SYLLABUS

(With effect from 2022 -23)

ಪಠ್ಯಕ್ರಮ

(ಶೈಕ್ಷಣಿಕ ವರ್ಷ 2022-23)

Bachelor Degree
In
Electrical and Electronics Engineering

III & IV Semester

Out Come Based Education
With
Choice Based Credit System

[National Education Policy Scheme]

P.E.S. College of Engineering, Mandya - 571 401, Karnataka
[An Autonomous Institution affiliated to VTU, Belagavi,
Grant – in – Aid Institution (Government of Karnataka),
Accredited by NBA (All UG Programs), NAAC and Approved by AICTE, New Delhi]

ಪಿ.ಇ.ಎಸ್. ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ
ಮಂಡ್ಯ–571 401, ಕರ್ನಾಟಕ
(ವಿ.ಟಿ.ಯು, ಬೆಳಗಾವಿ ಅಡಿಯಲ್ಲಿನ ಸ್ವಾಯತ್ತ ಸಂಸ್ಥೆ)
Ph : 08232- 220043, Fax : 08232 – 222075,Web : www.pescemandya.org

VISION

"PESCE shall be a leading institution imparting quality Engineering and Management education developing creative and socially responsible professionals."

MISSION

- *Provide state of the art infrastructure, motivate the faculty to be proficient in their field of specialization and adopt best teaching-learning practices.*
- *Impart engineering and managerial skills through competent and committed faculty using outcome based educational curriculum.*
- *Inculcate professional ethics, leadership qualities and entrepreneurial skills to meet the societal needs.*
- *Promote research, product development and industry-institution interaction.*

QUALITY POLICY

Highly committed in providing quality, concurrent technical education and continuously striving to meet expectations of stake holders.

CORE VALUES

***P**rofessionalism*
***E**mpathy*
***S**ynergy*
***C**ommitment*
***E**thics*

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Profile

Department of Electrical & Electronics Engineering Programme has been accredited by NBA for 6 Academic years (2017-18 to 2022-23)

The Department of Electrical and Electronics Engineering was established right from the inception of the institute in the year 1962. The various programs offered by the Department are B.E., M.Sc., (Engg.) by research and research leading Ph.D affiliated to Visvesvaraya Technological University (VTU), Belagavi. Also, Department is affiliated for Ph.D program with University of Mysore, Mysore . More than 100 research papers have been published by the Department faculty members in various International & National journals and conferences.

The Department emphasizes towards imparting quality education, rigorous teaching-learning, hands-on expertise and helping students to shape their all-round personality. The Department with its strong pool of faculty, well-developed laboratories, latest software and hardware facilities, contributes to develop life-long learning skills to its students and producing worthy researchers by offering doctoral research program.

The academic programs are designed and updated keeping in view the constantly changing industrial needs, skills and challenges emerging out of new research. The academic programs are well received by the industry and academia. The department has always exerted the best of its effort to meet the objectives of achieving technical excellence in the areas of Electrical and Electronics Engineering such as High Voltage Engineering, Power Electronics & Drives, Control Systems, Power Systems, Energy Systems, Analog and Digital Electronics, Signal Processing, PLC & SCADA and Microcontrollers

The Department regularly organizes industrial visits, Technical lectures by experts from industries and institutes in contemporary areas to bridge the gap between syllabi and current developments.

VISION

The department of E & E would endeavour to create a pool of Engineers who would be technically competent, ethically strong also fulfill their obligation in terms of social responsibility.

MISSION

- Adopt the best pedagogical methods and provide the best facility, infrastructure and an ambience conducive to imbibe technical knowledge and practicing ethics.
- Group and individual exercises to inculcate habit of analytical and strategic thinking to help the students to develop creative thinking and in still team skills.
- MOUs and Sponsored projects with industry and R & D organizations for Collaborative learning
- Enabling and encouraging students for continuing Education and moulding them for life-long learning process

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Excel in professional career and/or higher education by acquiring knowledge in mathematical, computing and Electrical & Electronics engineering principles

PEO2: Analyze real life problems and Design Electrical & Electronics Engineering system with appropriate solutions that are technically sound, economically feasible and socially acceptable

PEO3: Exhibit professionalism, ethical attitude, communications kills, team work in their profession and adapt to current trends by engaging in lifelong learning.

PROGRAMME OUTCOMES (POs)

PO-1: Graduates will apply the knowledge of mathematics, Physics, chemistry and allied engineering subjects to solve problems in Electrical and Electronics Engineering.

PO-2: Graduates will Identify, formulate and solve Electrical and Electronics Engineering problem.

PO-3: Graduates will design Electrical and Electronics systems meeting the given specifications for different problems taking safety and precautions into consideration.

PO-4: Graduates will design, conduct experiments, analyze and interpret data

PO-5: Graduates will use modern software tools to model and analyze problems, keeping in view their limitations.

PO-6: Graduates will understand the impact of local and global issues / happenings on Electrical Engineers.

PO-7: Graduates will provide sustainable solutions for problems related to Electrical and Electronics Engineering and also will understand their impact on environment.

PO-8: Graduates will have knowledge of professional ethics and code of conduct as applied to Electrical Engineers.

PO-9: Graduates will work effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.

PO-10: Graduates will communicate effectively in both verbal and written form.

PO-11: Graduates will plan, execute and complete projects

PO-12: Graduates will have the ability for self- education and lifelong learning

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: To understand the concept in Electrical and Electronics Engineering and apply them to develop modules analyze assess the performance of various power system equipment, generation, transmission, utilization and protection mechanisms.

PSO2: Design, develop, analyze and test electrical and electronics system: Deploy control strategies for electrical dives, power system networks, power electronics, high voltage and other related applications.

Bachelor of Engineering (III–Semester)										
Sl. No.	**Course Code**	**Course Title**	**Teaching Department**	**Hrs/Week**			**Credits**	**Examination Marks**		
				L	**T**	**P**		**CIE**	**SEE**	**Total**
1	P21MA301	Transform and Numerical Analysis	MA	2	2	0	3	50	50	100
2	P21EE302	Electrical circuit Analysis	E&EE	2	2	-	3	50	50	100
3	P21EE303	Transformer and Induction Machines	E&EE	3	-	-	3	50	50	100
4	P21EE304	Digital Systems (Integrated)	E&EE	3	-	2	4	50	50	100
5	P21EE305	AEC and LIC (Integrated)	E&EE	3	-	2	4	50	50	100
6	P21EEL306	AC Machines Lab oratory	E&EE	-	-	2	1	50	50	100
7	P21KSK307	Samskrutika Kannada/	HSMC	0	2	0	1	50	50	100
	P21KBK307	Balake Kannada								
	OR									
	P21CIP307	Constitution of India and Professional Ethics	HSMC	0	2	0	1	50	50	100
8	P21HSMC308	Employability Enhancement Skills-III	HSMC	-	2	-	1	50	50	100
9.	P21AEC309	Innovation and Design Thinking	E&EE	-	2	-	1	50	50	100
Total							**21**			
10	P21MDIP301	Basic Engineering Mathematics - I	MA	2	2	0	0	100	-	100
11	P21HDIP308	Employability Enhancement Skills-I	HSMC	-	2	-	0	100	-	100

Bachelor of Engineering (IV–Semester)										
Sl. No.	**Course Code**	**Coure Title**	**Teaching Department**	**Hrs/Week**			**Credits**	**Examination Marks**		
				L	**T**	**P**		**CIE**	**SEE**	**Total**
1	P21MA401	Applied Mathematical Methods	MA	2	2	0	3	50	50	100
2	P21EE402	Electrical Power Generation, Transmission & Distribution	E&EE	2	2	-	3	50	50	100
3	P21EE403	DC and Synchronous Machines	E&EE	3	-	-	3	50	50	100
4	P21EE404	Microcontroller (Integrated)	E&EE	3	-	2	4	50	50	100
5	P21EE405	Signals and Digital Signal Processing (Integrated)	E&EE	3	-	2	4	50	50	100
6	P21EEL406	DC Machines Lab oratory	E&EE	-	-	2	1	50	50	100
7	P21KSK407	Samskrutika Kannada	HSMC	0	2	0	1	50	50	100
	P21KBK407	Balake Kannada								
	OR									
	P21CIP407	Constitution of India and Professional Ethics	HSMC	0	2	0	1	50	50	100
8	P21HSMC408	Employability Enhancement Skills-IV	HSMC	-	2	-	1	50	50	100
9.	P21INT409	Internship–I	E&EE	-	-	-	1	-	100	100
Total							**21**			
10	P21MDIP401	Basic Engineering Mathematics - II	MA	2	2	0	0	100	-	100
11	P21HDIP408	Employability Enhancement Skills–II	HSMC	-	2	-	0	100	-	100

Transform and Numerical Analysis
[As per Choice Based Credit System (CBCS) & OBE Scheme]
SEMESTER – III

Course Code:	**P21MA301**	**Credits:**	**03**
Teaching Hours/Week (L:T:P):	**2-2-0**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**40**	**SEE Marks:**	**50**

Course Learning Objectives:

- Adequate exposure to basics of engineering mathematics so as to enable them to visualize the applications to engineering problems
- Analyze periodic phenomena using concept of Fourier series, series solution of Engineering problems
- Understand Fourier transforms of functions and use it to solve initial value, boundary value problems.
- Apply Z-Transform technique to Solve difference equations and Numerical Technique to estimate interpolation, Extrapolation and area - (All formulae without proof)-problems only
- Use mathematical IT tools to analyze and visualize the above concepts.

UNIT – I	**8 Hours**

Fourier Series: Introduction, periodic function, even and odd functions, properties. Special waveforms - square wave, half wave rectifier, saw-toothwave and triangular wave. Dirichlet's conditions, Euler's formula for Fourier series (no proof). F urier series for functions of period 2L (all particular cases) – problems, Half Range Fourier series- Construction of Half range cosine and sine series and problems Practical harmonic analysis- Illustrative examples from engineering field.

Self-study component:	Derive Euler's formula, Fourier series in complex form.

UNIT – II	**8 Hours**

Partial differential equations (PDE's):
Formation of PDE's. Solution of non-homogeneous PDE by direct integration. Solutions of homogeneous PDE involving derivative with respect to one independent variable only, Method of separation of variables(first and second order equations).

Applications of PDE's: Various Possible solution of PDE's
Classification of second order PDE, various possible solutions for One- dimensional wave and heat equations, by the method of separation of variables. Solution of all these equations with specified boundary conditions (Boundary value problems). Illustrative examples from engineering field.

Self-study component:	Charpit's Method -simple problem. Various possible solutions of Two dimensional Laplace equation.

UNIT – III	8 Hours
Finite Differences and Interpolation: Forward and backward differences, Interpolation, Newton-Gregory forward and backward interpolation formulae, Lagrange's interpolation formula and Newton's divided difference interpolation formula (All formulae without proof)-problems only. **Numerical Differentiation**: Derivatives using Newton-Gregory forward and backward interpolation formulae, Applications to Maxima and Minima of a tabulated function. **Numerical Integration:** Newton-Cotes quadrature formula, Simpson's 1/3rd rule and Simpson's 3/8th rule. Weddle's rule (All rules without proof)-	
Self-study component:	Inverse Lagrange's Interpolation formula, Central differences.
UNIT – IV	**8 Hours**
Fourier Transforms: Infinite Fourier transforms. Properties- linearity, scaling, shifting and modulation (no proof), Fourier sine and cosine transforms. Inverse Fourier Transforms, Inverse Fourier cosine and sine transforms. Problems. Convolution theorem and Parseval's Identity (no proof)-problems.	
Self-study component:	Finite Fourier transform, Fourier transform of derivatives of functions
UNIT – V	**8 Hours**
Z - Transforms: Definition. Z-transforms of basic sequences and standard functions. Properties-linearity, scaling, Damping rule, first and second shifting, multiplication by *n*, initial and final value theorem (statement only)-problems. Inverse Z- transforms- problems. **Difference Equations:** Definition. Formation of Difference equations, Linear & simultaneous linear difference equations with constant coefficients-problems, Solutions of difference equations using Z- transforms.	
Self-study component:	Convolution theorem and problems, Application to deflection of a loaded string.

Course Outcomes: On completion of the course, student should be able to:

CO1	**Analyze** engineering problems using the fundamental concepts in Fourier series, Fourier Transforms and Basics ideas of PDE's.
CO2	**Explain** various methods to find the Fourier constants, solution of PDE's, Estimation of interpolation and find the area, solution of difference equations.
CO3	**Apply** the acquired knowledge to construct the Half- range Fourier series, Finding Fourier transforms and Inverse Laplace transforms for some standard functions.
CO4	**Evaluate** Z-transform of various functions, solutions of differential equations with initial and boundary conditions.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics (44th Edition 2018), Khanna Publishers, New Delhi.
2. E. Kreysizig, Advanced Engineering Mathematics, John Wiley and sons, 10th Ed. (Reprint) 2016.

