**
- Two alternate assessment tools (AATs) from the list shall be planned to attain the COs and POs for **20 Marks** (duration 01 hour).

The sum of three tests, two assignments, and AATs will be out of 100 marks and will be scaled down to 50 marks.

Textbooks

1. Hayt, Kemmerly and Durbin, "Engineering Circuit Analysis", TMH, 6th Edition, 2002
2. Ravish R Singh, "Electrical Network", Tata McGrawHill, Edition 2009

References

1. M.E Van Valkenberg, "Network Analysis", PHI, 3rd Edition, Reprint 2002
2. D. Roy Choudhary, "Networks and Systems", 2nd Edition, New Age international Publishing,

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Electrical Machines - I (2:1:0) 3

(Effective from the academic year 2022-2023)

Course Code	21EE36	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Lecture Hours	40	Exam Hours	03

Course objectives:

This course will enable students to:

1. Draw the circuit model of Transformers and induction machines used in power system.
2. Understand Operational characteristics of transformers and induction machines and its applications
3. Explain the necessity of starter and starting methods of induction machines
4. Study the speed control methods of motors.

Module – 1

Introduction: Role of Electrical machinery in nation's power generation, industrial applications like automation, robotics, electric vehicles etc.

Single Phase Transformers: Practical transformer - vector diagram of practical transformer on no load and load, Equivalent Circuit model of a transformer-Approximate and simplified, OC and SC tests- predetermination of Efficiency, Voltage regulation, parameters of equivalent circuit. **Three Phase Transformers –** Introduction, Constructional features of three phase transformers, choice between single unit and bank of three single phase transformers, Three phase transformer connections – star-star, star-delta, delta-star, delta-delta, open delta (V-V), Comparative features.

(8hours)

Module – 2

Testing and parallel operation of transformers:

Polarity test, Sumpner's test, 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.

Auto Transformers: Construction, principle, applications and comparison with two winding transformers (Cu- Saving). **Tap changing transformers:** No load and on load tap changing transformers.

(8hours)

Module – 3

Three phase Induction Motor - Principle of operation,slip, frequency of rotor current/EMF, speed of rotor field, rotor EMF, rotor current and power factor. Rotor Torque - Expression for rotor torque, Torque - slip curve, starting torque, Full load torque, pull out torque. Effect of parameter variation on torque speed characteristics (Variation of stator and rotor resistances, stator voltage, frequency).

Losses and power flow in three phase Induction motor- rotor output and motor torque, synchronous watt. Equivalent circuit model - Electrical equivalent of mechanical load, relation between rotor input and rotor cu-loss, Phasor diagram of three phase Induction motor. Comparison of three phase IM and Transformer. Methods of starting and speed control of three phase Induction motors

(8 Hours)

Module – 4

Testing and performance of Three Phase IM - No load test, blocked rotor test. Circle diagram – construction and predetermination of performance (efficiency, slip, torque, power factor, and current, at any given load and at maximum conditions), factors affecting performance of three phase Induction motor, cogging and crawling.

(8hours)

Module – 5

Single Phase Induction Motors

Constructional features double revolving field theory, equivalent circuit, determination of parameters, Split-phase starting methods and applications.

Recap: Emphasis on fundamental concepts of electrical machines, principles, circuit models and applications such as robots and electric vehicles.

(8 hours)

Course outcomes:

The students will be able to:

CO1: Describe the operating principles and characteristics of Transformers and Induction Motors

CO2: Describe the methods of testing and estimate performance of Transformers and Induction motors

CO3: Analyze the operation of Transformers and Induction Motors using phasor diagrams and circuit model of machines

Question paper pattern:

SEE will be conducted for 100 marks.

- The question paper will be set for 100 marks and marks scored will be proportionally scaled down to 50 marks
- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.

CIE will be conducted for 100 marks.

- Three Unit Tests each of **20 Marks** (Duration 01 hour).
- Two assignments **each of 10 Marks.**
- Two alternate assessment tools (AATs) from the list shall be planned to attain the COs and POs for **20 Marks** (duration 01 hour).
- The sum of three tests, two assignments, and AATs will be out of 100 marks and will be scaled down to 50 marks.

