SYLLABUS

(Witheffectfrom2022-23)

Bachelor Degree
In

Electronics & Communication Engineering

III& IV Semester

Out Come Based Education
With
Choice Based Credit System

[National Education Policy Scheme]

P.E.S. College of Engineering, Mandya -571401, 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, NewDelhi]

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VISION

"PESCE shall be 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 entre pre neural skills to meet the societal needs.*
- *Promote research, product development and industry-institution interaction.*

QUALITYPOLICY

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

COREVALUES

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

Department of Electronics and Communication Engineering

The department of Electronics and Communication Engineering was incepted in 1967 with an undergraduate program in Electronics and Communication Engineering. Initially, the program had an intake of 60 students, which increased to 120 in 2012, and further increased to 180 in 2019. Almost 200 students graduate every year, and the long journey of 50 years has seen satisfactory contributions to society, the nation, and the world. The alumni of this department have a strong global presence, making their alma mater proud in every sector they represent.

The department started its PG program in 2012 in the specializations of VLSI design and embedded systems. Equipped with well qualified and dedicated faculty, the department has a focus on VLSI design, embedded systems, and image processing. The quality of teaching and training has yieldeda high growth rate of placement at various organizations. The large number of candidates pursuing research programs (M.Sc. and Ph.D.) is a true testimonial to the research potential of the department. The department is recognized as a research centre by VTU, and Mysore University offers a part-time and full-time Ph.D. Program.

Vision

The department of E & C would end eavour to create a pool of Engineers who would be extremely competent technically, ethically strong also fulfil their obligation in terms of social responsibility.

Mission

- M1:Adopt the best pedagogical methods and provide the best facility, infrastructure and an ambience Conducive to imbibe technical knowledge and practicing ethics.
- M2:Groupandindividualexercisestoinculcatehabitofanalyticalandstrategicthinkingto help the Students to develop creative thinking and instil team skills
- M3:MoUsandSponsoredprojectswithindustryandR&Dorganizationsforcollaborative learning
- M4:Enablingandencouragingstudentsforcontinuingeducationandmouldingthemforlife- long Learning process

Program Educational Objectives (PEOs)

- **PEO1:** Graduates to exhibit knowledge in mathematics, engineering fundamentals applied to Electronics and Communication Engineering for professional achievement in industry, research and academia
- **PEO2:** Graduates to identify, analyse and apply engineering concepts for design ofElectronics and Communication Engineering systems and demonstrate multidisciplinary expertise to handle societal needs and meet contemporary requirements
- **PEO3:** Graduates to perform with leadership qualities, team spirit, management skills,attitude and ethics need for successful career, sustained learning and entrepreneurship.

Program Out comes(POs)

- **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **Conduct investigations of complex problems:** Use research- based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes(PSOs)

Electronics and Communication Engineering Graduates will be able to

- **PSO1:** An ability to understand the basic concepts in Electronics and Communication Engineering and to apply them in the design and implementation of Electronics and Communication Systems.
- **PSO2:** An ability to solve complex problems in Electronics and Communication Engineering, using latest hardware and software tools, along with analytical skills to arrive at appropriate solutions.

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	-	3	50	50	100
2	P21EC302	Linear Integrated Circuits	EC	3	-	-	3	50	50	100
3	P21EC303	Circuit Theory	EC	3	-	-	3	50	50	100
4	P21EC304	Digital Logic design	EC	3	-	2	4	50	50	100
5	P21EC305	Signals and Systems	EC	3	-	2	4	50	50	100
6	P21ECL306	Linear Integrated Circuits Laboratory	EC	-	-	2	1	50	50	100
7	P21KSK307	Samskrutika Kannada/	HSMC	-	2	-	1	50	50	100
	P21KBK307	Balake Kannada								
	OR									
	P21CIP307	Constitution of India and Professional Ethics	HSMC	-	2	-	1	50	50	100
8	P21HSMC308	Employability Enhancement Skills-III	HSMC	-	2	-	1	50	50	100
9.	P21AEC309	Innovation and Design Thinking	EC	-	2	-	1	50	50	100
Total							**21**			

10	P21MDIP301	Basic Engineering Mathematics-I	MA	2	2	-	0	100	-	100
11	P21HDIP308	Employability Enhancement Skills-I	HSMC	-	2	-	0	100	-	100

Bachelor of Engineering(IV–Semester)										
Sl. No.	Course Code	Course Title	Teaching Department	Hrs/ Week			Credits	Examination Marks		
				L	T	P		CIE	SEE	Total
1	P21MA401	Applied Mathematical Methods	MA	2	2	-	3	50	50	100
2	P21EC402	Analog and Digital Communication	EC	3	-	-	3	50	50	100
3	P21EC403	Electromagnetic field theory	EC	3	-	-	3	50	50	100
4	P21EC404	Digital Design Using Verilog HDL	EC	3	-	2	4	50	50	100
5	P21EC405	Microcontroller	EC	3	-	2	4	50	50	100
6	P21ECL406	Analog and Digital Communication Laboratory	EC	-	-	2	1	50	50	100
7	P21KSK407	Samskrutika Kannada/	HSMC	-	2	-	1	50	50	100
	P21KBK407	Balake Kannada								
	OR									
	P21CIP407	Constitution of India and Professional Ethics	HSMC	-	2	-	1	50	50	100
8	P21HSMC408	Employability Enhancement Skills-IV	HSMC	-	2	-	1	50	50	100
9.	P21INT409	Internship–I	EC	-	-	-	1	-	100	100
Total							**21**			

10	P21MDIP401	Basic Engineering Mathematics-II	MA	2	2	-	0	100	-	100
11	P21HDIP408	Employability Enhancement Skills–II	HSMC	-	2	-	0	100	-	100

L–Lecture,T–Tutorial,P-Practical/Drawing,CIE:ContinuousInternalEvaluation,SEE:Semester End Examination

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:

- Adequateexposuretobasicsofengineeringmathematicssoastoenablethemto 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.
- ApplyZ-TransformtechniquetoSolvedifferenceequationsandNumericalTechnique to estimate interpolation, Extrapolation and area - (All formulae without proof)-problems only
- Use mathematic all 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-tooth wave 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-ConstructionofHalfrangecosineandsineseriesandproblemsPracticalharmonicanalysis-Illustrative examples from engineering field.

Self-study component:	Derive Euler's formula, Fourierseries 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 withspecifiedboundaryconditions(Boundaryvalueproblems).Illustrativeexamplesfrom engineering field.

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

UNIT– III	**8 Hours**

FiniteDifferencesandInterpolation:Forwardandbackwarddifferences,Interpolation, Newton-Gregoryforwardandbackwardinterpolationformulae,Lagrange'sinterpolation formulaandNewton'sdivideddifferenceinterpolationformula(Allformulaewithout

proof)-problems only.
Numerical Differentiation: Derivatives using Newton-Gregory for ward and backward interpolation formulae, Applications to Maxima and Minima of at abulated function.
NumericalIntegration: Newton-Cotesquadratureformula,Simpson's1/3rdruleand 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 trans forms .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 (noproof)-problems.

Self-study component:	Finite Fourier transform, Fourier transform of derivatives of functions

UNIT– V	**8 Hours**

Z-Transforms: Definition.Z-transformsofbasicsequencesandstandardfunctions.Properties-linearity,scaling,Dampingrule,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**engineeringproblemsusingthefundamentalconceptsinFourierseries, 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**theacquiredknowledgetoconstructtheHalf-rangeFourierseries,FindingFourier Transforms and Inverse Laplace trans forms for somest and ard functions.
CO4	**Evaluate**Z-transformofvariousfunctions,solutionsofdifferentialequationswithinitial And boundary conditions.

TEXTBOOKS

1. B.S.Grewal,Higher Engineering Mathematics (44thEdition2018),KhannaPublishers, New Delhi.
2. E.Kreysizig, Advanced EngineeringMathematics,JohnWileyandsons,10thEd.(Reprint) 2016.

REFERENCE BOOKS

1. V.Ramana: Higher Engineering Mathematics, McGraw–HillEducation,11thEd..
2. H.C.Taneja, Advanced Engineering Mathematics, Volume I&II,I.K.

InternationalPublishingHousePvt.Ltd.,NewDelhi.
3.N.P.BaliandManishGoyal,AtextbookofEngineering Mathematics,
Laxmi Publications,Reprint, 2010.

ONLINERESOURCES

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**										
Strengthofcorrelation: Low-1,Medium-2,High-3												

Linear Integrated Circuits

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

SEMESTER–III

Course Code:	**P21EC302**	**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:

- Understand the basic operation of Op–Amp and its operation as D C and AC amplifiers.
- UnderstandthevariousapplicationsofOp-Amplikeinvertingamplifier,non–inverting amplifier, voltage follower, summing amplifier and difference amplifier.
- Understand the voltage sources, current sources, current amp lifers, Circuit stability and Frequency compensation methods.
- Understand the operation of Op Amp based differentiating, integrating and Schmitt trigger circuits.
- Knowtheapplicationsof555timersuchasmonostable, a stable multivibrators and use of Op–Amps in signal generators, filters and DC voltage regulators.
- Explaining the operation of ADC, DAC and PLL.