REFERENCE BOOKS

1. V. Ramana: Higher Engineering Mathematics, McGraw –Hill Education,11th Ed..
2. H. C. Taneja, Advanced Engineering Mathematics, Volume I & II, I.K. International PublishingHouse Pvt. Ltd., New Delhi.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2010.

ONLINE RESOURCES

1. http://www.nptel.ac.in
2. https://en.wikipedia.org
3. https://ocw.mit.edu/courses/18-085-computational-science-and-engineering-i-fall-2008/resources/lecture-28- fourier-series-part-1/
4. https://www.thefouriertransform.com/
5. http://mcatutorials.com/mca-tutorials-numerical-methods-tutorial.php

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**2**	**2**										
CO2	**2**	**3**										
CO3	**3**	**2**										
CO4	**2**	**3**										
Strength of correlation: Low-1, Medium- 2, High-3												

Electrical Circuit Analysis

[As per Choice Based Credit System (CBCS) & OBE Scheme]

SEMESTER – III

Course Code:	**P21EE302**	**Credits:**	**03**
Teaching Hours/Week (L:T:P):	**2:2:0**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**40**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- To obtain solution to problems on electrical network using different techniques
- To obtain solution to problems on electrical network using different Theorems
- Analyse the behavior of circuit elements (R, L, C) at the instant of switching with D.C. excitation
- Describe the Laplace transform of standard functions, determination of Laplace transform of different wave forms by applying wave form synthesis. and Analysis of series and parallel a.c. circuits in time domain using Laplace transform
- Interpretation of the given network as two port network, determination of various two port parameters of a network and relation between parameter sets

UNIT – I	**Basic Circuit Concepts**	**8 Hours**

Basic Circuit Concepts: Introduction, Dependent and Independent sources, Source transformation, Star - Delta transformation for DC circuits, Mesh and Super mesh, Nodal &Super node analysis with dependent and independent sources for DC and AC networks. .

Self-study component:	Source transformation, Star - Delta transformation for AC circuits

UNIT – II	**Network theorems**	**8 Hours**

Network theorems: Superposition, Thevenin's, Maximum power transfer, Reciprocity ,Norton's and Millman's Theorem as applied to DC and AC circuits.

Self-study component:	**Self-study**: Verification of Superposition, Thevenin's, Maximum power transfer , Reciprocity ,Norton's and Millman's Theorem by using PSPICE

UNIT – III	**Transient analysis and Three-Phase Circuits**	**8 Hours**

Transient behavior and Initial and Final Conditions In Networks: Integro-differential equations for networks, Transient behavior of series R-L, R-C, R-L-C Circuits for DC excitation, Behavior of R, L and C at the instant of switching and at final conditions when the excitation is D.C

Three-Phase Circuits: Measurement of Three phase Power – Two wattmeter method

Self-study component:	Voltages, Currents and Power in balanced star and delta connected loads

UNIT – IV	Laplace Transform	8 Hours

Laplace Transform: Definition of Laplace transforms and it's inverse. (problems are excluded) Laplace transforms of standard signals - step, ramp, impulse and gate functions. Waveform synthesis of Recurring and Non-Recurring signals.

Network Analysis Using Laplace Transforms: Analysis of R, L, C, R-L, R-C and R-L-C Circuits to various functions such as step, ramp, impulse.

Self-study component:	Determination of Laplace transform of waveforms using gate function.

UNIT – V	Two Port Network	8 Hours

Two Port Network Parameters: Network configurations, Z - parameters, Y-parameters, Transmission parameters, h-parameters, Relationship between these parameter sets. Interconnection of two port networks – Parallel connection, series connection, series parallel connection and parallel series connection. (Calculation of these parameters for resistive networks).

Self-study component:	Interconnection of two port networks – Cascade connection

Course Outcomes: On completion of this course, students are able to:

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Apply the knowledge of mathematics and electrical science to simplify electrical networks.	Applying	L3
CO2	Analyze complex electrical networks using network laws and theorems.	Analyzing	L4
CO3	Analyze the transient state behavior of complex electric networks.	Analyzing	L4
CO4	Solve two port networks to obtain different Parameters.	Applying	L3

Text Book(s):

1. VanValkenburg, "Network Analysis", PHI, Pearson Education, 2012.
2. Franklin F.Kuo, Network Analysis & Synthesis, Wiley International.
3. Roy Choudary, "Networks and system", New age Publication, 2nd edition, 2013

Reference Book(s):

1. P M Chandrashekaraiah. " Network Analysis '',
2. Ravish R. Singh Electrical Networks , TMH, Edition 1

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
Apply the knowledge of mathematics and electrical science to simplify electrical networks.	**3**												**3**	
Analyze complex electrical networks using network laws and theorems.		**3**												**2**
Analyze the transient state behavior of complex electric networks.		**3**												**2**
Solve two port networks to obtain different Parameters.		**3**												**2**

Transformers & Induction Machines [As per Choice Based Credit System (CBCS) & OBE Scheme] SEMESTER – III			
Course Code:	**P21EE303**	**Credits:**	**03**
Teaching Hours/Week (L:T:P):	**3:0:0**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**40**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- Analyze the theory, construction, classifications and working principle of single phase, three phase transformers and single phase, three phases Induction motors.
- Able to carry out different tests on single phase, three phase transformers and single phase, three phase Induction motors.
- To draw equivalent circuit, circle diagram to know the performance of three phase induction motor.
- To evaluate the performance in terms of efficiency and regulation of single phase transformers along with Practical applications

UNIT – I	**1-Ø Transformer**	**8 Hours**

Transformers: Principle of operation, constructional details of shell type and core type single phase transformers. Description of Power transformers, distribution transformers, constant voltage transformers.

Analysis and Performance of Single Phase Transformers: Equation for EMF induced in the two windings. Voltage & Current transformation ratio, Concept of Ideal transformers, transformer on no-load and load with phasor diagrams. Concept of M.M.F. balance in transformers, Equivalent circuit of a transformer. Auto transformer, saving of copper in an auto trans-former, Advantages & Disadvantages, Applications

Self-study component:	Instrument Transformers.

UNIT – II	**Testing of Transformers**	**8 Hours**

Testing of Transformers: O.C. & S.C. test, pre-determination of efficiency and regulation, determination of equivalent circuit parameters. All day efficiency, Sumpner's test. Parallel operation: need, conditions for parallel operation & load sharing.

Self-study component:	Polarity Test

UNIT – III	**3-Ø Transformer**	**8 Hours**

Three phase Transformer: Three-Phase transformer connections: delta-delta, delta-star, star-delta, star-star & open delta. Single phase transformers for three phase operation. Scott connection for three phase to two phase conversion. Labeling of three phase transformer terminals, Parallel operation. Three winding transformer & its equivalent circuit, determination of parameters of three winding transformer, voltage regulation of three winding transformers.

Self-study component:	Tap changing transformers

UNIT – IV	3-Ø Induction Motor	8 Hours

Three Phase Induction Machines: Basic **c**oncepts of rotating magnetic field. Operating principle, construction, types: Squirrel-cage, Slip-ring.

Analysis of Three Phase Induction Motor: Induction motor operation on no-load and load conditions. Torque-slip characteristics of a three phase induction motor Need for starter. Qualitative analysis of DOL, Star-Delta, auto-transformer starting, Speed control by voltage, frequency, and rotor resistance methods.

Self-study component:	Schrage Motor

UNIT – V	3-Ø Induction Machine & 1-Ø Induction Motor	8 Hours

Performance of Three Phase Induction Machines: No-load and blocked rotor tests. Performance evaluation - output power, torque, and efficiency, current and power factor using Circle diagram. Losses and efficiency in an induction motor. Cogging and crawling.

Single-phase Induction Motor: Principle of operation, production of rotating field double revolving field theory, determination of equivalent circuit parameters Types of single phase induction motors: split-phase, capacitor start, shaded pole motors, universal motors.

Self-study component:	Induction generator.

Course Outcomes: On completion of this course, students are able to:

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Apply the knowledge of basic electrical laws to study the operating principle and characteristics of Transformers and Induction Motors.	Applying	L3
CO2	Analyze the operation of Transformers and Induction Motors using phasor/circle diagram.	Analyzing	L4
CO3	Apply the different testing methods to examine the performance of Transformers and Induction Motors.	Applying	L3
CO4	Solve the different problems on Transformers and Induction Motors.	Applying	L3

Text Book(s):

1. Alexander Langsdorf, "Theory of Alternating Current Machines", T.M.H, 2001
2. Dr.P.S.Bimbhra, "Electrical Machinery" Khanna publications", 3rd edition,New Delhi, 2006
3. B.L Theraja "Electrical Technology" Volume2, S. Chand, 22nd Edition.

Reference Book(s):

1. M.G.Say, "Performance and Design of A.C.Machines", C.B.S. Publishers, 2005
2. AshfaqHussain, "Electrical Machines", Dhanapatrai and Co, 2nd edition, 2012

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Apply the knowledge of basic electrical laws to study the operating principle and characteristics of Transformers and Induction Motors.	**3**												**3**	
Analyze the operation of Transformers and Induction Motors using phasor/circle diagram.		**2**												**2**
Apply the different testing methods to examine the performance of Transformers and Induction Motors.	**3**												**2**	
Solve the different problems on Transformers and Induction Motors.		**2**												**2**

Digital Systems [As per Choice Based Credit System (CBCS) & OBE Scheme] SEMESTER – III			
Course Code:	**P21EE304**	**Credits:**	**04**
Teaching Hours/Week (L:T:P):	**3:0:2**	**CIE Marks:**	**50**
Total Theory Teaching Hours: **Total Laboratory Hours:**	**40** **24**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- To optimize logic expressions using Karnaugh map and Tabular method
- To simplify Boolean equation and design combinational circuits with optimal gates
- To analyze the working principles of sequential circuits
- Understand the basic concepts of shift registers and A/D & D/A converters
- Analyze the concepts of VLSI technology

UNIT – I	**Combinational Logic**	**8 Hours**

Logic operations, axioms & laws of Boolean algebra, Duality, Reduction of Boolean expressions, Boolean functions and their representation, Expansion in SOP & POS form Boolean Expression conversation into logic. Minimization of switching functions using K-Map, 2, 3 & 4 variable, mapping and minimization. Don't care combination solutions. Minimization by Quine - Mclusky method.

Self-study component:	Signed binary number representation with 1's and 2's complement methods.
Practical Topics: **(6 Hours)**	a. Simplification, realization of Boolean expressions using basic gates b. Simplification, realization of Boolean expressions using Universal gates.

UNIT – II	**Combinational Circuits**:	**8 Hours**

Combinational Circuits: Half adder, Full adder, Parallel binary adder, Look ahead carry Adder.
Encoder: octal to binary, decimal to BCD, Priority encoder: 4 input, decimal to BCD
Decoder: 3 to 8 Line, BCD to Decimal, Multiplexer: 2 input, 4 inputs, 8 inputs. De-multiplexer: 1 to 4 line, 1 to 8 line.

Self-study component:	Half/Full Subtractor
Practical Topics: **(6 Hours)**	a. Realization of Half/Full Adder using logic gates b. Realization of Multiplexer and De-multiplexer.

UNIT – III	**Sequential circuits**:	**8 Hours**

Flip-Flops: Basic stable element, latches, S R latches, Gated S-R latch, Gated D- Latch, SR, D, JK, and T F/Fs, Master- Slave ,SR,D,JK F/Fs, Conversion of SR to D, SR to JK and SR to T flip-flops
.**Counters**: Synchronous Counters, Mealy and Moore models, Modulo-N Synchronous counter design

Self-study component:	Conversion of D to SR, T & JKF/Fs and Asynchronous Counters Design.
Practical Topics: **(4 Hours)**	a. Truth table verification of flip-flops: D, T, SR & JK b. Realization of 3 bit counter, Mod N counter, ring/Johnson counter design.

UNIT – IV	Shift Registers and A/D & D/A Converters	8 Hours

Registers: Types of Shift registers - SISO, SIPO, PISO and PIPO, shift left and shift right register

A/D & D/Converters: **A/D Converters** - Successive Approximation, Delta-Sigma, Dual slope, Flash type. **D/A Converters** - Weighted Resistor, R-2R ladder.