Textbooks:

1. D. P Kothari, "Electrical Machines", McGraw Hill, 4th edition 2011
2. Dr. P.S. Bhimbra, "Electrical Machinery", Khanna Publications, 7th Edition, 2007
3. AbhijitChakrabarti, "Electric Machines", McGraw Hill, Education 2015

References:

1. Ashfaq Husain, "Electric Machines", Dhanpat Rai and Co., Second Edition,2014
2. M. G. Say, "Performance and Design of Alternating Current Machines", John Wiley and Sons Publications, 3rdEdition,2002
3. A S Langsdorf, "Alternating current Machines", McGraw Hill, Education -1984

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Analog Electronic Circuits (2:1:0) 3

(Effective from the academic year 2021 -2022)

Course Code	21EE37	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Lecture Hours	40	Exam Hours	3 Hours

Course objectives:

This course will enable students to

1. Design diode-based wave shaping circuits.
2. Understand biasing techniques and stability concepts.
3. Understand transistor modelling fundamentals and frequency response
4. Understand feedback concepts.
5. Understand power amplifier and oscillator circuits.
6. Design oscillator and amplifier circuits.

Module – 1

INTRODUCTION: Relevance of electronics in the Global scenario. Role of electronics in environmental and Societal concerns. Internship and Job opportunities. Significance and application of the course in Electrical and Electronics Engineering.

a. Diode applications:

Diode Clippers: Operation of series clippers and parallel clippers with and without biasing.

Diode Clampers: Operation of positive and negative clampers with and without biasing.

b. Bipolar Junction Transistor (BJTs): -Introduction to Transistor Biasing, Operating point, Emitter Bias, Collector feedback bias, Voltage divider Bias configuration. Stability factors of Voltage Divider Bias configuration. Problems on Biasing, stability factors, and design operations (Voltage divider bias only). **(8 Hours)**

Self- study: Simulation of Rectifier circuits and Clippers and clampers.

Module – 2

BJT Transistor Modelling: re-model for CE and CB configuration. Derivation of Hybrid model. Determination of performance parameters such as input and output impedances, voltage and current gains using re and hybrid model (based on voltage divider bias and Emitter Bias only). Emitter follower circuit: Operation and analysis. Two port network model of a transistor. CB configuration. Analysis of Darlington emitter follower circuit. Problems on re-model and h-model for voltage divider bias and emitter bias configuration only. **(8 Hours)**

Module – 3

a. BJT Frequency Response:-Introduction to frequency response, Low-frequency response, and High-frequency response of BJT Amplifier (Qualitative treatment only). Miller effect Capacitance. **Multistage Amplifiers:** Cascaded systems. Determination of overall voltage gain and current gain in a cascaded system. Study of loading effect on cascaded connections. Problems on cascaded systems.

b. Feedback Amplifier: Introduction to feedback amplifiers, Feedback concept, Feedback connections type. Trans-conductance, Trans-resistance, Voltage, and Current Amplifier analysis in terms of Input and output impedances. **(8 Hours)**

Module – 4

a. Power Amplifiers: Introduction to power Amplifiers, Classification of power amplifiers. Class A Amplifier: Series Fed and Transformer coupled, DC Bias Operation, AC operation, Power Consideration, Efficiency. Class B operation: Class B Amplifier Circuits- Transformer coupled Push- Pull Circuits, Complementary Symmetry Circuits expression for efficiency. Problems on Class A operation only.

b. Oscillators: Introduction to oscillator, Barkhausen criteria, Operation of RC Phase shift oscillator, Wein bridge oscillator, Hartley oscillator, Colpitts oscillator, Crystal oscillator. Frequency expression of various oscillators (No derivation)

Simple oscillator design problems for RC Phase shift oscillator, Wein bridge oscillator, Hartley oscillator, Colpitts oscillator, Crystal oscillator. **(8 Hours)**

Module – 5

FET Amplifiers :

Review of FET and MOSFET construction and characteristics (no questions are to be set from this topic)

a. JFETs: Derivation of trans-conductance. FET parameters. Biasing of FET:Common source configuration with voltage divider bias.

JFET Amplifiers: FET AC equivalent circuit, JFET Voltage Divider Configuration (with bypass capacitor only). Finding input and output impedances and voltage gain.

b. MOSFETS: Small signal model of Depletion type MOSFET and Enhancement type MOSFET. Finding input impedance, output impedances and voltage gain of MOSFET amplifier circuits with voltage divider bias (with bypass capacitor only). **(8 Hours)**

Course outcomes:

The students will be able to:

CO1: Explain the operation of various solid-state devices and circuits.
CO2: Apply the knowledge of network theorems to determine the bias point details.
CO3: Design wave shaping and signal conditioning circuits using solid state devices(Diodes and Transistors).
CO4: Analyze the performance parameters of various amplifier and oscillator circuits.
CO5: Apply an appropriate modern tool to simulate electronic circuits.