UNIT– I	**8 Hours**

Operational Amplifier Fundamentals: IC Operational amplifiers, Op–Amp parameters – Input, output and supply voltages, Off set voltages and currents, Slew rate and frequency limitation. **Op– Amps as DC Amplifiers**– Biasing Op–Amps, Direct coupled –Voltage Follower, Direct–Coupled Non–inverting Amplifiers, Direct–Coupled Inverting amplifiers, Summing amplifiers, Difference amplifier.

Op–Amps as AC Amplifiers: Capacitor coupled Voltage Follower, Capacitor Coupled Non–inverting Amplifier, Capacitor Coupled Inverting Amplifier, Capacitor Coupled Difference amplifier.

Text1:1.1, 2.3, 2.4, 2.6,3.1, 3.2, 3.3, 3.4, 3.6, 3.7, 4.1, 4.3, 4.5, 4.7.

Self-study component:	1. Study of instrumentation amplifier. 2. Study of High Input Impedance Capacitor Coupled Voltage Follower.

UNIT– II	**8 Hours**

Op–Amps Frequency Response and Compensation: Op-Amp Circuit Stability, Frequency Compensation Methods, Circuit Stability Precautions.

OP–AMP Applications: Voltage Sources, Current Sources and Current Sinks, Current Amplifiers, Voltage Level Detectors, Inverting Schmitt Trigger Circuit, Differentiating Circuit, Integrating Circuit.

Text1:5.1, 5.2, 5.6,7.1,7.2, 7.3,8.2, 8.3, 8.6, 8.7.

Self-study component:	**1.** Study of Log and Anti-log amplifiers. **2.** Study of Circuit Bandwidth and Slewrate.

UNIT– III	8 Hours
Signal Processing Circuits: Precision Half–Wave Rectifiers: Saturating Precision Rectifier and Non saturating Precision Rectifier, Precision Full–Wave Rectifiers: Half wave and summing circuit, Limiting circuits: Peak Clipper and precision clipper, Clamping circuits, Peak detectors: Precisionrectifierpeakdetector,SampleandHoldCircuits,AstableMultivibratorusingOp-Amp, Triangular wave generator **Text1:**9.1,9.2.9.3(Mentioned topics only), 9.4,9.5(Mentioned topics only),9.6,10.1, 10.3.	
Self-study component:	**1.** Study Mon stable Multi vibrator using Op-Amp. **2.** Study of Dead Zone Circuit

UNIT– IV	8 Hours
Signal Generators: 555 Timer Mon stable, 555 Timer As table, Phase Shift and Quadrature Oscillators, Colpitts and Hartley Oscillators, **Active Filters –**Filter types and characteristics, First order active filter, Second Order active filters. **DC Voltage Regulators:** Voltage Regulator Basics, Op–Amp Series Voltage Regulator, Adjustable Output Regulators, IC linear Voltage Regulators: 723 IC regulator and LM 317 IC regulator. **Text1:**10.6, 10.7,11.1,11.2,12.1, 12.2,12.3, 13.1,13.2, 13.3,13.5(Mentioned topics only)	
Self-study component:	1. Study of Band pass and Band reject filter using Op-amp. 2. StudyofLM337 IC regulator and IC Function Generator(IC8038).

UNIT– V	8 Hours
DAC and ADC: Analog/Digital Conversion Basics, Digital-To-Analog Conversion, Parallel ADC,ADC Counting Methods: Dual-Slope Integrator ADC, Digital Ramp ADC(Mentioned topics only). **PLL:**BasicPLLSystem,PLLComponents,PLLPerformanceFactors,IntegratedCircuitPLL **Text1**:15.1,15.2,15.3,15.4(Mentioned topics only),16.1,16.2,16.3, 16.5	
Self-study component:	1. Study of Linear Ramp ADC. 2. Study of applications of PLL

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**	**Program Outcome Addressed(PO#) with BTL**
CO1	**Apply** the knowledge of basic circuit concepts to describe the operation and characteristics of Op-Amps.	Remember	L3(PO1)
CO2	**Discuss** the working of op-amp applications, signal generators, voltage regulators, ADC,DAC And PLL.	Understanding	L3(PO2)
CO3	**Analyze** the Circuit stability and Frequency	Understanding	L3(PO2)

	Compensation methods, and applications of op-amps.		
CO4	**Design** the different op-amp applications circuits, signal generators, voltage regulators, ADC, DAC And PLL systems for a given specifications.	Applying	L4(PO3)
CO5	**Design and develop** the given op-amp circuits and also simulate the same using any simulation Tools as an individual or in a group.	Applying	L3(PO5,PO9, PO12)

Text Book(s):

1. **"OperationalAmplifiersandLinearIC's"**,DavidA.Bell,3rdedition,Oxforduniversity Press, 2011.ISBN-13: 978-0-19-569613-4 ISBN-10: 0-19-569613-1

Reference Book(s):

1. **"Linear Integrated Circuits",** D. Roy Choudhury and Shail B. Jain, 2nd edition, Reprint 2006, New Age International. ISBN-10: 8122430988: ISBN-13: 978-8122430981
2. **"Op–AmpsandLinearIntegratedCircuits",**RamakantA.Gayakwad,4thedition, PHI.

Web and Video link(s):

1. Analog Electronic Circuit-https://youtu.be/pkIxCmaxWFg
2. DifferentialandOperationalAmplifiers-https://youtu.be/LS8ne40mSTE

E-Books/Resources:

1. https://www2.mvcc.edu/users/faculty/jfiore/OpAmps/OperationalAmplifiersAndLinearICs_3E.pdf
2. https://books.google.co.in/books?id=aByz9D63wC&printsec=frontcover#v=onepage&q&f=false
3. https://drive.google.com/u/0/uc?id=1cK8mBJXxeFyNENRFYzSuqLCHWsqyRzzp&export=download

D. Course Articulation Matrix(CAM)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	2												2	
#2		3												3
#3		2												2
#4			3											
#5					2				2			1		

Circuit Theory [As per Choice Based Credit System(CBCS) &OBE Scheme] **SEMESTER–III**			
Course Code:	**P21EC303**	**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:

- Understand electrical circuits, their sources and transformations and also their analysis and solutions through node analysis and mesh analysis methods, various network theorems (ac and dc) to analyze complex circuits.
- Analyze the transient conditions that may occur in electrical networks by solving necessary differential equations.
- Provide explanation of Laplace trans form and its application in solving circuit problems.
- Determine transient response of electrical circuits by Laplace trans form method.
- Examine the behavior of two-port networks and learn about few special two-port networks.
- Demonstrate that the graph theory concept eases the solution method for solving networks with a large number of nodes and branches.
- Discuss the various properties and synthesis methods for different one-port networks

UNIT– I	**8 Hours**

Introduction to Network Theorems: Mesh Analysis, Node Analysis, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem, Reciprocity Theorem.

Text:6.1, 6.2,6.3, 6.4, 6.5,6.6, 6.7, 6.8

Self-study component:	Source Transformation, Star Delta Transformation, Millman's Theorem, Substitution Theorem.

UNIT– II	**8 Hours**

Introduction to Resonance: Series Resonance, Parallel Resonance

Introduction to Transient Analysis: Initial Conditions, Resistor-Inductor Circuit, Resistor-Capacitor Circuit, Resistor-Inductor- Capacitor Circuit.

Text: 5.1, 5.2, 5.3, 10.1,10.2, 10.3, 10.4, 10.5

Self-study component:	Comparison of Series and Parallel Resonance Circuits, Behaviour of Pure Resistor in an ac Circuit, Behaviour of Pure Inductor in an ac Circuit, Behaviour of Pure Capacitorinanac Circuit.

UNIT– III	**8 Hours**

Introduction to Laplace Transforms and its Applications: Laplace transforms of Periodic Functions, Waveform Synthesis, The Transformed Circuit, Resistor-Inductor Circuit, Resistor-Capacitor Circuit, Resistor-Inductor- Capacitor Circuit, Response of RL Circuit to Various Functions, Response of RC Circuit to Various Functions.

Text:11.1, 11.5, 11.6,11.10, 11.11, 11.12,11.13, 11.14, 11.15

Self-study component:	Write programs in MATLAB/ PYTHON to synthesis the wave forms.

UNIT– IV	**8 Hours**

IntroductiontoNetworkTopology: GraphofaNetwork,DefinitionsAssociatedwithaGraph, Incidence Matrix, Loop Matrix or Circuit Matrix, Cut set Matrix,
Introduction to Two-Port Networks: Open-Circuit Impedance Parameters (Z Parameters), Short-Circuit Admittance Parameters (Y Parameters), Transmission Parameters (ABCD Parameters), Hybrid Parameters (h parameters).

Text:9.1, 9.2, 9.3,9.4, 9.5, 9.6, 13.1,13.2, 13.3, 13.4, 13.6

Self-study component:	Duality, Inter-relationships between the Parameters.

UNIT– V	**8 Hours**

Introduction to Network Synthesis: Hurwitz Polynomials, Positive Real Functions, Elementary Synthesis Concepts, Realization of LC Functions, Realization of RC Functions.