Self-study component:	Ring and Johnson Counter
Practical Topics: **(4 Hours)**	a. Shift register operations: Shift left; Shift right, SIPO, SISO, PISO, PIPO b. R-2R DAC

UNIT – V	Introduction to Verilog	8 Hours

Logic families: Two input TTL NAND gate, MOS and CMOS circuits & their operation.
Introduction to Verilog: Introduction to HDL & Verilog, Verilog constructs and operators , Basic coding of airthmetic operations. Verilog code for carry Save adder, multiplexer and Jk- flip-flops. Testbench writing and verifying Half adder and Full adder.

Self-study component:	Loops for Verilog.
Practical Topics: **(4 Hours)**	a. Execute a program for carry save adder, multiplexer and JK- flip-flops. b. Write and verify the test bench for Half and Full adder .

Course Outcomes: On completion of this course, students are able to

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Apply the knowledge of simplification methods to optimize a Digital circuit	Applying	L3
CO2	Analyze the concepts of combinational circuits, sequential circuits and VLSI technology	Analyzing	L4
CO3	Design of combinational circuits and sequential circuits	Creating	L6
CO4	Analyze different types of shift registers and A/D & D/A converters.	Analyzing	L4
CO5	Conduct experiments using digital ICs for a given statement.	Applying	L2

Text Book(s):

1. A.Anand Kumar, Fundamentals of Digital Circuits,PHI,2011
2. Givone,Digital Principles & Design, McGraw Hill,2011
3. Samir Palnikar, Verilog HDL – A guide to digital design and synthesis, Pearson 2nd edition, IEEE-1364-2001 complaint,

Reference Book(s):

1.Morries Mano, Digital Logic Design, PHI,2012
2. A.K.Maini, Digital Electronics, Wiley,India,201

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
Apply the knowledge of simplification methods to optimize a Digital circuit	**3**													**2**
Analyze the concepts of combinational circuits, sequential circuits and VLSI technology		**3**												**2**
Design of combinational circuits and sequential circuits			**3**											**2**
Analyze different types of shift registers and A/D & D/A converters.		**2**												**2**
Conduct experiments using digital ICs for a given statement.	**2**	**2**	**2**	**2**	**3**				**2**	**2**				

Analog Electronics & Linear Integrated Circuits

[As per Choice Based Credit System (CBCS) & OBE Scheme]

SEMESTER – III

Course Code:	**P21EE305**	**Credits:**	**04**
Teaching Hours/Week (L:T:P):	**3:0:2**	**CIE Marks:**	**50**
Total Theory Teaching Hours: **Total Laboratory Hours:**	**40** **24**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- Analyze and design Diode and Transistor circuit such as Clippers, Clampers, Voltage Multipliers and Amplifiers
- Analyze and design two port hybrid equivalent model for BJT amplifier and Various BJT Oscillator Circuits
- Analyze the effect of negative feedback and Power amplifier
- Analyze the frequency response, stability of op-amps and design the signal processing &waveform generator circuits

UNIT – I	**Diode Circuits and Transistor Biasing & Amplifiers**	**8 Hours**

Diode Circuits: Introduction, Clipping Circuits, Clampers, Voltage Doubler Circuits, Zener Regulator

Transistor Biasing & Amplifiers: Operating point, DC Load line and Voltage divider bias, Classification of Amplifiers, Distortions in Amplifiers, RC Coupled Amplifiers, and frequency responses of Amplifier

Self-study component:	Self and Emitter bias circuits.
Practical Topics: **(6 Hours)**	a. Clipping and Clamping Circuit b. RC Coupled Amplifier

UNIT – II	**BJT Transistor Modeling & Oscillators**	**8 Hours**

BJT Transistor Modeling: Introduction, Two port approach & hybrid Model, CB, CE, CC Hybrid equivalent Model, The Important Parameters: *Zi*, *Zo*, *Av*, *Ai*,

BJT Oscillators: Oscillator operation, Transistor RC Phase shift oscillator, Wien bridge oscillator, and Tuned oscillators (Hartley & Colpitt's) Crystal oscillator

Self-study component:	R_e transistor modeling
Practical Topics: **(6 Hours)**	a. RC oscillator; b. Colpitt's and Hartley Oscillator.

UNIT – III	**Feed Back Concepts & Power Amplifier**	**8 Hours**

Feed Back Concepts: Feedback concept, Loop gain, Transfer gain, Feedback connections type, Effect of Negative Feedback on Input Resistance, Output Resistance and Advantages of Feedback.

Power Amplifiers: Definitions of Power Amplifiers, Series fed Class A Amplifier, Transformer coupled Class A Amplifier, Transformer coupled Class B Push pull Amplifier.

Self-study component:	Distortions in Amplifiers.
Practical Topics: **(4 Hours)**	a. Feedback amplifier b. Power Amplifier circuit

UNIT – IV	**Basics of Operational Amplifiers**	**8 Hours**

Op-Amps Frequency Response And Compensation : Op-amp circuit stability, Frequency and phase response, Frequency compensating methods , Manufacturer's recommended compensation

Op-Amps-Nonlinear Circuits: Op-amps in switching circuits, Zero crossing detectors, Inverting & non-inverting Schmitt trigger, Astable & Mono stable multi vibrators.

Self-study component:	. Circuit stability precautions
Practical Topics: **(4 Hours)**	a. Inverting & non-inverting Schmitt trigger; b. Astable & Monostable multivibrators

UNIT – V	**Op–Amp -2**	**8 Hours**

Signal Processing & Generator Circuits: Precision half wave & full wave rectifiers, Limiting circuits, Peak detectors, Sample & hold circuit. Triangular & rectangular wave generator, Phase shift oscillator, Oscillator amplitude stabilization.

Self-study component:	Waveform generator design
Practical Topics: **(4 Hours)**	a. Sample & hold circuit b. Phase shift oscillator.

Course Outcomes: On completion of this course, students are able to:

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Apply the knowledge of semiconductor devices in different electronics circuits.	Applying	L3
CO2	Analyze the performance of transistor, amplifier and oscillator circuits	Analyzing	L4
CO3	Analyze the frequency response, stability and applications of op-amps.	Analyzing	L4
CO4	Design analog electronic circuits for given application and specifications	Creating	L6
CO5	Conduct experiments to demonstrate an application of analog electronics using components	Analyzing	L4

Text Book(s):

1. Electronic Devices & Circuits, Boylestead & Neshelsky ,Pearson Education/PHI Ltd, 10th

edition, 2010
2. "Operational amplifiers and linear IC's"- David A Bell, -PHI, 4th edition, 2011

Reference Book(s):

1. J. Millman and C. Halkias, Integrated Electronics: Analog and Digital Circuits and Systems, McGraw Hill, 1985.
2. Operational amplifiers and linear" - Ramakanth A Gayakwad,- IC's, Pearson Education, 4th edition, 2000..

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
Apply the knowledge of semiconductor devices in different electronics circuits.	**3**												**3**	
Analyze the performance of transistor, amplifier and oscillator circuits		**3**												**2**
Analyze the frequency response, stability and applications of op-amps.		**3**												**2**
Design analog electronic circuits for given application and specifications			**3**											**3**
Conduct experiments to demonstrate an application of analog electronics using components	**2**	**2**	**2**	**2**					**2**	**2**			**1**	**1**

AC Machines Laboratory

[As per Choice Based Credit System (CBCS) & OBE Scheme]

SEMESTER – III

Course Code:	**P21EEL306**	**Credits:**	**01**
Teaching Hours/Week (L:T:P):	**0:0:2**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**20**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- Students should be able to study OC and SC tests on single phase Transformer.
- Students should be able to determine the performance characteristics of single phase induction motor.
- Students should be able to study how the load can be shared between two transformers.

Sl.No	List of Experiments	No. of Hours
1.	OC & SC tests on Single Phase transformer: Pre-determination of efficiency & regulation.	**2**
2.	Sumpner's test on single phase transformers.	**2**
3.	Parallel operation of single phase transformers.	**2**
4.	Polarity test, connection of three single phase transformers in star-delta and determination of efficiency & regulation.	**2**
5.	Scott connection for balanced & unbalanced load.	**2**
6.	Load test on single phase Induction motor.	**2**
7.	Load test on three phase induction motor.	**2**
8.	Performance evaluation of three phase induction Motor using Circle diagram.	**2**
9.	Speed control of three phase induction motor by Rotor resistance control.	**2**
10.	Load test on three phase Induction generator.	**2**

Course Outcomes: On completion of this course, students are able to:

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Conduct experiments to obtain performance characteristics of Transformers.	Applying	L3
CO2	Conduct experiments to obtain performance characteristics of Induction Machines.	Applying	L3
CO3	Ability to communicate effectively in a team/as an individual to conduct experiments.	Understanding	L2

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
Conduct experiments to obtain performance characteristics of Transformers.	**3**	**3**		**3**									**2**	**2**
Conduct experiments to obtain performance characteristics of Induction Machines.	**3**	**3**		**3**									**2**	**2**
Ability to communicate effectively in a team/as an individual to conduct experiments.								**1**	**3**	**3**				

Employability Enhancement Skills (EES) - III
[As per Choice Based Credit System (CBCS) & OBE Scheme]
SEMESTER – III

Course Code:	**P21HSMC308**	**Credits:**	**01**
Teaching Hours/Week (L:T:P):	**0:2:0**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**28**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable students to:

- Build Personal Branding, team binding.
- Present the data using presentation skills in a better manner.
- Understand the importance of stress management, Entrepreneurship & Business skills.
- Usage of various voices in a sentence and critical reasoning.
- Explain the basic concepts in boat and stream, geometry and trigonometry problems.
- Calculations involving Permutations and combinations, probability and logarithms.
- Explain concepts behind logical reasoning modules of analytic, syllogisms, venn diagrams and puzzles.

UNIT – I	**8 Hours**

Soft Skills: Personal Branding, Synergy between Teams (Online and Offline), Interview skills, Stress Management, Entrepreneurship & Business skills.

Verbal Ability: Active voice and passive voice, critical reasoning.

Self-Study: Corporate ethics and Mannerism

UNIT – II	**10 Hours**

Quantitative Aptitude: Boats and streams, Geometry & Trigonometry, Permutations and combinations, Probability & Logarithms.

Self-Study: Pipes and cisterns

UNIT – III	**10 Hours**

Logical Reasoning: Analytical reasoning, Syllogisms, clocks and calendars, Venn diagram, puzzles.

Self-Study: Binary logic

Course Outcomes: On completion of this course, students are able to:	
CO – 1:	Exhibit amplified level of confidence to express themselves in English
CO – 2:	Develop the presentation skills, entrepreneurial skills by managing stress at various levels.
CO – 3:	Solve the problems based on Boats and streams, Geometry & Trigonometry, Permutations and combinations, Probability & Logarithms.
CO – 4:	Solve logical reasoning problems based on Analytical reasoning, Syllogisms, clocks and calendars, cases and Venn diagram, puzzles.

Text Book(s):

1. Word Power Made Easy New Revised and Expanded Edition, First Edition, Norman Lewis, Goyal Publisher.
2. Essential English Grammar by Raymond Murphy, Cambridge University Press, new edition
3. The 7 habits of Highly Effective People by Stephen R. Covey
4. Quantitative aptitude by Dr. R. S Agarwal, published by S.Chand private limited.
5. Verbal reasoning by Dr. R. S Agarwal , published by S. Chand private limited.

Reference Book(s):

1. Quantitative Aptitude by Arun Sharma, McGraw Hill Education Pvt Ltd
2. CAT Mathematics by Abhijith Guha, PHI learning private limited.

Web and Video link(s):

1. NPTEL Course: Soft skills by By Prof. Binod Mishra, IIT Roorkee

https://onlinecourses.nptel.ac.in/noc21_hs76/preview

COURSE ARTICULATION MATRIX [Employability Enhancement Skills (EES) - III]

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	-	-	-	-	-	-	-	2	3	-	2
CO-2	-	-	-	-	-	-	-	-	2	3	2	2
CO-3	2	-	-	-	-	-	-	-	-	-	-	-
CO-4	2	-	-	-	-	-	-	-	-	-	-	-

Innovation and Design Thinking [As per Choice Based Credit System (CBCS) & OBE Scheme] SEMESTER – III			
Course Code	**P21AEC309**	**Credits**	**01**
Teaching Hours/Week (L: T:P: S)	**0:2:0**	**CIE Weightage**	**50%**
Total Hours of Pedagogy	**25**	**SEE Weightage**	**50%**
Exam Hour	**01**	**Total Marks**	**100**

Course Category: Foundation

Preamble: This course provides an introduction to the basic concepts and techniques of engineering and reverses engineering, the process of design, analytical thinking and ideas, basics and development of engineering drawing, application of engineering drawing with computer aide.

