SYLLABUS

FOR

SEMESTER THIRD

Course Code	**BSCEE301**			**Semester**	**THIRD**
Category	**Basic Science Course**				
Course Title	**Engineering Mathematics - III**				
Scheme & Credits	**L**	**T**	**P**	**Credits**	**Max Marks: 100**
	3	**1**	**0**	**4**	
Prerequisites	**Nil**				

Course Objectives:

1. Familiarize the prospective engineers with different types of transform techniques.
2. To develop mathematical skills so that students are able to apply mathematical methods & principles in solving problems.

Unit	Topics	No. of Hours
I	Laplace Transforms: Laplace transform, shifting theorem, Laplace Transforms of different functions, Heaviside's unit function. Dirac Delta functions its Laplace Transforms. Heaviside's Expansion theorem.	13
II	Inverse Laplace Transforms: Initial and Final value theorems, Convolution theorem and applications,use of Laplace Transforms in the solution of linear Differential equations.	10
III	Fourier Transform: Fourier series, Harmonic analysis, Definition of Fourier transform. Fourier sine and cosine transform. Fourier integral formula, Applications to solutions of boundary value problems.	13
IV	Z- Transform: Definition, Linearity property, Z- transform of elementary functions, shifting theorems. Initial and Final value theorem. Convolution theorem.	12
V	Inverse Z-transform	8
Total Number of Hours		**56**

Textbooks:

S. No	Name of Book	Author	Publisher
1	Laplace Transforms	Murray R. Speigal	McGraw Hill
2	Advanced Engg. Mathematics	Erwin Kreyzing	Wiley Eastern. Pub.
3	The use of Integral Transform	Ian.N.Snedden	Tata McGraw Hill
4	Integral Transform	Loknath Debnath	New York, Press
5	Higher engineering mathematics	H. K. Dass, Rajnish Verma	S. Chand

Course Code	PCCEE302			Semester	THIRD
Category	Professional Core Course				
Course Title	Engineering Electromagnetics				
Scheme & Credits	L	T	P	Credits	Max Marks: 100
	2	1	0	3	
Prerequisites	Nil				

Course Objectives:

1. To understand the basic laws of electromagnetism.
2. To obtain the electric and magnetic fields for simple configurations under static conditions.
3. To analyse time varying electric and magnetic fields.

Unit	Topics	No. of Hours
I	Vector Analysis, coordinate systems, vector operator, curl, divergence theorem, Stoke's theorem, Coulomb's law, electric field intensity, field due to continuous volume charge distribution, field of a line charge, field of a sheet of charge.	8
II	Electric flux density, Gauss's law, symmetrical charge distributions, differential volume element, divergence, Maxwell's first equation, energy expended in moving a point charge in an electrostatic field, line integral, definition of potential; and potential difference, potential field of a charge, potential field of a system of charges, potential gradient, the dipole, energy density in electric field.	9
III	Current and current density, continuity of current, metallic conductors, conductor properties and boundary conditions, semiconductors, nature of dielectric materials, boundary conditions for perfect dielectric materials, capacitance, several capacitance examples, capacitance of two wire line, Poisson's and Laplace's equations, unique Theorem, examples of the solution of Laplace's and Poisson's equations, product solution of Laplace equation.	9
IV	Boit Savart law, Ampere's circuital law, magnetic flux and magnetic flux density, scalar and vector magnetic potentials, derivations of steady magnetic field laws, force on a moving charge, force on differential current element, force between differential current elements, force and torque on a closed circuit.	8
V	Faraday's law, displacement current, Maxwell's equations in point forms and in integral forms, Application of Maxwell's equations, EM waves and propagation of energy. Wave equation for free space. Plane and uniform plane wave. Poynting vector and power, Intrinsic impedance of media for uniform plane wave.	8
Total number of Hours		**42**

Textbooks:

S. No	Name of Book	Author	Publisher
1	Introduction to electro-dynamics	David J. Griffiths	Prentice hall India
2	Electrodynamics	J.D. Jacson	Pearson
3	Mathematical method for Physicists	Arfken Weber	Harcourt (INDIA)
4	Classical Theory & Fields	L.D. Landau, E.M. Lypshitz	Pergman

Course Code	PCCEE303			Semester	THIRD
Category	Professional Core Course				
Course Title	Analog Electronic Circuits				
Scheme & Credits	L	T	P	Credits	Max Marks: 100
	3	1	0	4	
Prerequisites	Nil				

Course Objectives:

1. Understand the characteristics of transistors. Design and analyse various rectifier and amplifier circuits.
2. Design sinusoidal and non-sinusoidal oscillators.
3. Understand the functioning of OP-AMP and design OP-AMP based circuits.