Text:16.1, 16.2,16.3, 16.4,16.5, 16.6, 16.7

Self-study component:	Passive Filters, Realization of RL Functions

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

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Program Outcome Addressed(PO#) With BTL**
CO1	Ability to **apply** the fundamental concepts in solving and Analyzing different Electrical networks	Remember	L3(PO1)
CO2	Ability to **solve** circuits using appropriate technique	Understanding	L3(PO2)
CO3	Ability to **apply** mathematics in analyzing and Synthesizing the networks in time and frequency domain	Understanding	L3(PO2)
CO4	Ability to **analyze** the performance of a particular network	Applying	L4(PO3)
CO5	Ability to **formulate** varioussyn thesis methods for Different one-port networks	Applying	L3(PO5,PO9,PO12)

Text Book(s):

1. Network Analysis and Synthesis, Ravish R Singh, Mc Graw Hill Education(India)Private Limited. ISBN:978-1259062957

Reference Book(s):

1. Networkanalysis,3E, M.E.Van Valken burgandT.S.Rathore, Pearson Education. ISBN: 978-9353433123
2. EngineeringCircuitAnalysis,9E,William H.HaytJr.,JackE. Kemmerly, JamieD.Phillips,StevenM.Durbin,McGrawHillEducation(India)PrivateLimited. ISBN: 978-9390185139

3.Problems and Solutions in Engineering Circuit Analysis, William Hayt ,Jack Kemmerly, McGraw Hill Education (India) Private Limited. ISBN: 978-0071333030
Web and Video link(s): https://archive.nptel.ac.in/courses/108/105/108105159/ Network Analysis by Prof. Tapas Kumar Bhattacharya, IIT Kharagpur
E-Books/Resources:

D. Course Articulation Matrix (CAM)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	2												2	
#2		3												3
#3		2							1			1		2
#4			3											
#5					2				2			1		

Digital Logic Design [As per Choice Based Credit System(CBCS) & OBE Scheme] **SEMESTER–III**			
Course Code:	**P21EC304**	**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:

- Discuss the simplification techniques such as K–map,Q Mmethod and VEM Technique.
- Design and implement the combination all ogic circuits.
- Analyze the sequential elements and sequential all circuits.
- Design and implement the sequential logic circuits.
- Develop digital circuits/systems applying finite state machine approach.
- Discuss the structure of Compute architecture, ROM, PLA and FPGA with logic Implementation.

UNIT– I	**8 Hours**

Simplification Methods and NAND/NOR Implementation: The Map Method, Two-Variable,Three-VariableandFourVariableK-Maps,NANDandNORImplementation, Don't – Care Conditions, Determination of Prime-Implicants.

Combinational Logic: Design Procedure, Binary Parallel Adder, Magnitude Comparator, Encoders, Decoders, Multiplexers, Demultiplexers.

Text1:3.1-3.3, 3.6,3.8-3.10, 4.2, 5.2, 5.4-5.6

Self-study component:	Tabulation Method, Logic Synthesis and optimization, Decoders in RAM.
Practical Topics: **(6 Hours)**	1. Discrete Gate Implementation (i) Logic circuit realization using basic gates. (ii) Logic circuit realization using universal gates. 2.(i)Realization of parallel adder/subtractorusing7483 chip (ii)Demonstration of BCD to Excess–3codeconversionandvice versa.

UNIT– II	**8 Hours**

Sequential Logic: Introduction, Flip-Flops, Triggering of Flip-Flops.
Registers and Counters: Introduction, Registers, Shift Registers, Ripple Counters, Synchronous-counters.

Text1:6.1-6.3,7.1-7.5

Self-study component:	Setup and hold time issues, flip-flop versus latches, Delay elements, Watchdog timer.
Practical Topics: **(6 Hours)**	1. (i)Realization of Boolean expression/ Combinational Logic. (ii)Application of the IC's–MUX–74153andDEMUX–74139forhalf and full adders for 3 – bit binary to gray and BCD to Excess–3 code converters. 2. Realizationof2–bit comparator using gates and basic operational study of Priority encoder using 74147.

UNIT– III	8 Hours

State Machines: State Tables and Graph, General Models of Sequential Circuits, Design of a Sequence detector, More Complex Design Problems, Guidelines for Construction of State Graphs, Elimination of Redundant States, Equivalent States, Equivalent Sequential Circuits, Reducing incompletely Specified State Tables, Derivation of Flip-Flop Input Equations.

Text2:13.3-13.4,14.1-14.3, 15.1,15.2, 15.4-15.6

Self-study component:	Digital Camera Controller State Machine. Bluetooth Controller.
Practical Topics: (4 Hours)	1. Design2/3bitsynchronouscountersusing Flip–Flops. **2.** Design2/3bitasynchronouscountersusingFlip–Flops.

UNIT– IV	8 Hours

Programmable Logic and Storage Devices: Read-Only Memory (ROM), ROM Based Implementation of Combinational Logic, Programmable Logic Array (PLA), Programmability of PLD's,CPLD's,XILINXXC9500CPLD's,XILINXFPGAFliedProgrammable Gate Array(FPGA), XILINX Spartan XLFPGA's.

Text3:5.7-5.8

Self-study component:	Architecture and programming examples of FPGA's.
Practical Topics: (4 Hours)	1. Design the Ring counters and Johnson counter. 2. Demonstration of FPGA.

UNIT– V	8 Hours

Computer Architecture and Memory: The Memory unit, Examples of Random- access Memories. Introduction, Processor Organization, Arithmetic Logic Unit, Design of Arithmetic Circuit, Design of Logic Circuit, Design of Arithmetic Logic Unit, Status Register, Design of Shifter, Processor Unit, Design of Accumulator.

Text1:7.7-7.8,9.1-9.10

Self-study component:	Intel4004,8085processors,ARMMachineandAMD's Processors.
Practical Topics: (4 Hours)	1. Demonstrationof7489,16by4 random access memory. 2. RealizationofShiftoperationsusing7495.

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

COs	**Course Outcomes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Program Outcome Addressed(PO #) with BTL**
CO1	Apply the simplification techniques /methods to Optimize and Implement the digital functions/ circuits.	Understand& Apply	L2,L3(PO1,PO2)

CO2	Analyze, Debug and design combinational and sequential logic circuit for the given requirements/ specification.	Apply, Analyze & Create	L3,L4,L6(PO2,PO3)
CO3	Develop, Simulate and Implement logic circuits For the given requirements/specification.	Analyze& Create	L4,L6(PO4, PO5,PO9, PO12)
CO4	Analyze and Design processor at a path b locks.	Analyze& Create	L4,L6(PO2,PO3)
CO5	Design ROM /PLA /FPGA based circuits for the Given requirements / specifications.	Apply and Create	L3,L6 (PO3)

Text Book(s):

1. M.MorrisMano,"DigitalLogicandComputerDesign",Pearson,2020.ISBN:978- 93-325-4252-5.
2. CharlesHRothJr,LarryL.Kinney,"FundamentalsofLogicDesign",7thEdition, Thomson Learning, 2019.ISBN-13: 978-81-315-2615-6.
3. MichaelD.Ciletti,"AdvancedDigitalDesignwiththeVerilogHDL",2ndEdition, Pearson, 2011. ISBN-13: 9780133002546.

Reference Book(s):

1. John.MYarbrough,"DigitallogicapplicationsandDesign",Pearson,Thomson Learning,2006.ISBN: 981-240-62-1.

We band Video link(s):

1. https://nptel.ac.in/courses/108106177-CoursebyNeerajGoel, IIT Ropar.
2. https://nptel.ac.in/courses/106105185-CoursebyIndranilSengupta,IIT Kharagpur.
3. https://ocw.mit.edu/courses/6-004-computation-structures-spring-2017/pages/syllabus/-ChrisTerman,MassachusettsInstituteofTechnology.

E-Books/Resources:

D. Course Articulation Matrix(CAM)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	3	3											3	3
#2		2	3											2
#3				2	3				1			1		
#4		2	2											2
#5			2											

Signals and Systems [As per Choice Based Credit System(CBCS) &OBE Scheme] **SEMESTER–III**			
Course Code:	**P21EC305**	**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:

- Classify the signals and understand different to perations on signals.
- Recognize the basic signals (both continuous-time and discrete-time)like impulse, unit step, ramp, sinusoids and exponentials, represented both in frequency and time domains.
- Characterize LTI system using impulse response and linear constant coefficient differential equations.
- Represent all types of signals(CT/DT, periodic/non-periodic)in terms of complex
- Define relationship between Z trans form and Fourier transform.
- Implement the systems (any order)in Direct-form-I and Direct-form-II

UNIT– I	**8 Hours**

Continuous time and discrete time signals, transformations of the independent variable, exponential and sinusoidal signals, the unit impulse and unit step functions, Continuous-time and discrete-time systems, basic system properties.
Text1:1.1,1.2,1.3,1.4, 1.6

Self-study component:	More problems on the periodicity ,energy and power a signal.
Practical Topics: **(6 Hours)**	1. Develop a MATLAB code to generate the CTS and DTS a. Periodic Signals b. Exponential Signals c. Sinusoidal Signals 2. Develop a MATLAB code to generate the CTS and DTS a. Exponentially Damped Sinusoidal Signals b. Step, Impulse and Ramp functions c. User defined functions

UNIT– II	**8 Hours**

Linear Time Invariant Systems: Discrete-time LTI systems- The Convolution sum, Continuous-time LTI systems- The Convolution integrals, properties of linear time-invariant systems, Causal LTI systems described by differential and difference equations,

Text1:2.1 to 2.4.3

Self-study component:	1. Example son the causality, time in variant and linearity of the system 2. Block diagram representation of systems(Direct form-I and Direct form-II)
Practical Topics: **(6 Hours)**	1. Write a MATLAB code to simulate difference equation. 2. Write a MATLAB code to find the frequency response of LTI systems described by differential or difference equations. 3. Write a MATLAB code to perform convolution of signals.