Course objectives:

- To explain the concept of design thinking for product and service development
- To explain the fundamental concept of design thinking
- To discuss the methods of implementing design thinking in the real world.

Module-1

Understanding Design Thinking
Definition of design - Design Vs Engineering Design– Difference between Design and Engineering Design– The General Design process Model – Design to Design thinking - Time line of Design thinking.

Module-2

Features of Design Thinking
Venn diagram of design thinking– Design thinking resources – Design thinking process Models – Design thinking methodologies

Module-3

Models to Do Design Thinking
Different kinds of thinking – 5 Stage d.School Process - 5 stages of Stanford – Empathize – Define- Ideate – Prototype – Test – Iterate - Applications of Design Thinking.

Module-4

Design thinking for Engineering - Concept models for comparing design thinking and engineering systems thinking - The Distinctive Concept Model - The Comparative Concept Model - The Inclusive Concept Model - The Integrative Concept Model.

Module-5

Design Thinking Tools and Methods - Purposeful Use of Tools and Alignment with Process - What Is: Visualization - What Is: Journey Mapping - What Is: Value Chain Analysis - What Is: Mind Mapping - What If: Brainstorming - What If: Concept Development - What Wows: Assumption Testing - What Wows: Rapid Prototyping - What Works: Customer Co-Creation - What Works: Learning Launch.

Course Outcomes:

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Understanding Design Thinking process	L2
CO2	Appreciate various design process procedure	L2
CO3	Generate and develop design ideas through different Technique.	L2
CO4	Identify the significance of reverse Engineering to Understand products	L3
CO5	Practice the methods, processes, and tools of Design Thinking	L2

Suggested Learning Resources:

Text Books :

1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengagelearning (International edition) Second Edition, 2013.
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage",Harvard Business Press , 2009.

References:

1. Jake knapp, John keratsky and Braden kowitz "Sprint how to solve big problems and test new ideas in just five days"
2. Tim Brown "Change by design"
3. Steve Krug "Don't make me think; Revisited"
4. Roger martin "The design of Business"
5. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", CengageLearning, SecondEdition, 2011.
6. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.
7. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011

Basic Engineering Mathematics - I [As per Choice Based Credit System (CBCS) & OBE Scheme] **SEMESTER – III (Lateral Entry: Common to all branches)**			
Course Code:	**P21MDIP301**	**Credits:**	**00**
Teaching Hours/Week (L:T:P):	**2-2-0**	**CIE Marks:**	**100**
Total Number of Teaching Hours:	**40**	**SEE Marks:**	**-**

Course Learning Objectives: The mandatory learning course **P21MADIP301**viz., **Basic Engineering Mathematics-I** aims to provide basic concepts of complex trigonometry, vector algebra, differential & integral calculus, vector differentiation and various methods of solving first order differential equations**.**

UNIT – I	**8 Hours**

Complex Trigonometry: Complex Numbers: Definitions & properties. Modulus and amplitude of a complex number, Argand's diagram, De- Moivre's theorem (without proof).

Vector Algebra: Scalar and vectors. Vectors addition and subtraction. Multiplication of vectors (Dot and Cross products). Scalar and vector triple products-simple problems.

Self-study component:	De-Moivre's theorem (without proof). Roots of complex number - Simple problems.

UNIT – II	**8 Hours**

Differential Calculus: Polar curves –angle between the radius vector and the tangent pedal equation- Problems. Taylor's series and Maclaurin's seriesexpansions- Illustrative examples.

Partial Differentiation: Elementary problems. Euler's theorem for homogeneous functions of two variables. Total derivatives-differentiation of composite and implicit function.

Self-study component:	Review of successive differentiation. Formulae for n^{th} derivatives of standard functions- Liebnitz's theorem (without proof). Application to Jacobians, errors & approximations.

UNIT – III	**8 Hours**

Integral Calculus: reduction formulae for $sin^n x$, $cos^n x$, *and* $sin^m x cos^m x$ and evaluation of these with standard limits-Examples. Applications of integration to area, length of a given curve, volume and surface area of solids of revolution.

Self-study component:	Differentiation under integral sign (Integrals with constants limits)- Simple problems.

UNIT – IV	**8 Hours**

Vector Differentiation: Differentiation of vector functions. Velocity and acceleration of a particle moving on a space curve. Scalar and vector point functions. Gradient, Divergence, Curl and Laplacian (Definitions only).

Self-study component:	Solenoidal and irrotational vector fields-Problems.

UNIT – V	8 Hours

Ordinary differential equations (ODE's): Introduction-solutions of first order and first degree differential equations: homogeneous, exact, linear differential equations of order one and equations reducible to above types.

Self-study component:	Applications of first order and first degree ODE's - Orthogonal trajectories of Cartesian and polar curves. Newton's law of cooling, R-L circuits- Simple illustrative examples from engineering field.

Course Outcomes: After the successful completion of the course, the students are able to

CO1	**Explain** the fundamental concepts –in complex numbers and vector algebra to analyze the problemsarising in related area of engineering field.
CO2	**Identify** – partial derivatives to calculate rate of change of multivariate functions.
CO3	**Apply** - the acquired knowledge of integration and differentiation to evaluate double and triple integrals to compute length surface area and volume of solids of revolution and indentify velocity, acceleration of a particle moving in a space.
CO4	**Find** analytical solutions by solving first order ODE's which arising in different branches of engineering.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics (44th Edition), Khanna Publishers, New Delhi.
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill publications, New Delhi, 11thReprint, 2010.

REFERENCE BOOKS

1. Erwin Kreyszig, Advanced Engineering Mathematics (Latest Edition), Wiley Publishers, New Delhi.
2. H. C. Taneja, Advanced Engineering Mathematics, Volume I & II, I.K. International PublishingHouse Pvt. Ltd., New Delhi.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,2010.
4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	3	2										
CO3	2	3										
CO4	2											
CO5	3											

Strength of correlation: Low-1, Medium- 2, High-3

Employability Enhancement Skills (EES) - I

[As per Choice Based Credit System (CBCS) & OBE Scheme]

SEMESTER - III

Course Code:	**P21HDIP308**	**Credits:**	**01**
Teaching Hours/Week (L:T:P):	**0:2:0**	**CIE Marks:**	**100**
Total Number of Teaching Hours:	**28**	**SEE Marks:**	**-**

Course Learning Objectives: This course will enable students to:

- Get introduced to some of the concepts of soft skills and enhance communication skills
- Recognize common mistakes done by an individual in the course of his / her communication
- Write effective emails
- Identify their strengths, weakness, opportunities and threats
- Understand the basic rules of sentence structures
- Understand the correct usage of parts of speech, tenses and articles
- Explain divisibility roles, properties of various types of numbers
- Explain application of percentage in our daily life
- Describe the concepts of profit, loss, discounts
- Explain concepts behind logical reasoning modules of arrangements and blood relations

UNIT – I	**10 Hours**

Soft Skills: LSRW, Listening, communication skills (verbal and non-verbal skills), public speaking, Email writing, SWOT Analysis

Self-Study: Motivation and Time Management

UNIT – II	**10 Hours**

Verbal Ability: Parts of Speech - Prepositions, Adjectives and Adverbs ; Tenses, Articles, Idioms and Phrasal verbs, Subject verb agreement, Synonyms and Antonyms

Self-Study: Para jumbles and one word substitution

UNIT – III	**8 Hours**

Quantitative Aptitude: Number system, Percentage, Profit & Loss
Logical Reasoning: Blood Relations and Arrangements

Self-Study: Speed Maths

Course Outcomes: On completion of this course, students are able to:	
CO – 1:	Exhibit amplified level of confidence to express themselves in English
CO – 2:	Understand the correct usage of tenses and articles
CO – 3:	Increase the number of words in his/her day to day
CO – 4:	Solve logical reasoning problems based on blood relations and arrangements
CO - 5:	Solve the problems based on number system, percentage and profit & loss

Text Book(s):

1. Word Power Made Easy New Revised and Expanded Edition, First Edition, Norman Lewis, Goyal Publisher.
2. Essential English Grammar by Raymond Murphy, Cambridge University Press, new edition
3. The 7 habits of Highly Effective People by Stephen R. Covey
4. Quantitative aptitude by Dr. R. S Agarwal, published by S.Chand private limited.
5. Verbal reasoning by Dr. R. S Agarwal , published by S. Chand private limited.

Reference Book(s):

1. Quantitative Aptitude by Arun Sharma, McGraw Hill Education Pvt Ltd
2. CAT Mathematics by Abhijith Guha, PHI learning private limited.

Web and Video link(s):

1. Improve Your English Communication Skills Specialization https://www.coursera.org/specializations/improve-english

COURSE ARTICULATION MATRIX [Employability Enhancement Skills (EES) - I]

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	-	-	-	-	-	-	-	2	3	-	2
CO-2	-	-	-	-	-	-	-	-	-	2	-	2
CO-3	-	-	-	-	-	-	-	-	-	2	-	2
CO-4	2	-	-	-	-	-	-	-	-	-	-	-
CO-5	2	-	-	-	-	-	-	-	-	-	-	-

Applied Mathematical Methods

[As per Choice Based Credit System (CBCS) & OBE Scheme]

SEMESTER – IV (Common to EC, EE, CS, IS)

Course Code:	**21MA401B**	**Credits:**	**03**
Teaching Hours/Week (L:T:P):	**2-2-0**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**40**	**SEE Marks:**	**50**

Course Learning Objectives:

- Adequate exposure to basics of engineering mathematics so as to enable them to visualize the applications to engineering problems.
- Analyze the concept of complex variables in terms real variables
- Understand the concept of statistical methods to fit curves of samples and correlation and regression analysis
- To have a insight into numerical techniques to find solution of equations having no analytic solutions
- Provide insight into develop probability distribution of discrete and continuous random variables Testing hypothesis of sample distribution

UNIT – I	8 Hours

Calculus of complex functions: Introduction to functions of complex variables. Definitions of limit, continuity and differentiability, Analytic functions: Cauchy- Riemann equations in Cartesian and polar forms (no proof) and consequences. Applications to flow problems. Constructionof analytic functions: Milne-Thomson method-Problems.

Conformal transformations: Introduction. Discussion of transformations $w = z^2$, $w = e^z$, $w =$ z+1/z, $(z \neq 0)$. Bilinear transformations- Problems.

Self-study component:	Derivation of Cauchy- Riemann equation in Cartesian and polar forms, transformations of reflection, translation and Inversion.

UNIT – II	8 Hours

Complex integration: complex line integrals. Cauchy theorem, Cauchy integral formula. Taylor's and Laurent's series (Statements only) and illustrative examples. Singularities, poles and residues. (Statement only). Examples.

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

Statistical Methods: Correlation and regression-Karl Pearson's coefficient of correlation and rank correlation- problems, Regression analysis, lines of regression, problems.

Self-study component:	Contour integration Type-I & Type-II.

UNIT – III	8 Hours

Solution of algebraic and transcendental equations: Introduction, Bisection method, Regula-Falsi & Newton-Raphson method:- Illustrative examples only.

Numerical solution of ordinary differential equations (ODE's): Numerical solutions of ODE's of first order and first degree – Introduction. Taylor's series method. Modified Euler's method, Runge - Kutta method of fourth order (All formulae without proof). Illustrative examples only.

Numerical methods for system of linear equations- Gauss-Jacobi and Gauss- Seidel iterative methods. Determination of largest eigen value and corresponding eigen vector by power method.	
Self-study component:	Solution of equations using secant method, Picards method.

UNIT – IV	**8 Hours**
Random variables and Probability Distributions: Review of random variables. Discrete and continuous random variables-problems. Binomial, Poisson, Exponential and Normal distributions (with usual notation of mean and variance)-: problems. **Joint Probability Distributions :** Introduction, Joint probability and Joint distribution of discrete random variables and continuous random variables	
Self-study component:	Geometric and Gamma distributions- problems.

UNIT – V	**8 Hours**
Stochastic Processes and sampling theory: **Markov Chains:** Markov chains, Classification of Stochastic processes, Probability vector, Stochastic matrix, Regular stochastic matrix, Transition probabilities and Transition probability matrix. **Testing of Hypothesis** Sampling distributions-introduction. Standard error, Type-I and Type-II errors. Testing of hypothesis and confidence intervals for means. Student's ***t*** – distribution and Chi-square distribution as a test of goodness of fit - Illustrative examples only.	
Self-study component:	Classification of Stochastic process, Bernoulli Process, Poisson Process

Course Outcomes: On completion of the course, student should be able to:

CO1	**Apply** the concepts of an analytic function and their properties to solve the problems arising in engineering field
CO2	**Use** the concept of correlation and regression analysis to fit a suitable mathematical model for thestatistical samples arise in engineering field
CO3	**Apply** the acquired knowledge of numerical technique to solve equations approximately having no analytical solutions.
CO4	**Explain** discrete and continuous probability distributions in analyzing the probability models and solveproblems involving Markov chains.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics (44th Edition 2018), Khanna Publishers, New Delhi.
2. E. Kreysizig, Advanced Engineering Mathematics, John Wiley and sons, 10th Ed. (Reprint) 2016.