Question paper pattern:

SEE will be conducted for 100 marks.

- The question paper will be set for 100 marks and marks scored will be proportionally scaled down to 50 marks
- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.

CIE will be conducted for 100 marks.

- Three Unit Tests each of **20 Marks** (Duration 01 hour).
- Two assignments **each of 10 Marks.**
- Two alternate assessment tools (AATs) from the list shall be planned to attain the COs and POs for **20 Marks** (duration 01 hour).
    - The sum of three tests, two assignments, and AATs will be out of 100 marks and will be scaled down to 50 marks.

Textbooks:

1. Robert L.Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", PEARSON EDUCATION, 11th edition

References:

1. David A Bell, Electronic Devices and Circuits, PHI, 5th edition.
2. Millman and Halkias, TMH, Electronic Devices and Circuits, 4th edition.
3. Charles Roth Jr.LarryL.Kinney, Raghunandan G.H, "Fundamentals of Analog and digital electronics", Cengage Learning, 2019

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Electrical Machines Laboratory - I (0:0:1) 1

(Effective from the academic year 2021 -2022)

Course Code	21EEL38A	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:1:2	SEE Marks	50
Total Number of Lecture Hours	30	Exam Hours	3

Course objectives:

This course will enable students to:

1. Conduct open and short circuit tests on single phase transformer
2. Conduct load tests on single phase and three phase induction motor.
3. Conduct test on induction motor to determine the performance characteristics
4. Conduct Scott connection test on transformers
5. Conduct speed control test on single phase and three phase induction motor

List of Experiments

1. Predetermination of efficiency and regulation by OC and SC test on single phase transformer
2. No Load and blocked rotor test on three phase induction motor
3. Parallel operation of two dissimilar single phase transformers.
4. Sumpner's test
5. Three phase connection of three single phase transformers -Start-Delta.
6. Scott connection for balanced and unbalanced two phase UPF loads.
7. Load test on single phase induction motor
8. Load test on three phase induction motor
9. Comparison of performance of direct and indirect load test on transformer
10. Equivalent circuit analysis of transformer with indirect tests

Open ended Experiments

1. Speed control of three phase induction motor – Rotor resistance control
2. Three phase connection of three single phase transformers of Delta -Delta and Open Delta.

Course outcomes:

The students will be able to:

CO1: Determine the performance characteristics of transformers.
CO2: Determine the performance characteristics of three phase Induction motors
CO3: Analyze the load sharing of transformers with direct and indirect methods.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Analog Electronics Laboratory (0:0:1) 1

(Effective from the academic year 2021-22)

Course Code	21EEL38B	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:1:2	SEE Marks	50
Total Number of Contact Hours	30	Exam Hours	3

Course objectives:

This course will enable students to:

1. Design Clipper and Clamper Circuits using pn junction diodes.
2. Design Amplifier for a given set of specifications.
3. Analyse power amplifier circuit.
4. Design Oscillator circuits.
5. Plot frequency response of amplifier circuits.

List of Experiments

1. Design and Testing of diode clipping circuits
2. Design and Testing of diode clamping circuits
3. Design and Testing of Full wave rectifier circuits.
4. Determination of h-parameters of a transistor in CE configuration.
5. Design and testing of BJT as RC coupled amplifier with simulation.
6. Design and testing of BJT as RC Phase shift oscillator.
7. Performance analysis of class – B Power Amplifier.
8. Design a FET amplifier for a given set of specification-Hardware/Simulation
9. Implementation of a transistor as a switch.
10. Frequency response characteristics a Darlington emitter follower circuit, with the determination of input and output impedances.

Open Ended Experiment

1. Lead Compensators.
2. Lag Compensators.
3. Testing of a MOS amplifier circuit-Hardware/Simulation
4. Apply high level programming to determine the different currents and voltages of a given biasing network.

Course outcomes:

The students will be able to:

CO1: Design and test wave-shaping circuits.
CO2: Design and Test Transistor amplifier and oscillator circuits.
CO3: Apply an appropriate modern tool to simulate electronic circuits.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Electrical Simulation Laboratory (0:0:1) 1

(Effective from the academic year 2021-22)

Course Code	21EEL38C	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:1:2	SEE Marks	50
Total Number of Contact Hours	30	Exam Hours	3

Course objectives:

1. To impart practical working knowledge of Electrical and Electronics Simulation and Analysis using Mathematical computing languages such as MATLAB.
2. To Solve, Simulate and Analyse basic Electrical and Electronics Circuits and Applications by writing Mathematical Equations and Programs.
3. To develop hands on working experience with reference to Solve, Simulate and Analyse Electrical & Electronics Circuits using MATLAB or SCI LAB environments.