UNIT– III	8 Hours
Fourier Representation of Continuous-time (CT) Signals: Fourier series representation of continuous-time periodic signals, Properties of continuous –Time Fourier Series. CT Non-Periodic Signals: Representation of Aperiodic signals: The continuous time Fourier transform, Properties of continuous- time Fourier Transform, Convolution property. **Text1:**3.3, 3.5, 4.1,4.3,4.3.1,4.3.5,4.3.7,4.4	
Self-study component:	1. Examples on the convolution of two discrete time signals and Fourier transform of the signal. 2. Properties of continuous-time Fourier Transform. 3. The Fourier transform for periodic signals.
Practical Topics: **(4Hours)**	1. Write a MATLAB code to generate Amplitude Modulated signal. 2. Write a MATLAB code to find the DTF Soft the given signal.

UNIT– IV	8 Hours
Discretization of CT signals and Fourier Representation of Discrete-Time (DT) Signals SamplingofCTSignals-RepresentationOfcontinuous-Timesignalsbyitssamples:Thesampling theorem, **Fourier Representation for DT Non Periodic Signals**: Representation of Aperiodic signals: The discrete- Time fourier Transform, Properties of the Discrete- Time Fourier transforms, Multiplication Property. **Text1:**7.1,5.1,5.3,5.5	
Self-study component:	The Convolution property
Practical Topics: **(4 Hours)**	1. Write a MATLAB code to find Poles and Zero soft LTI systems. 2. Write a MATLAB code to generate sampled signal of a discrete and Continuous-time signal.

UNIT– V	8 Hours
Z–Transforms: The Z – transform, the region of convergence for the Z-transform. The inverse Z-transform,propertiesofZ–transforms,Systemfunctionalgebraandblockdiagramrepresentations, The Unilateral Z transform. **Text1:**10.1,10.2,10.3,10.5,10.8,10.9	
Self-study component:	1. Find Z transform of the unit impulse, unit step, cosine signals and find the z transform using differentiation property 2. Analysis and characterization of LTI systems using Z-transforms.
Practical Topics: **(4Hours)**	1. Write a MATLAB code to find Z-transform and inverse of the Z-transform.

	2.Solve a given difference equation/ system of line are quations[Z-transform].

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

COs	Course Outcomes with *Action verbs* for the Course topics	Bloom's Taxonomy Level	Program Outcome Addressed(PO #) with BTL
CO1	**Apply** knowledge of basic mathematics to classify different signals and systems	Remember	L1[PO1]
CO2	**Analyze** signals and systems to determine their properties.	Understanding	L2[PO2]
CO3	**Develop** LTI/LSI systems in time domain and frequency domain to determine system output and properties.	Applying	L3[PO2],[PO3]
CO4	**Design** CT and DT system and implement using different structures.	Applying	L3[PO2],[PO3]
CO5	**Develop** and **Simulate** the different types of signals and perform many operations on discrete time signals and Continuous time signals using tools.	Analyzing	L4[PO5],[PO9]

Text Book(s):

1. **"Signals and Systems",**V.Oppenheim, Alan Willsky and A.HamidNawab, Pearson education asia /PHI, 2nd edition, 2006. ISBN: 9789332550230, 9332550239
2. **"Signals and Systems",** Simon Haykin and Barry VanVeen,2nd Edition John Wiley& Sons, 2nd edition 2008. ISBN:9788126512652, 8126512652

ReferenceBook(s):

1. **"Signals and systems",**H.P.Hsu, R.Ranjan, Schaum's outlines, TMH, 2006. ISBN:9780070669185, 007066918X
2. **"SignalsandSystems",**ANagoorKani,McGrawHill2010.ISBN:9780070151390, 0070151393.
3. **"Fundamentals of Signals and Systems",**Michael J Roberts, Govind Sharma, McGrawHill 2010. ISBN: 0070702217, 9780070702219.

WebandVideo link(s):

- **https://www.youtube.com/watch?v=up55tuwestg&list=PLWPirh4EWFpHr_1ZCkuF9ToYUrmujv9Aa**
- **https://www.youtube.com/watch?v=I_ZcZF-EWj8&list=PLWPirh4EWFpHr_1ZCkuF9ToYUrmujv9Aa&index=3**
- **https://www.youtube.com/watch?v=0nZYen9w_eo&list=PLyqSpQzTE6M8KJ-XQ1m2vl3nd2ZUqKEN8**
- **https://www.youtube.com/watch?v=uEIVDGbaE5c**

E-Books/Resources:

- **https://link.springer.com/book/10.1007/978-3-031-02545-7?page=2#book-header**

"Fundamentals of Signals & amp; Systems", BenoitBoulet, Charles RiverMedia2006, ISBN:1-58450-381-5, eISBN: 1-58450-660-1.

- **https://mlichouri.files.wordpress.com/2013/10/fundamentals-of-signals-and-systems.pdf.**

D. Course Articulation Matrix(CAM)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	3												3	
#2		2												2
#3		3	2											3
#4		2	1											2
#5					1				1					

Linear Integrated Circuit Laboratory

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

SEMESTER–III

Course Code:	**P21ECL306**	**Credits:**	**01**
Teaching Hours/Week(L:T:P):	**0-0-2**	**CIE Marks:**	**50**
Contact Period:	**Lecture:2Hr,Exam:2Hr.**	**SEE Marks:**	**50**

Prerequisite: Basic Electronics and Basic Electricals**.**

Course Learning Objectives (CLOs)

This course aims to

1. Provide the basic knowledge of how to use CRO, signal generator, breadbox are, power supply, ammeter, voltmeter and how to rig-up the circuits.
2. Analyze the characteristics of MOSFET, Op-amp.
3. Design Inverting and Non-inverting amplifiers, Summing, Subtracting and Schmitt trigger circuit using Op-Amp.
4. Demonstrate the working of Integrator, Differentiating circuit, precision half wave and full wave rectifier using 741 IC
5. Design the RC phase shift oscillators using Op-amp.
   Understanding theworkingDACusingOp-AmpandVoltageregulatorusingLM317IC regulator.

Course Content

1. MOSFET drain and transfer characteristics
2. Op-amp RC phase shift to scillator.
3. Determining the Characteristic parameters of Op-Amp 741IC,
4. Design of Inverting and Non-inverting amp lifier using741IC
5. Op-amp as adder, sub tractor and voltage follower
6. Op-amp as Integrator and Differentiator circuit
7. Precision half wave and full waverectifierusing741IC.
8. Design of Schmitt trigger andzerocrossingdetectionusing741IC
9. 4bitR-2R DACusingOp-amp741IC
10. VoltageregulatorusingLM317ICregulator.

Open ended experiments

1. ConductanexperimentforthevoltagelevelmonitortoenergizetheLEDwhenVcc exceeds 16V. Use z ener diode and 471 op-amp with single power supply
2. Conduct an experiment to sum two sinusoidal signalsofpeakamplitude4vandclip the output level to 5v.
3. Conductanexperimenttoclipnegativehalfcycleat2Vandinvertthesignal.Assume5V p-psinusoidal in put signal.

Course Outcome (CO)

CO #	Course Outcome	Bloom Taxonomy Levels	Program Outcome Addressed(PO#)with BTL
CO1	**Analyze** the MOSFET characteristics, working of amplifier and oscillator with Op-amp, and to find characteristics of Op-Amp.	Understanding	L3(PO2)
CO2	**Design** the inverting and non-inverting amplifier for a given gain, Schmitt trigger circuit for a given LTP and UTP, and voltage regulatorusingLM217regulator.	Apply	L4(PO3)
CO3	**Ability** to conduct experiments using op- amps and other electronic component son adder, sub tractor, voltage follower, integrator, differentiator, rectifiers and DAC circuits.	Apply	L4(PO2)
CO4	**Ability** to work effectively in a team to analyze the given design and conduct experiment.	Evaluate	L4(PO2,PO9,PO12)

D. Course Articulation Matrix(CAM)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1		**2**												**2**
#2			**3**											
#3		**3**												**3**
#4		**2**							**2**			**1**		**2**

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 be hind logical reasoning modules of analytic, syllogisms, ven n 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 amp lified level of confidence to express them selves 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. EssentialEnglishGrammarbyRaymondMurphy,CambridgeUniversityPress,new edition
3. The7 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 ArunSharma, McGraw Hill Education Pvt Ltd
1. 2.CATMathematicsbyAbhijithGuha, 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

COURSEARTICULATIONMATRIX[EmployabilityEnhancementSkills(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 to 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 method so implementing design thinking I nthe 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–5Staged.SchoolProcess -5stagesofStanford–Empathize–Define- Ideate – Prototype – Test – Iterate - Applications of Design Thinking.

Module-4

Design thinking for Engineering- Concept models for comparing design thinking and engineeringsystemsthinking-TheDistinctiveConceptModel-TheComparativeConceptModel- The Inclusive Concept Model - The Integrative Concept Model.

Module-5

DesignThinkingToolsandMethods-PurposefulUseofToolsandAlignmentwithProcess-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. RogerMartin," The Design of Business: Why Design Thinking is the NextCompetitive Advantage",Harvard Business Press , 2009.