REFERENCE BOOKS

1. V. Ramana: Higher Engineering Mathematics, McGraw –Hill Education,11th Ed..
2. H. C. Taneja, Advanced Engineering Mathematics, Volume I & II, I.K. International PublishingHouse Pvt. Ltd., New Delhi.

3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2010.

ONLINE RESOURCES

1. http://www.nptel.ac.in
2. https://en.wikipedia.org
3. http://mcatutorials.com/mca-tutorials-numerical-methods-tutorial.php
4. https://www.iitg.ac.in/physics/fac/charu/courses/ph503/book.pdf

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**3**										
CO2	**3**	**2**										
CO3	**3**	**3**										
CO4	**2**	**3**										
CO5	**3**	**3**										
Strength of correlation: Low-1, Medium- 2, High-3												

Electrical Power Generation, Transmission and Distribution [As per Choice Based Credit System (CBCS) & OBE Scheme] SEMESTER – IV			
Course Code:	**P21EE402**	**Credits:**	**03**
Teaching Hours/Week (L:T:P):	**2:2:0**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**40**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- Explain the detail description of hydroelectric plants, thermal power generation, nuclear power plants and diesel electric plants.
- Understand the concept of load curves, different tariff, grounding and power factor.
- To Describe the transmission and distribution system scheme
- Describe and study the effect of sag and tension on over head transmission line
- To describe and study about line insulators and UG cables
- To Describe and study the performance evaluation of OH lines having different configurations.
- To determine the line parameter values of 1-phase and 3-phase OH lines of different configuration.
- To describe and study the concept of corona and its impact on OH transmission line.
- To describe and study about DC and AC- distributors carrying point and/or uniformly varying load.

UNIT – I	**Conventional Power Generation**	**8 Hours**

Hydro Electric Power Generation: Selection of site, Classification, General arrangement and operation.

Thermal Power Generation: Plant layout, Working, Coal handling system, Ash disposal schemes.

Nuclear Power Station: Selection of site, Plant layout, Reactors.

Diesel Electric Station: Plant layout, Working and Maintenance, Choice and characteristics

Self-study component:	Hydro electric Turbines.

UNIT – II	**Economic Aspects and Grounding Systems**	**8 Hours**

Economic Aspects: Diversity factor, Load factor, Plant capacity factor, Plant use factor, Plant utilization factor, Loss factor. Power factor improvement and Tariffs.

Grounding Systems: Resistance grounding system, Neutral grounding, Ungrounded system, Resonant grounding, Solid grounding, Reactance grounding.

Self-study component:	Load curve and load duration curve and its uses

UNIT – III	**Typical Transmission and Distribution System Scheme and Overhead Transmission Line**	**8 Hours**

Typical Transmission and Distribution System Scheme: Single line diagram of typical transmission and distribution system scheme indicating various voltage levels, Standard voltages

for transmission, Selection of optimal value of transmission voltage, Effect of increase of transmission voltage on: i) volume of copper used ii) efficiency of transmission iii) line loss and regulation.

Overhead Transmission Line: Requirements and types of - line conductors, Line supports. Sag calculation in conductors i) suspended on level supports ii) supports at different levels; Effect of wind & ice on sag tension calculations (Problems excluded).

Self-study component:	Tension and sag at erection

UNIT – IV	**Insulators, Underground Cables and Performance of Power Transmission Lines**	**8 Hours**

Insulators: Requirement, Types of insulators, Potential distribution over a string of suspension insulators, String efficiency & methods of improving it.

Underground Cables: Types, Material used, Insulation resistance, Thermal rating of cables, Charging current, Grading of cables –capacitance grading & inter-sheath grading,

Performance of Power Transmission Lines: Classification of Over head transmission lines, Regulation of short transmission line, Medium transmission line using nominal T-method, Long transmission line-ABCD constants, Ferranti effect.

Self-study component:	Testing of insulators and cables

UNIT – V	**Corona and Distribution System**	**8 Hours**

Corona: Phenomenon of corona, Expression for disruptive & visual critical voltage, Corona power loss, Factors effecting corona power loss, Advantages and disadvantages of corona, Methods of reducing corona effect, Radio interference.

Distribution System: Typical distribution system scheme- Feeders, distributors & service mains; Requirements of distribution system, Radial & ring main systems, DC distributors, Calculation for concentrated loads, AC Distributors- when the load PFs referred to voltages at load.

Self-study component:	AC Distributors when PF refer to the supply voltage.

Course Outcomes: On completion of this course, students are able to:

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Apply the knowledge of basic science in power generation, transmission & distribution systems.	Applying	L3
CO2	Analyze the performance characteristics of transmission and distribution system	Analyzing	L4
CO3	Analyze the classification of line conductors and voltage distribution in insulators and UG cables.	Analyzing	L4
CO4	Compute the parameters and performance of the transmission lines	Applying	L3

Text Book(s):

1. S. M. Singh, "Electrical power generation, transmission and distribution" -Prentice hall of India, New Delhi, 2nd 2008.
2. Chakrabarti, M-L Soni, P.V. Gupta, U.S. Bhatnagar, "Power system Engineering", Dhanpat Rai & Co., 2001.
3. C L Wadwa, Electrical power systems –New Age Publishers, 6 th edition, 2010.

Reference Book(s):

1. Dr. S L Uppal & S Rao, Electrical Power –Khanna publications, 15 th edition, 2001.
2. M.V. Deshapande, "Electrical Power System Design" T.M.H., 1993.

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Apply the knowledge of basic science in power generation, transmission & distribution systems.	**3**												**3**	
Analyze the performance characteristics of transmission and distribution system		**3**												**2**
Analyze the classification of line conductors and voltage distribution in insulators and UG cables.		**3**												**2**
Compute the performance parameters of the transmission lines	**3**												**2**	

DC & Synchronous Machines

[As per Choice Based Credit System (CBCS) & OBE Scheme]

SEMESTER – IV

Course Code:	**P21EE403**	**Credits:**	**03**
Teaching Hours/Week (L:T:P):	**3:0:0**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**40**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- Explain the detail description of hydroelectric plants, thermal
- To know about basic operation and construction of different types of DC Generators.
- To know about basic operation and construction of different types of DC Motors.
- Analysis of various tests to be conducted on DC Machines.
- To study about voltage regulation of synchronous generators.
- To learn about principle of operation and the effect of load variation in synchronous motors

UNIT – I	**DC Generator**	**8 Hours**

DC Generator: Types of generators, Types of armature windings, EMF Equation**,** O.C.C and Load characteristics, Armature reaction and methods of reducing its effects. Ideal, Resistance and EMF Commutation, Compensating winding, Use of Inter poles

Self-study component:	Construction of DC Machines

UNIT – II	**DC Motor**	**8 Hours**

DC Motor: Introduction, Torque equation**,** Characteristics of Shunt, Series and Compound motors, Factors controlling motor speed, Rheostatic Speed Control of shunt and series motors, its Merits & Demerits, Necessity of a Starters, 3-point starter and Applications of DC motor.

Self-study component:	Back EMF and its significance.

UNIT – III	**Testing Of DC Machines**	**8 Hours**

Testing Of DC Machines: Direct and Indirect methods of testing of shunt and series motors: Swinburne's test, Hopkinson's test, Field test, Retardation test, Advantages and disadvantages.

Self-study component:	Permanent magnet DC motor.

UNIT – IV	**Synchronous Generator**	**8 Hours**

Synchronous Generator: Principle of operation, Construction of salient & non-salient pole machines, armature windings, Coil span factor, Distribution factor, Chorded coils and EMF equation.
Voltage Regulation: Significance, EMF, MMF & ZPF methods.

Self-study component:	Harmonics and its elimination

UNIT – V	**Synchronous Motor**	**8 Hours**

Synchronization: Parallel operation of alternators: Reasons & Conditions, Synchronization: synchroscope, Infinite Bus.
Synchronous Motor: Principle of operation, Motor on load with constant Excitation, Power Flow

equations, Synchronous motor with different Excitation, Different Torques of Synchronous Motor, Effect of Increased load with constant excitation and vice versa, V and inverted V curves.

Salient Pole Synchronous Machine: Two reaction theory, Power angle diagram, Reluctance power, Slip test.

Self-study component:	Hunting in synchronous machines and Damper windings

Course Outcomes: On completion of this course, students are able to:

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Apply the knowledge of basic electrical laws to study the operating principle of DC & Synchronous machines.	Applying	L3
CO2	Analyze the performance characteristics of DC & Synchronous machines.	Analyzing	L4
CO3	Apply the different testing methods to examine the desired parameters of DC & Synchronous machines.	Applying	L3
CO4	Compute numerical problems on DC & Synchronous machines.	Applying	L3

Text Book(s):

1. Ashfaq Hussain "Electrical Machines", Dhanapath Rai& Co, 3rd Edition, Reprint 2015.
2. B.L Theraja "Electrical Technology" Volume2, S. Chand, 22nd Edition.

Reference Book(s):

1. A. Langsdorf, "Theory of alternating current machinery" TMH, 2005.
2. M.G.Say, "Performance and design of A.C. Machines" C.B.S Publishers, 2002.

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Apply the knowledge of basic electrical laws to study the operating principle of DC & Synchronous machines.	**3**												**3**	
Analyze the performance characteristics of DC & Synchronous machines.		**3**												**2**
Apply the different testing methods to examine the desired parameters of DC & Synchronous machines.	**3**												**2**	
Compute numerical problems on DC & Synchronous machines.	**3**												**2**	

MICROCONTROLLERS

[As per Choice Based Credit System (CBCS) & OBE Scheme]

SEMESTER – IV

Course Code:	**P21EE404**	**Credits:**	**04**
Teaching Hours/Week (L:T:P):	**3:0:2**	**CIE Marks:**	**50**
Total Theory Teaching Hours: **Total Laboratory Hours:**	**40** **24**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- Comparison of Microcontroller with Microprocessor and their evolution with the 8051architecture.
- Understanding the basic instruction set for program writing using different arithmetic and logical instructions.
- Describe and analyze the timer/counter operation with various modes
- Explain and analyze the various modes of serial communications with interfacing the circuits with external world.

UNIT – I	**Architecture of 8051**	**8 Hours**

Microprocessors and Microcontrollers, A Microprocessors survey. RISC & CISC CPU Architectures, Harvard & Von Neumann CPU architecture. Introduction of 8051 Micro controller Hardware, Input /output pins, Ports and circuits, Counter and Timers, Serial data input / output. Basics on Addressing modes.

Self-study component:	External memory
Practical Topics: **(6 Hours)**	a. Addition, Subtraction, Multiplication & Division of 8-bit data b. Addition &Subtraction of 16 bit data

UNIT – II	**Instruction set**	**8 Hours**

Introduction, Data moves & Logical Operations: External data moves, Code Memory, Read only data moves / Data exchanges, Addition, Subtraction, Multiplication and division (signed representation), Decimal arithmetic, Programs. Byte level logical operations, Bit level logical operations, Rotate and Swap operations. Incrementing and decrementing. JUMP and CALL program range, Jumps, Calls and Subroutines programs.

Self-study component:	Stack operation
Practical Topics: **(6 Hours)**	a. Largest and smallest number ; Counting of 1's & 0's of a given number; Ascending & Descending order b. **Code conversions:** Binary to Gray, ASCII to BCD, Hexadecimal to decimal and vice-versa c. Data movement with and without overlapping using external memory

UNIT – III	**Timer / Counter programming in 8051**	**8 Hours**

Timer / Counter programming in 8051: Programming 8051 Timers, Counter Programming, Programming timers 0 and 1 in assembly language

Self-study component:	Programs using subroutines
Practical Topics: **(4 Hours)**	a. Generation of waveforms with time delay using timers/counters in simulation b. Generation of waveforms without time delay using timers/counters in simulation

UNIT – IV	**8051 Serial Communication**	**8 Hours**

Basics of serial Communication, 8051 connecting to RS-232, 8051 Serial communication programming, Serial port programming in assembly language.