List of Experiments

1. Basic operations on matrices
2. Simulate the circuit to find out the node voltages and respective branch currents.
3. Series and parallel resonance
4. Generation of Various Signals such as Unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc.
5. Measurement of Active power of three phase circuit for balanced and unbalanced loads
6. Finding the fourier transform of a given signal and plotting its magnitude and phase spectrum
7. Verification of Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem and Maximum power Transfer theorem.
8. Study of Single Phase Half Wave Controlled Rectifier with R and RL Load
9. Study of Single Phase Bridge Controlled Rectifier with R and RL load
10. Study of Load and Load Duration Curve
11. Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function
12. Harmonic analysis of non-sinusoidal waveforms
13. Three Phase waveform generation using MATLAB, Simulink and Simscape
14. Measurement of power and power factor of single phase RLC circuit.

Course Outcomes: On successful completion, the students will be able to:

CO1: Understand the main features and importance of the MATLAB mathematical programming environment.

CO2: Apply working knowledge of MATLAB/ SIMULINK toolbox to simulate and solve Electrical, Electronic circuits and Applications.

CO3: Solve, Simulate and Analyse various DC and AC circuits.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Diploma Mathematics- I (0:0:0) NIL

COMMON TO ALL BRANCHES

(Effective from the academic year 2021-22)

Course Code	21DIP31A	CIE Marks	100
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	-
Total Number of Contact Hours	30	Exam Hours	3

Course Objectives:

This course will enable students to:

1. To enable students to apply knowledge of mathematics in various engineering fields by making them to learn the basic tools of vector differentiation, calculus and elementary Linear Algebra.
2. To familiarize the important tools of Differential and Integral Calculus required to analyze the engineering problems.

Module – I

Introduction: Understanding the importance of the study of Complex Trigonometry, Calculus, Linear algebra and its applications in the field of Science, Engineering and Economics.

Differential Calculus-I: Differentiation: Polar curves: angle between the radius vector and tangent, angle between two curves, pedal equation-problems; Maclaurin's series of single variable. (6 Hours)

Module – II

Differential Calculus-II: Partial differentiation, Total derivatives-differentiation of composite functions, Jacobians-simple problems. (6 Hours)

Module – III

Vector Differentiation: Velocity and acceleration of a particle moving on a space curve. Scalar and vector point functions. Gradient, Divergence, Curl-simple problems. Solenoidal and irrotational vector fields-Problems. (6 hours)

Module – IV

Linear Algebra: Introduction - Rank of matrix by elementary row operations - Echelon form. Gauss elimination method and approximate solution by Gauss-Seidel method. Eigen values and Eigen vectors of a square matrix of 2×2 & Rayleigh's power method -problems. (6 hours)

Module – V

Integral Calculus: Reduction formulae for $\int Sin^n x dx$, $\int Cos^n x dx$ (proofs with limits between 0 and $\pi/2$), $\int Sin^m x Cos^n x dx$ (m & n are positive integers) (proof without limits) and problems on these Reduction formulae with limits. Double and triple integration-Simpleexamples. **Recap**/Summary of the Course**.** (6 hours)

Course outcomes:

The students will be able to:

CO1: Use derivatives to calculate rate of change of functions of a single and multivariate variable.

CO2: Analyze position, velocity and acceleration in two and three dimensions of vector Valued functions.

CO3: Learn techniques of integration including the evaluation of double and triple integrals.

CO4: Solve system of Linear equations by using Matrix Algebra.

Question paper pattern:

CIE will be conducted for 100 marks.

- Three Unit Tests each of **20 Marks** (Duration 01 hour).
- Two assignments each of 10 Marks.
- Course Seminar suitably planned to attain the COs and POs for 20 Marks (duration 01 hours).
- The sum of three tests, two assignments, and a seminar will be out of 100 marks. The student shall secure a minimum of 40% of marks of the course to qualify and become eligible for the award of a degree.

Textbooks:

1. B.S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2015.
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill, 2010.
3. C. Pandurangappa, Advanced Mathematics II (Lateral entry bridge course textbook), 3rd Edition, Sanguine Publishers, 2015.

References:

1. N.P. Bali, Manish Goyal, A Text Book of Engineering Mathematics, Laxmi Publishers, 2014.
2. E. Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2015.
3. H.K. Dass, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Private Ltd. , 2014.
4. S. Pal and S.C. Bhunia, Engineering Mathematics, 3rd edition, Oxford University Press, 2016.