References:

1. Jakeknapp, Johnkeratsky and Bradenko witz" Sprin thow to solve big problems and test new ideas in just five days"
2. Tim Brown "Change by design"
3. SteveKrug "Don't make me think; Revisited"
4. Rogermartin "Thedesign of Business"
5. YousefHaikandTamerM.Shahin,"EngineeringDesignProcess",CengageLearning, Second Edition, 2011.
6. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.
7. HassoPlattner,ChristophMeinelandLarryLeifer(eds),"DesignThinking: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 series expansions-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. Formulaefornth derivatives of standard functions-Liebnitz's the orem(without proof).Applicationto 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 Lap lacian (Definitions only).

Self-study component:	Solenoidal and irritation al 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.

CourseOutcomes: Afterthesuccessfulcompletionofthecourse,thestudentsare able to

CO1	**Explain** the fundamental concepts–in complex numbers and vector algebra to Analyze the problems arising in related area of engineering field.
CO2	**Identify**–partialderivativestocalculaterateofchangeofmultivariatefunctions.
CO3	**Apply**-the acquired knowledge of integration and differentiation to evaluate double and Triple integrals to compute length surface are a and volume of solids of revolution and identify velocity, acceleration of a particle moving in a space.
CO4	**Find**analyticalsolutionsbysolvingfirstorderODE'swhicharisingindifferent branches of engineering.

TEXTBOOKS

1. B.S.Grewal, Higher Engineering Mathematics(44th Edition),Khanna Publishers, New Delhi.
2. B.V.Ramana, Higher Engineering Mathematics, TataMc Graw 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 House 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,LinearAlgebra:AModernIntroduction,2ndEdition,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**											

Strengthofcorrelation: 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**
Tota l 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 one byan in dividualin the course of his/her communication
- Write effective mails
- 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**

SoftSkills:LSRW,Listening,communicationskills(verbalandnon-verbalskills),public speaking, Email writing, SWOT Analysis

Self-Study: Motivation and Time Management

UNIT– II	**10 Hours**

VerbalAbility: PartsofSpeech-Prepositions,AdjectivesandAdverbs;Tenses,Articles, Idioms and Phrasal verbs, Subject verb agreement, Synonyms and Antonyms

Self-Study: Parajumbles 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 Out comes: On completion of this course, students are able to:	
CO– 1:	Exhibit amp lified level of confidence to express them selves 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, newedition
3. The7 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 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

COURSEARTICULATIONMATRIX[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:

- A dequate expo sure to basics of engineering mathematics soapstone able 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 equation shaving no analytic solutions
- Provideinsightintodevelopprobabilitydistributionofdiscreteandcontinuousrandom 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. Construction of analytic functions: Milne-Thomson method-Problems.

Conform al transformations: Introduction. Discussion of transformations $w=z^2$, $w=e^z$, $w=z+1/z, (z\neq0)$.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

$y=ax^2+bx+c$, $y=ae^{bx}$, $y=ax^b$, $y=a+bx$

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'soffirstorderandfirstdegree–Introduction.Taylor'sseriesmethod.ModifiedEuler's method,Runge-Kuttamethodoffourthorder(Allformulaewithoutproof).Illustrative

examples only.
Numerical methods for system of line are equations- Gauss-Jacobi and Gauss-Seideliterative methods. Determination of largest eigen value and correspond in geigen vector by power method.

Self-study component:	Solution of equations using secant method, Pi cards 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 suitable mathematical model for The statistical sample series 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 Solve problems involving Mark ov chains.

TEXTBOOKS

1. B.S.Grewal, Higher Engineering Mathematics (44thEdition2018),Khanna Publishers, New Delhi.
2. E.Kreysizig, Advanced Engineering Mathematics, JohnWileyand sons,10th Ed.(Reprint) 2016.

REFERENCE BOOKS

1. V.Ramana: Higher Engineering Mathematics, McGraw–Hill Education,11thEd..
2. H.C.Taneja, Advanced Engineering Mathematics, Volume I&II,I.K.

InternationalPublishingHousePvt.Ltd.,NewDelhi.
3.N.P.Baliand Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

ONLINERESOURCES

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**										
Strengthofcorrelation: Low-1,Medium-2,High-3												

Analog and Digital Communication [As per Choice Based Credit System(CBCS) &OBE Scheme] **SEMESTER–IV**			
Course Code:	**P21EC402**	**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 elements of communication system provide basic knowledge of Modulation, generation, detection and application of Amplitude and Angle modulation of signal in time domain and frequency domain.
- Explain the aspects of sampling of signal in digital communication, the model of digital communication system and outline the use of correlation.
- Explain quantization process, quantities and commanding of signals in PCM system.
- Describe the principle of DM, ADM, DPCM systems.
- Describe and contrast various aspects of different digital coherent and non-coherent modulation schemes such as ASK, PSK, QPSK, DPSK and MSK.
- Analyze different coding schemes adopted in PAM signaling and explain the causes for the occurrence of ISI and advantages of pulse shaping and correlation coding.

UNIT– I	**8 Hours**

AMPLITUDE MODULATIONS AND DEMODULATIONS: Baseband versus carrier communications, Double-sideband amplitude modulation, Amplitude modulation, bandwidth-efficient amplitude modulations, Amplitude modulations: Vestigial sideband (VSB),Local carrier synchronization.

Text1:3.1-3.6

Self-study component:	Single side band modulation**,** Frequency Division Multiplexing **(FDM),** Phase locked loop.

UNIT– II	**8 Hours**

ANGLE MODULATION AND DEMODULATION: Non linear modulation ,band width of angle- modulated waves, generating FM waves, demodulation of FM signals, effects of non linear distortion and interference, super heterodyne analog AM/FM receivers.

Text1:4.1-4.7

Self-study component:	FM broad casting system ,QAM.

UNIT– III	**8 Hours**

SAMPLING: Sampling theorem, Signal Reconstruction from Uniform Samples, Practical Issues in Signal Sampling and Reconstruction, Maximum Information Rate: Two Pieces of Information per SecondperHertz,NonidealPracticalSamplingAnalysis,SomeApplicationsoftheSampling theorem,PulseCodeModulation(PCM),AdvantagesofDigitalCommunication,Quantizing,

Principle of Progressive Taxation: Non uniform Quantization, Transmission Band width and the Output SNR, Digital Telephony: PCM in T1carrier systems.

Text1:5.1-5.3

Self-study component:	Random Variables, Matlab /Octave code for Sampling and Reconstruction of Low pass Signals

UNIT– IV	**8 Hours**

ANALOG-TO-DIGITAL CONVERSION: Digital Multiplexing, Differential Pulse Code Modulation (DPCM), Adaptive Differential PCM (ADPCM), Delta Modulation.

PRINCIPLES OF DIGITAL DATA TRANSMISSION: Digital communication systems, Line coding, Pulse shaping, Scrambling, Digital receivers and regenerative repeaters.

Text 1: 5.4-5.7, 8.1-8.5 **DC Voltage Regulators:** Voltage Regulator Basics, Op–Amp Series Voltage Regulator, Adjustable Output Regulators, IC linear Voltage Regulators: 723 IC regulator and LM 317 IC regulator.

Text1:10.6,10.7,11.1,11.2,12.1, 12.2,12.3, 13.1,13.2, 13.3,13.5(Mentioned topics only)

Self-study component:	A daptivedelta modulation**,** Video Compression

UNIT– V	**8 Hours**

DIGITAL COMMUNICATION SYSTEM: Eye diagrams, PAM: M-ary baseband signaling for higher data rate, Digital carrier systems, M-ary digital carrier modulation, Optimum linear detector for binary polar signaling, general binary signaling, coherent receivers for digital carrier modulations, Signal space analysis of optimum detection.

Text1:8.6-8.9,9.1-9.4

Self-study component:	Noise in Communication systems.

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

COs	**Course Out comes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Program Outcome Addressed(PO#) With BTL**
CO1	Apply the basic knowledge of mathematics for Formulation and analysis of Analog and Digital communication system.	Remember	L2(PO1)
CO2	Analyze various aspects of sampling, quantizing, encoding and SNR of Analog / Digital signal modulation/ transmission and demodulation/reception techniques.	Understanding	L3(PO2)

CO3	Analyze digital techniques like pulse shaping, coding and other digital communication systems	Understanding	L2(PO2)
CO4	Identify and Analyze different coherent receiver for digital modulation, Eye diagram, ISI and other digital communication signaling techniques.	Applying	L3(PO2)
CO5	**Apply** appropriate techniques, resources and modern tools to **examine** and **design** elementary communication system for various modulation schemes.	Applying	L4(PO2,PO5,PO9)

Text Book(s):

1. **"Modern Digital and Analog Communication Systems",** B.P.Lathi. ZhiDing, HariM. Gupta4th Edition ISBN-13:978-0-19-947628-2, ISBN-10:0-19-947628-4.