Self-study component:	Counter/Timer programming in C
Practical Topics: **(4 Hours)**	a. Programs on transmitting / receiving signals using RS232 in serial form to 8051. b. Programs on transmitting / receiving signals using RS232 in serial form to 8051.

UNIT – V	**Interrupts and Interfacing applications**	**8 Hours**

Interrupts & Interfacing applications: 8051 interrupts, Programming Timer Interrupts, Programming external Hardware Interrupts, Programming the Serial Communication Interrupts, Interrupt Priority in the 8051/52, interrupt programming in assembly language. Interfacing 8051 to Stepper motor, Elevator & DC Motor Assembly language interfacing programming

Self-study component:	Serial port programming in C
Practical Topics: **(4 Hours)**	a. DC Motor interface with microcontroller. b. Stepper motor interface with microcontroller. c. Elevator interface with microcontroller.

Course Outcomes: On completion of this course, students are able to:

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Apply basic computer knowledge to study the internal organization and instruction set of Microcontrollers	Applying	L3
CO2	Analyze different instructions set to write ALP's on logical, data transfer and mathematical operations.	Analyzing	L4
CO3	Analyze timers, counters and serial/parallel communication to interface the 8051 Microcontroller	Analyzing	L4
CO4	Execute ALP/ C Programs using Microcontroller kit /suitable simulation platform.	Applying	L3

Text Book(s):

1. Kenneth J. Ayala : "The 8051 Microcontroller Architecture, Programming & Applications" 2nd Edition, Penram International, 1996/ Thomason Learning 2005.
2. Muhammad Ali Mazidi and Janaice Gillespie Mazidi and Roollin D. Mckinlay" The 8051 Micro controller and Embedded Systems- using assembly and C " , Person Education, 2nd Edition 2006

Reference Book(s):

1. Predko "Programming and Customising the 8051 Micro controller" TMH 3rd Edition 2007
2. Ajaya V Deshmukh "Microcontrollers- Theory and applications", TMH 3rd Edition 2005
3. Rajkamal "Microcontrollers: Architecture, Programming, interfacing and system design", Person education, 4th Edition 2005

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Apply basic computer knowledge to study the internal organization and instruction set of Microcontrollers	**3**												**2**	
Analyze different instructions set to write ALP's on logical, data transfer and mathematical operations.		**3**												**2**
Analyze timers, counters and serial/parallel communication to interface the 8051 Microcontroller		**3**												**2**
Execute ALP/ C Programs using Microcontroller kit /suitable simulation platform.	**3**												**2**	

Signals and Digital Signal Processing
[As per Choice Based Credit System (CBCS) & OBE Scheme]
SEMESTER – IV

Course Code:	**P21EE405**	**Credits:**	**04**
Teaching Hours/Week (L:T:P):	**3:0:2**	**CIE Marks:**	**50**
Total Theory Teaching Hours: **Total Laboratory Hours:**	**40** **24**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable the students to:

- Analyze the types of signals, operations which can be performed on signals and properties of systems.
- Explain the concept of Z-Transform.
- Describe the concept of discrete-time Fourier transform (DFT), Inverse DFT (IDFT) and properties of DFT and understand and use the FFT algorithms and its applications
- Carry out the design and implementation of IIR filters and FIR filters

UNIT – I	**Introduction**	**8 Hours**

Introduction: Definitions of signals and systems, Classification of signals, Basic operations on signals (Excluding Problems), Systems viewed as interconnections of operations on signals, Properties of systems.

Self-study component:	Elementary signals
Practical Topics: **(6 Hours)**	a. Generation of elementary signals in continuous and discrete time b. Multiplication of two discrete time sequences

UNIT – II	**Z-Transforms**	**8 Hours**

Z-Transforms: Introduction, Definition of the z-transform and its inverse, Region of Convergence, Properties of z-transforms(Excluding problems), z-transform Inversions, z-Transform analysis of LTI Systems.

Self-study component:	Initial and final value theorem
Practical Topics: **(6 Hours)**	a. Z-Transforms and inverse Z-Transforms of given sequenc b. Convolution Property of the Fourier transform

UNIT – III	**Discrete Fourier transform (DFT)**	**8 Hours**

Introduction, definitions of Discrete Fourier Transform (DFT) and Inverse Discrete Fourier transform (IDFT). Properties of DFT – Periodicity, Linearity, Circular Symmetries of a sequence. Symmetry properties of the DFT - real valued sequences, real & even sequences, real & odd sequences, purely imaginary sequences and circular convolution. Additional DFT properties – time reversal of sequences, circular time shift of a sequence, circular frequency shift, complex conjugate properties

Self-study component:	Relation between DFT and DFS

Practical Topics: **(4 Hours)**	a. MATLAB Scripts to perform discrete convolution for the given sequences b. MATLAB program to perform the Discrete Fourier Transform (DFT) for the given sequences by computing the N point DFT of a given sequence and plot magnitude and phase spectrum.

UNIT – IV	**Fast Fourier Transform (FFT)**	**8 Hours**

Efficient computation of the DFT: FFT algorithms - Direct computation of DFT, Radix-2 algorithms - Decimation In Time and Frequency algorithms, Applications of FFT algorithms -Efficient computation of the DFTs of two real sequences (using a Single N-point DFT), Efficient computation of the DFTs of 2N point real sequences.

Self-study component:	Inverse Fast Fourier transform
Practical Topics: **(4 Hours)**	a. MATLAB program to perform the Discrete Fourier Transform (DFT) for the given sequences by using FFT algorithm of a given sequence and plot magnitude and phase spectrum. b. Circular Convolution using FFT Algorithm

UNIT – V	**Design of filters:**	**8 Hours**

(a) Design of Analog IIR filters – Analog Filter Specifications, classification of analog Filters, Butterworth analog filter, frequency/spectral transformations, design of Low pass (analog) Butterworth filters.
(b) Digital filters: Design of IIR filters from analog filters -Bilinear transformation, Impulsive invariance transformation.
(c) Design of FIR filters: Introduction, design of Linear phase FIR filter using windows. Windowing functions, rectangular

Self-study component:	Design of Chebyshev Filter
Practical Topics: **(4 Hours)**	a. Design of IIR Butterworth analog filter to meet the given specification. b. Design of IIR Butterworth digital filter to meet the given specification.

Course Outcomes: On completion of this course, students are able to

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Apply the knowledge of mathematics to visualize, Classify and perform computation on discrete time signals, systems and properties	Applying	L3
CO2	Analyze both continuous and discrete time systems in time, frequency and z-domains	Analyzing	L4

CO3	Design simple signal conditioning systems by using different techniques	Creating	L6
CO4	Execute MATLAB program to implement signal operations, processing and filter algorithms	Applying	L3

Text Book(s):

1. Simon Haykin and Barry Van Veen, "Signals and Systems", John Wiley & Sons, Second edition, 2008.
2. J.S.Chitode , "Digital Signal Processing" - Technical publications. Pune. 2013

Reference Book(s):

1. Michel J Roberts, "Signals and Systems: Analysis of signals through Linear Systems", Tata McGraw-Hill, 2003..
2. H. P. Hsu and R. Ranjan, "Signals and Systems", Schaum's Outline Series, T.M.H., 2006.
3. D. Ganesh Rao and SatishTunga, "Signals and Systems: A Simplified Approach", Sanguine Technical Publishers.
4. 4. Dr. D Ganesh Rao & Vineeta P. Gejji , "Digital Signal Processing", Sanguine Technical Publishers, 2013

Course Articulation Matrix

Course Outcome (CO)	**Program Outcome**													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Apply the knowledge of mathematics to visualize, Classify and perform computation on discrete time signals, systems and properties	**3**												**2**	
Analyze both continuous and discrete time systems in time, frequency and z-domains		**3**												**2**
Design simple signal conditioning systems by using different techniques			**2**											**1**
Execute MATLAB program to implement signal operations, processing and filter algorithms	**2**	**2**	**2**	**2**	**2**				**2**	**2**			**2**	**2**

DC Machines Laboratory [As per Choice Based Credit System (CBCS) & OBE Scheme] SEMESTER – IV			
Course Code:	**P21EEL406**	**Credits:**	**01**
Teaching Hours/Week (L:T:P):	**0:0:2**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**20**	**SEE Marks:**	**50**

Course Learning Objectives: This course aims to:

- They will be able to study OCC and load characteristics of DC generator & DC Motor
- They will be able study the different methods of speed control of DC motor
- They will be able to determine the efficiency of machine both as generator and motor by conducting various tests.
- They will know the working of synchronous Motor

Sl.No	List of Experiments	No. of Hours
1.	Speed control of DC shunt motor	**2**
2.	Load Characteristics of a DC Generators	**2**
3.	Load test on DC shunt motor by Electrical Loading	**2**
4.	Swinburne's test	**2**
5.	Field test on DC series motor	**2**
6.	Regulation of Alternator by EMF & MMF methods	**2**
7.	Slip test	**2**
8.	Hopkinson's test	**2**
9.	Self study experiment	**2**

Course Outcomes: On completion of this course, students are able to:

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	Conduct experiments to obtain performance characteristics of DC Machines.	Applying	L3
CO2	Conduct experiments to obtain performance characteristics of Synchronous Machines.	Applying	L3
CO3	Ability to communicate effectively in a team/as an individual to conduct experiments.	Understanding	L2

Course Articulation Matrix

Course Outcome (CO)	Program Outcome													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
Conduct experiments to obtain performance characteristics of DC Machines.	**3**	**3**		**3**									**2**	**2**
Conduct experiments to obtain performance characteristics of Synchronous Machines.	**3**	**3**		**3**									**2**	**2**
Ability to communicate effectively in a team/as an individual to conduct experiments.								**1**	**3**	**3**				

Employability Enhancement Skills (EES) - IV
[As per Choice Based Credit System (CBCS) & OBE Scheme]
SEMESTER – IV

Course Code:	**P21HSMC408**	**Credits:**	**01**
Teaching Hours/Week (L:T:P):	**0:2:0**	**CIE Marks:**	**50**
Total Number of Teaching Hours:	**28**	**SEE Marks:**	**50**

Course Learning Objectives: This course will enable students to:

- Solve problems on ages, mixtures and alligations and progressions.
- Understand the concepts of Data interpretation, crypt arithmetic and data sufficiency.
- Understand the basic concepts of C programming language.
- Apply programming constructs of C language to solve the real-world problem.
- Explore user-defined data structures like arrays, structures and pointers in implementing solutions to the problems.
- Design and Develop solutions to problems using functions.

UNIT – I	**10 Hours**

Quantitative Aptitude: Problems on Ages, Mixtures and Alligations, Progressions.
Logical Reasoning: Data Interpretation, Cryptarithmetic, Data sufficiency.

Self-Study: Sequential output tracing

UNIT – II	**08 Hours**

C Programming: Data types and Operators, Control statements, Looping, Arrays and Strings

Self-Study: Pre-processors

UNIT – III	**10 Hours**

C Programming: Functions, Recursion, Structure, Pointers, Memory management.

Self-Study: Enum and Union

Course Outcomes: On completion of this course, students are able to:

CO – 1:	Solve the problems based on ages, Mixtures, alligations and progressions.
CO – 2:	Apply suitable programming constructs of C language to solve the given problem.
CO – 3:	Design and Develop solutions to problems using functions and recursion.

Text Book(s):

1. Quantitative aptitude by Dr. R. S Agarwal, published by S.Chand private limited.
2. Exploring C by Yashavant Kanetkar, 2nd edition, BPB Publications
3. Test Your C Skills by Yashavant Kanetkar, 2nd edition, BPB Publications

Reference Book(s):

1. Quantitative Aptitude by Arun Sharma, McGraw Hill Education Pvt Ltd
2. Reema Thareja, Programming in C, 2nd Edition, Oxford University Press, 2016.
3. Schaum's outlines, Programming with C, Byron Gottfried, 3rdEdition, Tata McGraw-Hill Publication, 2017.

Web and Video link(s):

1. NPTEL Course: Problem Solving through Programming in C, Prof. Anupam Basu, IIT Kharagpur

https://nptel.ac.in/courses/106/105/106105171/

COURSE ARTICULATION MATRIX [Employability Enhancement Skills (EES) - IV]

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	-	-	-	-	-	-	-	-	-	-
CO-2	-	2	1	-	-	-	-	-	3	1	2	2
CO-3	-	1	2	-	-	-	-	-	-	2	-	1

Internship - I

[As per Choice Based Credit System (CBCS) & OBE Scheme]

SEMESTER – IV

Course Code:	**P21INT409**	**Credits:**	**01**
Teaching Hours/Week (L:T:P):	**0 : 0 : 0**	**CIE Marks:**	**-**
Internship duration	**2 weeks**	**SEE Marks:**	**100**

All the students registered to II year of BE shall have to undergo a mandatory internship of 02 weeks during the intervening vacation of II and III semesters or III and IV semester. Internship shall include Inter / Intra Institutional activities. A Semester End Examination (Presentation followed by question-answer session) shall be conducted during IV semester and the prescribed credit shall be included in IV semester. The internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take up / complete the internship shall be declared fail and shall have to complete during subsequent Semester End Examination after satisfying the internship requirements. (The faculty coordinator or mentor has to monitor the students' internship progress and interact to guide them for the successful completion of the internship.)

List of Activities

1. Activities concerned with the works of Indian scholars like Charaka and Susruta, Aryabhata, Bhaskaracharya, Chanakya, Madhava, Patanjali, Panini and Thiruvalluvar, among numerous others. (Reference NEP 2020, page 04)
2. Activities such as training with higher Institutions or Soft skill training organized by Training and Placement Cell of the respective institutions.
3. Contribution at incubation/ innovation /entrepreneurship cell of the institute.
4. Participation in conferences/ workshops/ competitions etc.
5. Learning at Departmental Lab/Tinkering Lab/ Institutional workshop.
6. And working for consultancy/ research project with-in the institute. [Serial numbers 2 to 6, AICTE Internship Policy.pdf page 8]
7. Learning MS Word, Excel, Microsoft equations, MS drawing tools, MS Power point, etc.
8. Coding.
9. Mini-projects using commercially available assembled electronic products.
10. Debates, quizzes, and group discussions: On technica
11. Essay competitions: Both in Kannada and English on technical topics already studied.
12. Survey and study of published literature on the assigned topic: Technical paper survey, Preparation of synopsis. Exposure to technical paper publications.
13. Athletics and Sports.
14. Photography.
15. Short film production: Contemporary aspects, Technical aspects etc.
16. Music Competition (Vocal and Instrumental): Classical – Indian and western, Sugama-Sangeetha (Bhava Geethegalu), Folk songs, film songs etc.
17. Internship in Disaster Management. [AICTE APH 2021-22 pdf page166]

18. Solar energy connected activities that help common man. [AICTE APH 2021-22 pdf page166]
19. Working with Smart City Administration.
20. Hackathon (it is a design sprint-like event in which computer programmers and others involved in software development, including graphic designers, interface designers, project managers, and others, often including domain experts, collaborate intensively on software projects).
21. Industrial Safety, Fire Safety, Electrical Safety, Chemical Process Safety, Food Safety etc.
22. Internship and project work in Indian Knowledge System related Areas / Topics.
23. Industrial visits / small scale Industries / Factories / Cottage Industries / substation visit / short project tour, etc., and submission of report.

Documents to be submitted by Students for Internship Evaluation

I. Student's Diary

The main purpose of writing a daily diary is to cultivate the habit of documenting and to encourage the students to search for details. It develops the students' thought process and reasoning abilities. The students shall record in the daily training diary the day to day account of the observations, impressions, information gathered and suggestions given, if any, and activities carried out. It should contain the sketches and drawings related to the observations made by the students. The daily training diary should be signed after every day or at least twice a week by the Faculty/ in charge of the section (external expert) where the student has been working.

The student's Diary should be submitted by the students along with attendance record. It shall be evaluated on the basis of the following criteria:

- **(i)** Regularity in the maintenance of the diary.
- **(ii)** Adequacy and quality of information recorded.
- **(iii)** Drawings, sketches, and data recorded.
- **(iv)** Thought process and recording techniques used.
- **(v)** Organization of the information.

II. Internship Report

After completion of the Internship, the student shall prepare, with daily dairy as a reference, a comprehensive report in consultation with the evaluators to indicate what he has observed and learned in the training period along with the internship outcomes. The training report should be signed by the Evaluator.

The Internship report shall be evaluated on the basis of the following criteria and/or other relevant criteria pertaining to the activity completed.

- **(i)** Originality.
- **(ii)** Adequacy and purposeful write-up.
- **(iii)** Organization, format, drawings, sketches, style, language etc.
- **(iv)** Variety and relevance of learning experience.

Practical applications relationships with basic theory and concepts taught in the course.

Table – 1: Intra and Inter Institute Activities and Assessment Rubrics					
Sl No	**Sub Activity Head**	**Performance/ Appraisal**	**Assessment Rubrics (Allotted marks decide the letter grade)**	**Proposed Document as Evidence**	**Evaluated by**
1	Inter/Intra Institutional Workshop/ Training.	Excellent	80 to 100	**(i)** Student's Diary and **(ii)** Internship Report along with the certificate issued from relevant authorized Authority	**i)** Institute Faculty together with External Expert if any. **(ii)** Training and Placement Officer. **(iii)** Physical Education Officer or the concerned in charge Officer of the Activity
		Good	79 to 60		
		Satisfactory	59 to 40		
		Unsatisfactory and fail	<39		

Basic Engineering Mathematics - II [As per Choice Based Credit System (CBCS) & OBE Scheme] SEMESTER – IV (Lateral Entry: Common to all branches)			
Course Code:	**P21MDIP401**	**Credits:**	**00**
Teaching Hours/Week (L:T:P):	**2-2-0**	**CIE Marks:**	**100**
Total Number of Teaching Hours:	**40**	**SEE Marks:**	**-**

Course objective: The mandatory learning course **P21MADIP401** viz., **BASIC ENGINEERING MATHEMATICS-II** aims to provide essential concepts of linear algebra, introductory concepts of second & higher order differential equations along with various techniques/ methods to solve them, Laplace & inverse Laplace transforms and elementary probability theory.

UNIT – I	**8 Hours**

Linear Algebra: Introduction - Rank of matrix by elementary row operations - Echelon form of a matrix. Consistency of system of linear equations - Gauss elimination method. Gauss-Jordan and LU decomposition methods. Eigen values and Eigen vectors of a square matrix.

Self-study component:	Application of Cayley-Hamilton theorem (without proof) tocompute the inverse of a matrix-Examples.

UNIT – II	**8 Hours**

Higher order ODE's: Linear differential equations of second and higher order equations with constant coefficients. Homogeneous /non-homogeneous equations. Inverse differential operators. and variation of parameters. Solution of Cauchy's homogeneous linear equation and Legendre's linear differential equation.

Self-study component:	Method of undetermined coefficients

UNIT – III	**8 Hours**

Multiple Integrals: Double and triple integrals-region of integration. Evaluation of double integrals by change of order of integration.

Vector Integration: Vector Integration: Integration of vector functions. Concept of a line integrals, surface and volume integrals. Green's, Stokes's and Gauss theorems (without proof) problems.

Self-study component:	Orthogonal curvilinear coordinates.

UNIT – IV	**8 Hours**

Laplace transforms: Laplace transforms of elementary functions. Transforms of derivatives and integrals, transforms of periodic function and unit step function-Problems only. Inverse Laplace transforms: Definition of inverse Laplace transforms. Evaluation of Inverse transforms by standard methods.

Self-study component:	Application to solutions of linear differential equations and simultaneous differential equations.

UNIT – V	8 Hours

Probability: Introduction. Sample space and events. Axioms of probability. Addition and multiplication theorems. Conditional probability – illustrative examples.

Self-study component:	State and prove Bayes's theorem.

Course Outcomes: After the successful completion of the course, the students are able to

CO1	**Apply** matrix theory for solving systems of linear equations in the different areas of linear algebra.
CO2	**Solve** second and higher order differential equations occurring in of electrical circuits, damped/un-damped vibrations.
CO3	**Identify** - the technique of integration to evaluate double and triple integrals by change of variables, and vector integration technique to compute line integral
CO4	**Explore** the basic concepts of elementary probability theory and, apply the same to the problems ofdecision theory.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics (44th Edition), Khanna Publishers, New Delhi.
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill publications, New Delhi, 11thReprint, 2010.

REFERENCE BOOKS

1. Erwin Kreyszig, Advanced Engineering Mathematics (Latest Edition), Wiley Publishers, New Delhi.
2. H. C. Taneja, Advanced Engineering Mathematics, Volume I & II, I.K. International Publishing HousePvt. Ltd., New Delhi.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,2010.
4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–Westpress, Reprint 2005.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**										
CO2	**3**	**2**										
CO3	**2**	**3**										
CO4	**2**	**2**										
CO5	**3**											

Strength of correlation: Low-1, Medium- 2, High-3

Employability Enhancement Skills (EES) - II
[As per Choice Based Credit System (CBCS) & OBE Scheme]
SEMESTER – IV

Course Code:	**P21HDIP408**	**Credits:**	**01**
Teaching Hours/Week (L:T:P):	**0:2:0**	**CIE Marks:**	**100**
Total Number of Teaching Hours:	**28**	**SEE Marks:**	**-**

Course Learning Objectives: This course will enable students to:

- Get introduced to the concepts of teamwork and leadership
- Understand the importance of professional etiquettes
- Describe the reading with comprehension
- Explain the purpose, plan and ways to identify specific details in a paragraph for better comprehension
- Form grammatically correct sentences
- Explain the basic concepts in calculating simple interest and compound interest
- Explain concepts behind logical reasoning modules of direction sense, coding & decoding, series and visual reasoning

UNIT – I	**10 Hours**

Soft Skills: Etiquette, Presentation Skills, Introduction to Body Language, Interpersonal and Intrapersonal Skills, Team work, Leadership skills, Extempore

Self-Study: Concepts of Sympathy and Empathy

UNIT – II	**10 Hours**

Verbal Ability: Verbal Analogies, Sentence completion & correction, Reading comprehension

Self-Study: Paragraph sequencing

UNIT – III	**8 Hours**

Quantitative Aptitude: Simple & Compound Interest, Ratio & Proportion, Time & Work
Logical Reasoning: Direction Sense, Coding and Decoding, Series, Visual reasoning

Self-Study: Directions and Pythagoras Theorem, differences between mirror and water images

Course Outcomes: On completion of this course, students are able to:

CO – 1: Exhibit amplified level of confidence to express themselves in English

CO – 2: Critical awareness of the importance of teamwork and development of the skills for building effective teams

CO – 3: Solve the questions under reading comprehension confidently with higher accuracy

CO – 4: Solve the problems based on interest, ratio & proportion, time & work

CO – 5: Solve logical reasoning problems based on direction sense, coding & decoding and series

Text Book(s):

1. Word Power Made Easy New Revised and Expanded Edition, First Edition, Norman Lewis, Goyal Publisher.
2. Essential English Grammar by Raymond Murphy, Cambridge University Press, new edition
3. The 7 habits of Highly Effective People by Stephen R. Covey
4. Quantitative aptitude by Dr. R. S Agarwal, published by S.Chand private limited.
5. Verbal reasoning by Dr. R. S Agarwal , published by S. Chand private limited.

Reference Book(s):

1. Quantitative Aptitude by Arun Sharma, McGraw Hill Education Pvt Ltd
2. CAT Mathematics by Abhijith Guha, PHI learning private limited.

Web and Video link(s):

1. Teamwork Skills: Communicating Effectively in Groups https://www.coursera.org/learn/teamwork-skills-effective-communication

COURSE ARTICULATION MATRIX [Employability Enhancement Skills (EES) - II]

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	-	-	-	-	-	-	-	2	3	-	2
CO-2	-	-	-	-	-	-	-	-	3	1	2	2
CO-3	-	-	-	-	-	-	-	-	-	2	-	1
CO-4	2	-	-	-	-	-	-	-	-	-	-	-
CO-5	2	-	-	-	-	-	-	-	-	-	-	-

BE – III / IV Semester – Common to all

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ			
ವಿಷಯ ಸಂಕೇತ (**Course Code**)	**P21KSK307/407**	ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಅಂಕಗಳು	**50**
ಒಂದು ವಾರಕ್ಕೆ ಬೋಧನಾ ಅವಧಿ **Teachin Hours / Week (L:T:P)**	**0-2-0**	ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯ ಅಂಕಗಳು	**50**
ಒಟ್ಟು ಬೋಧನ ಅವಧಿ	**25 ಗಂಟೆಗಳು**	ಒಟ್ಟು ಅಂಕಗಳು	**100**
ಕ್ರೆಡಿಟ್ಸ್ (**Credits**)	**1**	ಪರೀಕ್ಷೆಯ ಅವಧಿ	**01 ಗಂಟೆ**

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯದ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

೧. ವೃತ್ತಿಪರ ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಾಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

೨. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಹಯಿಸಿ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಾಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.