Reference Book(s):

1. **"An Introduction to analog and digital communications" ,**Simon Haykin, John Wiley and Sons, Inc.2013, ISBN:9788126536535.
2. **"Digital Communication",** P. Ramakrishna Rao, TATA cGraw Hill, 2011, ISBN:9780070707764.
3. **"PrinciplesofElectronicCommunicationSystems",**LouisE.Frenzel,Jr.TATA McGraw Hill ,Fourth Edition, ISBN : 978-0-07-337385-0

Web and Video link(s):

1. **Analog Communication :https://archive.nptel.ac.in/courses/117/105/117105143/**
2. **Digital Communication :https://nptel.ac.in/courses/117105077**
3. **Modern Digital Communication Techniques: https://onlinecourses.nptel.ac.in/noc22_ee118/preview**

E-Books/Resources:

1. **https://www.skylineuniversity.ac.ae/pdf/computer/An%20Introduction%20to%20Digital%20Multimedia.pdf**
2. **https://edisciplinas.usp.br/pluginfile.php/5251120/mod_resource/content/1/B.%20P.%20Lathi%2C%20Zhi%20Ding%20%20Modern%20Digital%20and%20Analog%20Communication%20Systems-Oxford%20University%20Press%20%282009%29.pdf**

D.CourseArticulationMatrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	**3**												3	
#2		**3**												3
#3		**2**												2
#4		**2**												2
#5		2			2				2					**2**

Electromagnetic Field Theory [As per Choice Based Credit System(CBCS) &OBE Scheme] **SEMESTER–IV**			
Course Code:	**P21EC403**	**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:

- Provide the basic knowledge of electromagnetic fields and waves of radio communication.
- Describe the basic laws, properties and equations of static electric fieldusing3–dimensional vector method.
- Understand the basic laws, properties and equations of static magnetic field using3– dimensional vector method.
- Analyse the concept so magnetic forces and inductance.
- Extend the Maxwell's equations to time varying electromagnetic waves.
- Illustrate the properties of electromagnetic waves.

UNIT – I	**8 Hours**

Electrostatic Fields Part1: Coulomb's law and Field intensity, Electric fields due to Continuous charge distributions- line charge, surface charge, Electric Flux density, divergence of a vector and divergence theorem, Gauss law, Application of Gauss's Law: Point charge, Infinite Line charge.

Text1:3.6,4.2 to 4.6.

Self-study component:	1. Vectors and Co-ordinate Systems: Cartesian Coordinates, Cylindrical Coordinates, Spherical Coordinates. 2. Applications of Gausslaw

UNIT– II	**8 Hours**

Electrostatic Fields Part 2: Electric potential, Del operator, gradient of a scalar, Relationship between E and V, An Electric Dipole and Flux lines.

Electric Fields in material Space: Convection and Conduction current, Continuity equation sand Relaxation time, Boundary conditions.

ElectrostaticBoundary–valueProblems: Poisson'sandLaplace'sequations,UniquenessTheorem

Text1:3.4,3.5, 4.7 to 4.9, 5.3, 5.8, 5.9, 6.2 to 6.3.

Self-study component:	1. Energy density in electro static fields 2. Resistance and Capacitance

UNIT– III	**8 Hours**

Magneto statics Fields: Biot– Savart's law, Ampere's circuital law, applications of Ampere's law, magnetic flux density, Curl of a vector and Stroke theorem, Maxwell's equations for static fields, Magnetic scalar and vector potentials.

Magnetic Forces: Forces due to magnetic fields, A magnetic dipole, magnetic boundary conditions.

Text1:7.2-7.7,3.7,8.2,8.4,8.7

Self-study component:	1. Magnetic torque and moment. 2. Inductors and inductance.

UNIT– IV	8 Hours

forces, displacement current, Maxwell's equations in final forms, Time Varying Potential.
Electromagnetic Wave Propagation: Introduction, Waves in general, Wave propagation in Lossy dielectrics, Plane waves in free space, Wave Polarization, Power and Poynting Vector.
Text1:9.2-9.6,10.2, 10.3,10.5,10.7, 10.8

Self-study component:	1. Plane waves in Losses dielectrics and Good Conductors. 2. Reflection of plane wave in normal incidence.

UNIT– V	8 Hours

Basics of Wave Propagation: Introduction, Definition and Broad Categorization, Basic Definition, Guided Waves, Unguided Waves, Different modes of wave propagation.
Ground Wave Propagation: Introduction, Space Wave and Surface Wave, Transition between Surface and Space Wave, Tilt of Wave Front due to Ground Losses.
Space Wave Propagation: Introduction, Field Strength Relation, Effects of Imperfect Earth, Effects of Curvature of Earth, Effects of Interference Zone, Shadowing Effect of Hills and Buildings.
Sky Wave Propagation: Introduction, Structural Details of the Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF of, Virtual Height and Skip Distance, Relation between MUF and the Skip Distance.
Text2:22.1-22.2, 22.5**,** 23.1, 23.3to 23.5, 24.1 to 24.6,25.1, 25.2, 25.4, 25.5, 25.6.

Self-study component:	1. Scattering Phenomena, Tropospheric Propagation, Fading, Path Loss Calculations. 2. Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC).

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

COs	**Course Out comes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	**Apply** the knowledge of physics and Vector calculus to Understand EM fields and waves.	Remember	L3(PO1)
CO2	**Analyze** Electric fields ,magnetic fields and EM waves and its Effect in various charge distribution of medium.	Applying	L4(PO1,PO2)
CO3	**Compute** the electric and magnetic field potentials due to Different charge distributions and boundary conditions.	Applying	L3(PO2,PO3)
CO4	**Discus s**time-varying electromagnetic fields and waves as governed by Maxwell's equations.	Understanding	L4(PO2)
CO5	**Examine** the effects and losses of medium on wave and Various parameters influencing wave propagation	Understanding	L4(PO1,PO2)

Text Book(s):

1. **"Principles of Electromagnetics "**Matthew N.O. Sadiku, S.V Kulkarni Oxford University Press 6th edition, 2018.ISBN-13: 978-0-19-946185-1, ISBN-10:0-19-946185-6
2. **"Antennas and Wave Propagation",** JohnD Kraus, RonaldJ Marhefka and AhmedS Khan, TataMcGrawHill,4thEdition,2015.ISBN:9780070671553.

Reference Book(s):

1. **"Electromagnetics with Application"**, John Kraus and Daniel .A. Fleischer, McGraw Hill, 5th edition 1999.ISBN: 9780071164290
2. **"Electromagnetics",**JosephAEdminister,Adaptedby:Vishnupriye.McGraw–Hill, Revised 2nd edition, 2013.ISBN:9780070353961
3. **"EngineeringElectromagnetics"**,WilliamH.HaytJr.JohnA.BuckandMJaleelAkhtar McGraw–Hill,8thedition,2015.ISBN:9789339203276.

Web and Video link(s):

https://archive.nptel.ac.in/courses/108/106/108106073/

E-Books/Resources:

1. **Electromagnetic Fields and Energy ByHermannA.Haus|JamesR.Melcher|1998| PDF**
2. **Electromagnetic Field Theory: A Problem Solving Approach ByMarkusZahn|2003| 752 pages | PDF**
3. **Introduction to Electromagnetic Engineering by Roger F. Harrington –McGraw-Hill, 1958**

D. Course Articulation Matrix(CAM)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	3												3	
#2	2	3											2	3
#3		2	3											2
#4		3												3
#5	3	2											3	2

Digital Design Using Verilog HDL [As per Choice Based Credit System(CBCS) &OBE Scheme] **SEMESTER–IV**			
Course Code:	**P21EC404**	**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:

- Explain the working knowledge of abroad variety of Verilog based topic for global understating of Verilog HDL based design.
- Describe the practical design perspective of Verilog HDL.
- Explain the logical progression of Verilog HDL based topics.
- Explain the basics and some advanced topics such as PLI and logic synthesis.

UNIT– I	**8 Hours**

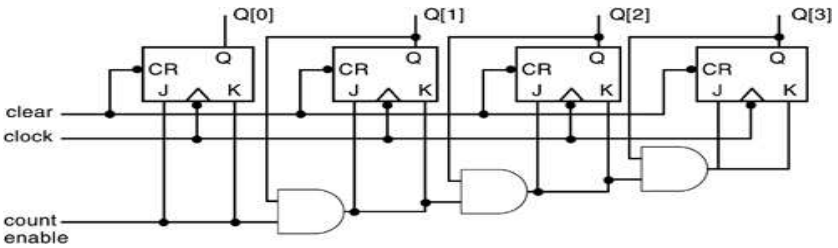
Basic Concepts: Lexical Conventions, Data Types, System Tasks and Compiler Directives.
Modules and Ports: Modules, Ports, Hierarchical Names.
Gate-Level Modeling: Gate Types, Gate Delays.
Dataflow Modeling: Continuous Assignments, Delays, Expressions, Operators, and Operands, Operator Types, Examples.

Self-study component:	Develop a Verilog code and test bench for following question and verify it by using any EDA tool (Xilinx / libero/ vivado/ iverilogetc.). 1. Study typical design flow for designing VLSI Circuits. 2. Design2to1 muxusingbufif0and bufif1. 3. Design4bitmod13counteranddisplayallinputandoutput values in command window.
Practical Components (6 Hours)	1. Write Verilog HDL code to realize all the logic gates. 2. Write a Verilog HDL program for the following combinational designs a. Decoder b. Encoder(with and with out priority)

UNIT– II	**8 Hours**

Behavioral Modeling: Structured Procedures, Procedural Assignments, Timing Controls, Conditional Statements, Multiway Branching, Loops, Sequential and Parallel Blocks, Generate Blocks. Examples.
Tasks and Functions: Difference between Tasks and Functions, Tasks, Functions.

Self-study component:	1. Design8-bitALUUsingtaskorfunction. 2. Design clock with time period=80anddutycycleof40%using always & initial statement.
Practical Components (6 Hours)	1. Write a Verilog HDL program for the following combinational designs. a. Multiplexer and Demultiplexer b. Code converter. c. Comparator. 2. Write a VERILOG HDL code to describe the functions of a Full

	Adder, parallel adder and subtract or using three Modeling styles.
UNIT– III	**8 Hours**
Useful Modeling Techniques: Procedural Continuous Assignments, Overriding Parameters, Conditional Compilation and Execution, Time Scales, Useful System Tasks. **Timing and Delays:** Types of Delay Models, Path Delay Modeling, Timing Checks, Delay Back-Annotation. **Switch Level Modeling:** Switching-Modeling Elements, Examples.	
Self-study component:	1. Design16to1muxusing4to1muxanddisplayallinputandoutput values in command window. 2. Create a design that uses the full adder example above. Use a conditional compilation (`ifdef).Compilethefulladd4withdefparam statements if the text macro DPARAM is defined by the `define statement; otherwise, compile the fulladd4 with module instance parameter values. 3. Switch Level Verilog Description for XOR gate.
Practical Components (4 Hours)	1. DevelopandsimulateaVERILOGHDLcodefor8-bitbooth Multiplier. 2. Develop the VERILOG HDL code for the following flip– flops, SR, D, JK, T and counter.
UNIT– IV	**8 Hours**
User Defined Primitives: UDP basics. Combinational UDPs, Sequential UDPs, UDP Table Shorthand Symbols, Guidelines for UDP Design. **Programming Language Interface:** Uses of PLI, Linking and Invocation of PLI Tasks. Internal Data Representation, PLI Library Routines. **Logic Synthesis with Verilog HDL:** What Is Logic Synthesis? Impact of Logic Synthesis, Verilog HDL Synthesis, Synthesis Design Flow.	
Self-study component:	1.Design the 4-bitsynchronouscountershownbelow(UsetheUDP jk_ff). 
Practical Components (4 Hours)	1. DesignanddevelopVERILOGHDLcodefora4-bitbinaryserial adder and simulate. 2. Write VERILOG HDL code to display messages on the given seven

	Segment display and LCD and accepting Hex key pad input data. 3.Write VERILOG HDL code to controls peed, direction of DC and Stepper motor.

UNIT– V	**8 Hours**

Logic Synthesis with Verilog HDL: Verification of the Gate-Level Net list, Modeling Tips for Logic Synthesis, Example of Sequential Circuit Synthesis.

Advanced Verification Techniques: Traditional Verification Flow, Assertion Checking, Formal Verification.

Self-study component:	1. A1-bitfull subtract or has three inputs x, y, and z(previous borrow) and two outputs D(difference) and B(borrow). The logic equations for D and B are as follows: a. D =x'y'z+x'yz'+xy'z'+xyz b. B= x'y+ x'z+yz 2. Write the Verilog RTL description for the full subtract or. Synthesize the full subtract or, using any technology library available to you. Optimize for fastest timing. Apply identical stimulus to the RTL and the gate-level net list and compare the output.
Practical Components (4 Hours)	1. Write VERILOG HDL code to accept 8 channel Analog signals, Temperature sensors and display the data on LCD panel or seven segment display. 2. Write VERILOG HDL code to generate different waveforms (Sine, Square, Triangle, Ramp etc.,) using DAC change the frequency and amplitude. 3. Write VERILOG HDL code to simulate Elevator operations.

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

COs	**Course Out comes** with ***Action verbs*** for the Course topics	**Bloom's Taxonomy Level**	**Level Indicator**
CO1	To **apply** the knowledge of digital fundamentals to explain basic concepts used in Verilog HDL	Remember	L2(PO1)
CO2	To **write** a Verilog model for combinational and sequential circuits.	Apply	L2,L3(PO2,PO3)
CO3	To **analyse** the given digital circuit and develop Verilog model for given digital circuits.	Analyze	L3,L4(PO2)
CO4	To **design** any combinational and sequential circuits and develop Verilog model for the given inputs.	Design	L4,L5(PO3, PO4,PO5)
CO5	To **verify** the design through synthesis and demonstrate the application using EDA tools.	Evaluate	L4,L5 (PO3,PO5,PO9, PO10, PO12)

Text Book(s):

1. **"Verilog®HDL,A Guide to Digital Design and Synthesis",** Samir Palnitkar Pearson Education, Second Edition, ISBN 978-81-775-918-4.

Reference Book(s):

1. **"Advanced Digital Design with the Verilog HDL",**MichaelDCiletti,PHI,ISBN: 9789332584464, 933258446X**.**
2. **"A Verilog HDLPrimer",**J.Bhaskar,BSPublications,ISBN:9788178000145, 8178000148
3. **"Fundamentals of Digital Logic with Verilog Design",** Stephen brown and Z vonko Vranesic, TMH, ISBN: 9780073380544, 0073380547

Web and Video link(s):

1. https://youtu.be/VS9JzfJ6Oxg
2. https://youtu.be/wiNDn19GpRU

E-Books/Resources:

D. Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	2												2	
#2		2	3											2
#3		2												2
#4			2	2	2									
#5			2		2				3	1		1		

Microcontroller [As per Choice Based Credit System(CBCS) &OBE Scheme] **SEMESTER–IV**			
Course Code:	**P21EC405**	**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:

- Provide the basic knowledge of embedded systems.
- Outline the architecture of MSP430.
- Make use of the instruction sets and addressing modes for writing programs.
- Understand working and applications of interrupts.
- Utilize the Low-Power ModesfortheOperationofMSP430
- Summarize the operation and utilization of timers.

UNIT – I	**8 Hours**

Embedded Electronic Systems and Microcontrollers: What and where are embedded systems, Approaches to Embedded Systems, Small Microcontrollers, Anatomy of aTypical Small Microcontroller, Memory, and Software.

The Texas Instruments MSP430: The Outside View—Pin-Out, the Inside View—Functional Block Diagram, Memory, Memory Mapped input and output, Clock Generator, Exceptions: Interrupts and Resets.

Text1:1.1,1.2, 1.3, 1.4,1.5, 1.6, 2.1, 2.2,2.3, 2.5, 2.6, 2.7.

Self-study component:	1. Studyandunderstandtheapplicationof MSP430inrealtime applications. 2. Understand the environmental development to develop programs for microcontroller.
Practical Topics: **(6 Hours)**	1. Arithmetic operation -Addition, Subtraction, multiplication, division, incrementing, decrementing operations. **2.** Data transfer-Block move and exchange, sorting, finding largest and smallest element in an array.

UNIT – II	**8 Hours**

Architecture of the MSP430 Processor: Central Processing Unit, Addressing Modes, Constant Generator and Emulated Instructions, Instruction set, Examples, Reflections on the CPU and Instruction Set, Resets, Clock system.

Text1:5.1,5.2, 5.3,5.4,5.5,5.6, 5.7, 5.8.

Self-study component:	1. Light LED's in C and Assembly Language. 2. Access to the microcontroller for programming and debugging

	Along with demonstration boards
Practical Topics: **(6 Hours)**	1. Boolean and logical instructions: AND, OR, XOR, NOT, rotate and swap operations, Conditional CALL and RETURN. Interfacing experiments: 2. Program to b link the LED' susing on- chiptimer.

UNIT – III	**8 Hours**

Functions, Interrupts and Low-Power Modes: Functions and Subroutines, What happens when a Subroutine is called?, Storage for Local Variables, Passing Parameters to a Subroutine and Returning a Result, Interrupts, what happens when an interrupt is requested?, Interrupt Service Routines, Issues Associated with Interrupts, Low-Power Modes of Operation.

Text1:6.1, 6.2, 6.3, 6.4,6.6, 6.7, 6.8, 6.9, 6.10.

Self-study component:	1. Study of assembly language/ c-programming tools with programming exercises. 2. Develop and Implement a assembly level program to Flash LED's with frequency of 1Hz using software delay and subroutine.
Practical Topics: **(4 Hours)**	1. Interfacing an LCDunittoMSP430F2013. 2. Generation of different wave forms using DAC interface.

UNIT – IV	**8 Hours**

Timers: Watchdog Timer, BasicTimer1, Timer_ A, Measurement in the Capture Mode, Measurement of time: Press and Release of button, Output in the Continuous Mode, operation of Timer_ A in the sampling mode, Timer_ B, what Timer where?

Text1:8.1,8.2, 8.3,8.4,8.4.1, 8.5,8.8, 8.9, 8.10.

Self-study component:	1. Study of ouput in the upmode-Edge-Aligned PWM. 2. Design and develop a assembly level program to generate pseudorandom stream of bits using shift register.
Practical Topics: **(4 Hours)**	1. Step premotor interface and speed control of stepper motor. 2. Measurement of pressure, temperature, weight.

UNIT – V	**8 Hours**

Mixed signal system: Analog input and output: Comparator_A, Analog-to-Digital Conversion: General Issues, Analog-to-Digital Conversion: Successive Approximation, Operation of a switched capacitor SAR ADC. TheADC10 Successive-Approximation ADC, Basic Operation of the ADC10, ADC conversion Sigma-Delta.