೩. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು

೪. ಕನ್ನಡ ಶಬ್ದಸಂಪತ್ತಿನ ಪರಿಚಯ ಮತ್ತು ಕನ್ನಡ ಭಾಷಿಯ ಬಳಕಿ ಹಾಗೂ ಕನ್ನಡದಲ್ಲಿ ಪತ್ರ ವ್ಯವಹಾರವನ್ನು ತಿಳಿಸಿಕೊಡುವುದು.

ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process – General Instructions):

These are sample Strategies, which teacher can use to accelerate the attainment of the course outcomes.

೧. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಬೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧಾರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.

೨. ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು – ಅಂದರೆ ಕವಿ–ಕಾವ್ಯ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಜಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.

೩. ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಬೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.

ಘಟಕ – ೧ ಲೇಖನಗಳು

೧. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ – ಹಂಪ ನಾಗರಾಜಯ್ಯ

೨. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ – ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ

೩. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ – ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೋ. ವಿ. ಕೇಶವಮೂರ್ತಿ

ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**

ಘಟಕ – ೨ ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ	
೧. ವಚನಗಳು: ಬಸವಣ್ಣ, ಅಕ್ಕಮಹದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ. ೨. ಕೀರ್ತನೆಗಳು: ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ – ಕನಕದಾಸರು ೩. ತತ್ವಪದಗಳು: ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು – ಶಿಶುನಾಳ ಶರೀಫ	
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**
ಘಟಕ – ೩ ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ	
೧. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು ೨. ಕುರುಡು ಕಾಂಚಾಣ: ದಾ.ರಾ. ಬೇಂದ್ರೆ ೩. ಹೊಸಬಾಳಿನ ಗೀತೆ: ಕುವೆಂಪು	
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**
ಘಟಕ – ೪ ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ	
೧. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ: ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ ಎನ್ ಮೂರ್ತಿರಾವ್ ೨. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ: ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ	
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**
ಘಟಕ – ೫ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ	
೧. ಯುಗಾದಿ: ವಸುಧೇಂದ್ರ ೨. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ	
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಪರಿಣಾಮಗಳು (Course Outcomes)

೧. ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯವಾಗುತ್ತದೆ.
೨. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳು ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಆಸಕ್ತಿಯು ಮೂಡುತ್ತದೆ.
೩. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವಾಗುತ್ತದೆ.
೪. ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ, ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳ ಪರಿಚಯವಾಗುತ್ತದೆ.

ಮೌಲ್ಯಮಾಪನದ ವಿಧಾನ (Assessment Details – both CIE and SEE)

(methods of CIE – MCQ, Quizzes, Open book test, Seminar or micro project)
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is

50%. The student has to obtain a minimum of 40% marks individually both in CIE and 35% marks in SEE to pass. Theory Semester End Exam (SEE) is conducted for 50 marks (01 hour duration). Based on this grading will be awarded.

Continuous Internal Evaluation:
Two Tests each of **40 Marks (duration 01 hour)**
Two assignments each of **10 Marks**

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

ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯು ಈ ಕೆಳಗಿನಂತಿರುತ್ತದೆ – Semester end Exam

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

1. The question paper will have 25 questions. Each question is set for 02 marks.
2. SEE Pattern will be in MCQ Model for 50 marks. Duration of the exam is 01 hour.

ಪಠ್ಯ ಪುಸ್ತಕ:
ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ
ಡಾ. ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಎಲ್. ತಿಮ್ಮೇಶ,
ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ

BE – III / IV Semester – Common to all

ಬಳಕೆ ಕನ್ನಡ – Balake Kannada (Kannada for Usage) **ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ – (Prescribed Textbook to Learn Kannada)**			
ವಿಷಯ ಸಂಕೇತ (**Course Code**)	**P21KBK307/407**	ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ ಅಂಕಗಳು	**50**
ಒಂದು ವಾರಕ್ಕೆ ಬೋಧನಾ ಅವಧಿ **Teachin Hours / Week (L:T:P)**	**0-2-0**	ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯ ಅಂಕಗಳು	**50**
ಒಟ್ಟು ಬೋಧನ ಅವಧಿ	**25 ಗಂಟೆಗಳು**	ಒಟ್ಟು ಅಂಕಗಳು	**100**
ಕ್ರೆಡಿಟ್ಸ್ (**Credits**)	**1**	ಪರೀಕ್ಷೆಯ ಅವಧಿ	**01 ಗಂಟೆ**

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯದ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು (Course Learning Objectives):

- To create the 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 rain the learners for correct and polite conservation.

ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process – General Instructions):

These are sample Strategies, which teacher can use to accelerate the attainment of the course outcomes.

೧. ಬಳಕೆ ಕನ್ನಡವನ್ನು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಬೋಧಿಸಲು ವಟಿಯು ಸೂಚಿಸಿರು ಪಠ್ಯಪುಸ್ತಕವನ್ನು ಉಪಯೋಗಿಸಬೇಕು.

೨. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಉತ್ತೇಜಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.

೩. ಪ್ರತಿ ವಿದ್ಯಾರ್ಥಿ ಪುಸ್ತಕವನ್ನು ತರಗತಿಯಲ್ಲಿ ಬಳಸುವಂತೆ ನೋಡಿಕೊಳ್ಳುವುದು ಮತ್ತು ಪ್ರತೆ ಪಾಠ ಮತ್ತು ಪ್ರವಚನಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಪೂರಕ ಚಟುವಟಿಕೆಗಳಿಗೆ ತೊಡಗಿಸತಕ್ಕದ್ದು.

೪. ಡಿಜಿಟಲ್ ತಂತ್ರಜ್ಞಾನದ ಮುಖಾಂತರ ಇತ್ತೀಚೆಗೆ ಡಿಜಿಟಲೀಕರಣಗೊಂಡಿರುವ ಭಾಷೆ ಕಲಿಕೆಯ ವಿಧಾನಗಳನ್ನು ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ಮುಖಾಂತರ ಚರ್ಚಿಸಲು ಕ್ರಮಕೈಗೊಳ್ಳುವುದು. ಇದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ತರಗತಿಯಲ್ಲಿ ಹೆಚ್ಚು ಏಕಾಗ್ರತೆಯಿಂದ ಪಾಠ ಕೇಳಲು ಮತ್ತು ಅಧ್ಯಯನದಲ್ಲಿ ತೊಡಗಲು ಅನುಕೂಲವಾಗುತ್ತದೆ.

೫. ಭಾಷಾಕಲಿಕೆಯ ಪ್ರಯೋಗಾಲಯದ ಮುಖಾಂತರ ಬಹುಬೇಗ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಕಲಿಯಲು ಅನುಕೂಲವಾಗುವಂತೆ ಕಾರ್ಯಚಟುವಟಿಕೆಗಳನ್ನು ಮತ್ತು ಕ್ರಿಯಾ ಯೋಜನೆಗಳನ್ನು ರೂಪಿಸುವುದು.

Module - 1

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activites
3. Key to Transcription.
4. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ / ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು –Personal Pronouns, Possessive Forms, Interrogative words

ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**

Module - 2	
೧. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು – Possessive forms of nouns, dubitive question and Relative nouns ೨. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative and Colour Adjectives, Numerals ೩. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು – ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) Predictive Forms, Locative Case	
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**
Module - 3	
೧. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು – Dative Cases, and Numerals ೨. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು – Ordinal numerals and Plural markers ೩. ನ್ಯೂನ / ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ಮತ್ತು ವರ್ಣ ಗುಣವಾಚಕಗಳು – Defective / Negative Verbs and Colour Adjectives	
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**
Module - 4	
೧. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಅರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು Permission, Commands, encouraging and Urging words (Imperative words and sentences) ೨. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು Accusative Cases and Potential Forms used in General Communication ೩. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು – Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs ೪. ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧ ಸೂಚಕ ಮತ್ತು ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ – Comparative, Relationship, Identification and Negation Words	
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**
Module - 5	
೧. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು – ifferint types of forms of Tense, Time and Verbs ೨. ದ್, –ತ್, –ತು, –ಇತು, –ಆಗಿ, –ಅಲ್ಲ, –ಗ್, –ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ – Formation of past, Future and Present Tense Sentences with Verb Forms ೩. Kannada Vocabulary List : ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು – Kannada Words in Conversation	
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವಿಧಾನ	**ಪುಸ್ತಕ ಆಧಾರಿತ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನ, ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ಬಳಸುವುದು, ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ವಿಡಿಯೋಗಳನ್ನು ಬಳಸುವುದು, ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಚಟುವಟಿಕೆಗಳ ಮುಖಾಂತರ ಚರ್ಚಿಸುವುದು.**

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯದ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು :

Course Outcomes (Course Skill Set): At the end of the Couse, 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 conservation.

(**Assessment Details – both CIE and SEE)**

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 marks (20 marks). A student shall be deemed to have satisfied the academic requirements and aearned 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 maeks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation:
Two Tests each of **40 Marks (duration 01 hour)**
Two assignments each of **10 Marks**

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

ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯು ಈ ಕೆಳಗಿನಂತಿರುತ್ತದೆ – Semester end Exam (SEE)

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

1. The question paper will have 25 questions. Each question is set for 02 marks.
2. SEE Pattern will be in MCQ Model for 50 marks. Duration of the exam is 01 hour.

ಪಠ್ಯ ಪುಸ್ತಕ (Text book) :
ಬಳಕೆ ಕನ್ನಡ
ಲೇಖಕರು: ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,
ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ

BE – III / IV Semester – Common to all

Constitution of India and Professional Ethics (CIP)			
Course Code	**P21CIP307/407**	**CIE Marks**	**50**
Teachin Hours / Week (L:T:P)	**0-2-0**	**SEE Marks**	**50**
Total Hours of Pedagogy	**25 Hours**	**Total Marks**	**100**
Credits	**1**	**Exam Hours**	**01 Hour**

Course Objectives: This course will enable the students

a. To know the fundamental political structure & codes, procedures, powers, and duties of Indian government institutions, fundamental rights, directive principles, and the duties of citizens.

b. To understand engineering ethics and their responsibilities, identify their individual roles and ethical responsibilities towards society.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

- ✓ Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve thecombination of different methodologies which suit modern technological tools and software's to meet the present requirements of the Global employment market.
  - (i) Direct instructional method (Low /Old Technology),
  - (ii) Flipped classrooms (High/advanced Technological tools),
  - (iii) Blended learning (combination of both),
  - (iv) Enquiry and evaluation based learning,
  - (v) Personalized learning,
  - (vi) Problems based learning through discussion,
  - (vii) Following the method of expeditionary learning Tools and techniques,

1. Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can enhance the students in theoretical applied andpractical skills in teaching of 21CIP39/49 in general.

Module - 1

Introduction to Indian Constitution: Definition of Constitution, Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution,Role of the Constituent Assembly. Preamble of Indian Constitution & Key concepts of the Preamble. Salientfeatures of India Constitution.

Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community withadministration real time situations).

Module - 2	
Fundamental Rights (FR's), Directive Principles of State Policy (DPSP's) and Fundamental Duties (FD's): Fundamental Rights and its Restriction and limitations in different Complex Situations. DPSP's and its present relevance in Indian society. Fundamental Duties and its Scope and significance inNation building.	
Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community withadministration real time situations).
Module - 3	
Union Executive: Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Courtof India, Judicial Reviews and Judicial Activism.	
Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community withadministration real time situations).
Module - 4	
State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (Why and How) and Important Constitutional Amendments till today. Emergency Provisions.	
Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community withadministration real time situations).
Module - 5	
Professional Ethics: Definition of Ethics & Values. Professional & Engineering Ethics. Positive and Negative aspects of Engineering Ethics. Clash of Ethics, Conflicts of Interest. The impediments to Responsibility. Professional Risks, Professional Safety and liability in Engineering. Trust & Reliability inEngineering, Intellectual Property Rights (IPR's).	
Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community withadministration real time situations).

Course outcome (Course Skill Set)

At the end of the course the student should :

CO 1: Have constitutional knowledge and legal literacy.

CO 2: Understand Engineering and Professional ethics and responsibilities of Engineers.

Assessment Details (both CIE and SEE)

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 marks that 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:

Two Tests each of **40 Marks (duration 01 hour**)

Two assignments each of **10 Marks**

The average of two tests, two assignments, and quiz/seminar/group discussion will be out of 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 will be conducted by University as per the scheduled timetable, with common question papers for the subject.

- The question paper will have 25 questions. Each question is set for 02 marks.
- SEE Pattern will be in MCQ Model (Multiple Choice Questions) for 50 marks. Duration of the examination is 01 Hour.

Textbook:

1. **"Constitution of India & Professional Ethics"** Published by Prasaranga or published onVTU website with the consent of the university authorities VTU Belagavi.