Text1:9.1,9.2, 9.3, 9.3.1, 9.4, 9.5, 9.8.

Self-study component:	1. Study of ADC12Successive-ApproximationADC. 2. Examine whether direct connection to a MSP430 is sufficient or further connection of the signal is required for conversions of analog signals to digital signals.
Practical Topics: **(4 Hours)**	1. Measurement of time and frequency using timers and interrupts. 2. Temperature monitoring system.

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

COs	Course Out comes with *Action verbs* for the Course topics	Bloom's Taxonomy Level	Program Outcome Addressed(PO#) With BTL
CO1	**Apply** the knowledge of logic design to understand the concept of 16-bit Microcontroller (MC), its instruction set, addressing modes and other features.	Remember	L1(PO1)
CO2	**Understand working of** different peripheral components associated with MSP430 MC	Understanding	L2(PO1,PO2)
CO3	**Develop** logical skills to write programs using MSP430 instruction set and by using 'C' for the given Engineering Problems.	Apply, Analize ,Create	L3,L4,L6 (PO3)
CO4	To **analyze** the developed code using modern engineering tools.	Applying	L2(PO3)
CO5	**Interface hardware modules** to F2013 MC and **develop** interfacing programs in C Programming language	Analize, Create	L3,L4,L6 (PO2, PO5,PO9, PO12)

Text Book(s):

1. **"MSP430MicrocontrollersBasics",**JohnH.Davies,Newnes(Elsevier Science), 2008, ISBN: 978-0-7506-8276-3

Reference Book(s):

1. ,**"Getting Started with the MSP430 Launchpad",** Adrian Fernandez, Dung Dang**,** Newnes (Elsevier Science), 2013, ISBN: 978-0-124116009
2. **"Programmable Microcontrollers with Applications: MSP430 Launch Pad with CCS and Grace"** Cem Unsalan, H. Deniz Gurhan, McGraw Hill Publictions, 2013, ISBN: 978-0071830034.

Web and Video link(s):

https://www.youtube.com/watch?v=l6M7aqN6dmo

E-Books/Resources:

https://www.academia.edu/38330666/MSP430_Microcontroller_Basics_John_H_Davies

D. Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	2												2	
#2	2	3											2	3
#3			2											
#4			2											
#5		2			2				2			1		2

Analog and Digital Communication Laboratory

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

SEMESTER–IV

Course Code:	**P21ECL406**	**Credits:**	**01**
Teaching Hours/Week(L:T:P):	**0-0-2**	**CIE Marks:**	**50**
Contact Period:	**Lab:36Hrs., Exam:3Hrs.**	**SEE Marks:**	**50**

Course Learning Objectives (CLOs)

This course aims to:

- Provide the basic practical knowledge of Analog and Digital Fiber Optic links, laser, diode characterization and attenuation.
- Demonstrate the measurement of various parameters of Optical fiber losses, Numerical Aperture and WDM MUX- DEMUX.
- Demonstratethegenerationanddetectionofanalogsignalsusingvariousmodulation techniques such as AM, PAM.
- Provide the basic practical knowledge of digital modulation& demodulation.
- Design and Analyze the frequency response of Second order active filters using op-Amp and A stable multi-vibrators

Course Content

Allthefollowingexperimentshavetobeperformedusingdiscretecomponentsand modules.

1. Analog and Digital Fibreopticlinks .Attenuation, Bending loss and Numerical aperture measurement of optical fibre.
2. Characterization of WDM MUX and DEMUX.
3. Time Division Multiplexing of signals (Using PAM Kit).
4. Amplitude Modulation and Detection in timed o main and its observation in frequency domain (Use Spectrum Analyser).
5. Demonstration of ASK, FSK, PSK and DPSK modulationand Demodulation.
6. SimulationofQPSKtransmitterandreceivertakingintoaccountthephaseandthe frequency offset (Using WICOMM–T Kit).
7. Design anA-stableMulti-vibratorusingIC555Timer.
8. Design Second order active filters for different cut-off frequencies using op-Amp: LPF, HPF and BPF.

Open Ended Experiments:

1. AnalyseandUnderstandtheHysteresisCurvegeneratedusingSchmittTriggerOp-amp Circuit.
2. Determine the Bit Error Rate(BER)andAnalysetheEyePatterngeneratedinaDigital Transmission using Light Runner.

REFERENCE BOOKS:

1. **"Introduction to Fiber Optic",** A.Ghatak and K.Thygarajan,Cambridge University Press, Cambridge, UK 1988.
2. **"Fiber Optical Communication System",**3rd edition GovindP. Agrawal, Johnwiley Sons Inc. 2002.
3. **"Optical Fiber Communication Principles and Systems",** S.Kar, A.Selvarajanand T Sreenivas Tata McGraw Hill Publishing Company Ltd., New Delfi, 2002.
4. **"An Introduction to Analog and Digital Communication System",** Simon Hykin and John Wiley 2004.
5. **"AdvancedDigitalCommunicationLaboratoryManual",**PreethaSharan,RBhargava Rama Gowda, CBS Publishers & Distributors Pvt. Ltd., First Edition, 2013.

Course Outcomes

CO #	Course Outcome	Bloom's Taxonomy Level	Level indicator Program Outcome
CO1	**Apply** the basic knowledge of communication to determine attenuation, losses and other parameters.	**Apply**	**L2(PO1, PO2,PO9)**
CO2	**Analyze** by **applying** basic knowledge of communication theory the working of TDM, WDM-MUX and WDM-DEMUX.	**Analyze**	**L3(PO1, PO2, PO9)**
CO3	**Analyze** the operation of different Analog and Digital modulation and demodulation schemes.	**Analyze**	**L3(PO2,PO4,PO9, P12)**
CO4	Design and **Analyze** Second Order Active Filters and Multi-vibrator.	**Create**	**L4(PO2, PO3, PO9)**

D. Course Articulation Matrix (CAM)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
#1	**2**	**2**							**3**				**2**	**2**
#2	**2**	**2**							**3**				**2**	**2**
#3		**2**		**2**					**3**			**1**		**2**
#4		**2**	**2**						**3**					**2**

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, Crypt arithmetic, 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 Out comes: 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 YashavantKanetkar, 2nd edition,BPB Publications
3. 3.Test Your CS kills byYashavantKanetkar,2nd edition, BPB Publications

Reference Book(s):

1. Quantitative Aptitude by Arun Sharma, McGraw Hill Education Pvt Ltd
2. Reema Thareja, Programmingin C, 2ndEdition,Oxford University Press,2016.
3. Schaum' soutlines, Programming with C, ByronGottfried, 3rdEdition, TataMcGraw-Hill Publication, 2017.

Web and Video link(s):

1. NPTELCourse:ProblemSolvingthroughProgramminginC,Prof.AnupamBasu,IIT Kharagpur

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

COURSEARTICULATIONMATRIX[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. Contributionatincubation/innovation/entrepreneurshipcelloftheinstitute.
4. Participation in conferences/workshops/ competitions etc.
5. Learning at Departmental Lab/Tinkering Lab/ Institutional workshop.
6. Andworkingforconsultancy/researchprojectwith-intheinstitute.[Serialnumbers2to6, 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 topicsal ready studied.
12. Survey and study of published literature on the assigned topic: Technical papersurvey, Preparation of synopsis. Exposure to technical paper publications.
13. Athletics and Sports.
14. Photography.
15. Short film production : Contemporary aspects, Technicalaspects etc.
16. Music Competition (Vocaland Instrumental): Classical–Indian and western, Sugama- Sangeetha (Bhava Geethegalu), Folk songs, film songs etc.
17. Internship in Disaster Management.[AICTEAPH2021-22pdf page166]

18. Solar energy connected activities that help common man. [AICTE APH2021-22 pdfpage166]
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.

Practicalapplicationsrelationshipswithbasictheoryandconceptstaughtinthecourse.

Table–1:IntraandInterInstituteActivitiesandAssessmentRubrics					
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	80to100	**(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 ENGINEERINGMATHEMATICS-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- Hamilt on theorem (without proof)to compute 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.

VectorIntegration: VectorIntegration:Integrationofvectorfunctions.Conceptofaline integrals,surfaceandvolumeintegrals.Green's,Stokes'sandGausstheorems(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 the orem.

Course Out comes: 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 of decision theory.

TEXTBOOKS

1. B.S.Grewal, Higher Engineering Mathematics(44th Edition), Khanna Publishers, New Delhi.
2. B.V.Ramana, Higher Engineering Mathematics, Tata McGraw Hill publications, NewDelhi,11th Reprint, 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 House 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 toLinear Algebra, Affiliated East–Westpress, Reprint 2005.
5. D.Poole,LinearAlgebra:AModernIntroduction,2ndEdition,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**											

Strengthofcorrelation: 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 team work 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
- Explainconceptsbehindlogicalreasoningmodulesofdirectionsense,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: DirectionsandPythagorasTheorem,differencesbetweenmirrorandwater images

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

CO– 1: Exhibit amplified level of confidence to express them selves 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. EssentialEnglishGrammarbyRaymondMurphy,CambridgeUniversityPress,new edition
3. The7 habits of Highly Effective People by Stephen R. Covey
4. Quantitative aptitude by Dr.R. SAgarwal 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

COURSEARTICULATIONMATRIX[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 andNegative 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 theoutcome 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.