Unit	Topics	No. of Hours
I	BJTs: Brief review of BJTs, Analysis and Design of transistor amplifier circuits using h-parameters, Low frequency h- parameter model. High frequency hybrid – pi model, analysis and design of transistor amplifier circuits at high frequencies, Multistage amplifiers. Feedback Basics: Negative feedback, Effect of negative feedback on the performance of amplifiers e.g. on bandwidth. Types of feedback amplifiers, current shunt, current series, voltage shunt and voltage series feedback. Analysis of feedback amplifiers circuits	18
II	Sinusoidal Oscillators: Analysis of general oscillator circuits, Barkhausen's criteria, various types of oscillator circuits and their analysis, Design of practical oscillator circuits.	8
III	Power Amplifiers: Classification of power amplifiers, Class A, Class B, Class AB and Class C power amplifiers; analysis and design. Power supplies and IC regulators	9
IV	Operational Amplifiers: Operational amplifier stages, Differential amplifier, CMRR, Cascade amplifier, Ideal and practical operational amplifier characteristics and properties Op-amp applications, inverting and non-inverting amplifiers, difference amplifier, summer, differentiator and integrator, rectifiers etc. Op-amp in analog computation. Frequency response, Gain Bandwidth product, Signal to noise ratio.	13
V	Multivibrators and WaveForm Generators: Bistable multivibrators, Bistable circuit as a memory element, Generation of Square & Triangular waves using Astable multivibrators, Generation of the standard Pulse-The Monostable multivibrators, Integrated circuit Timers, Implementation of Astable, Monostable and Bistable multivibrators using 555 Timer, Various practical applications of 555 Timer.	8
Total Number of Hours		**56**

Textbooks:

S. No	Name of Book	Author	Publisher
1	Integrated circuits	Millman & Halkias	Tata Mc-Graw Hill
2	Microelectronic circuits	Sedra and Smith	Oxford univ. Press
3	Introduction to Electronic Circuit Design	Spencer and Ghausi	Pearson
4	Op-Amps and Linear Integrated Circuits	Ramakant Gaekwad	Pearson

Course Code	**PCCEE304**			**Semester**	**THIRD**
Category	**Professional Core Course**				
Course Title	**Signal & Systems**				
Scheme & Credits	**L**	**T**	**P**	**Credits**	**Max Marks: 100**
	3	**1**	**0**	**4**	
Prerequisites	**Nil**				

Course Objectives:

1. Understand the concepts of continuous time and discrete time systems.
2. Analyse systems in complex frequency domains.
3. Understand sampling theorem and its implications.

Unit	Topics	No. of Hours
I	Continuous-Time and Discrete-Time Signals, signal operations, Transformations. Independent Variable, Exponential and Sinusoidal Signals, Energy and power signals, Even and odd signals, Impulse and Unit Step Functions, Continuous and Discrete-Time Systems, Properties.	9
II	Discrete-Time & Continuous-Time LTI Systems: Properties of Linear Time-Invariant Systems. Causal LTI Systems described by Differential and Difference Equations, Singularity Functions.	7
III	Fourier Series Representation of Periodic Signals: Response of LTI Systems to Complex Exponentials, Fourier Series Representation of Continuous-Time Periodic Signals, Convergence of the Fourier Series, Properties of Continuous-Time Fourier Series, Fourier Series Representation of Discrete-Time Periodic Signals. Discrete-Time Fourier Transform.	15
IV	Time- and Frequency Characterization of Signals and Systems: The Magnitude-Phase Representation of the Fourier Transform,properties of Continuous-Time Fourier transform, Duality, Inverse Fourier Transform, The Magnitude-Phase Representation of the Frequency Response of LTI Systems. Sampling: Representation of a Continuous-Time Signal by Its Samples: The Sampling Theorem,The Effect of Undersampling: Aliasing, Sampling of Discrete-Time Signals.	17
V	The Laplace Transform: Region of Convergence for Laplace Transforms, properties, Analysis and Characterization of LTI Systems Using the Laplace Transform. Inverse Laplace Transform The Z-Transform: Region of Convergence for the z-Transform, properties, Analysis and Characterization of LTI Systems Using z-Transforms.	13
Total Number of Hours		**56**

Textbooks:

S. No	Name of Book	Author	Publisher
1	Signals and Systems	A.V. Oppenheim, A.S. Willsky and I.T. Young	Prentice hall
2	Signals and Systems - Continuous and Discrete	R.F. Ziemer, W.H. Tranter and D.R. Fannin	Prentice hall
3	Signal Processing and Linear Systems	B.P. Lathi	Oxford univ. press

Course Code	**PCCEE305**			**Semester**	**THIRD**
Category	**Professional Core Course**				
Course Title	**Circuit Analysis and Transients**				
Scheme & Credits	**L**	**T**	**P**	**Credits**	**Max Marks: 100**
	3	**1**	**0**	**4**	
Prerequisites	**Nil**				

Course Objectives:

1. Apply network theorems for the analysis of electrical circuits.
2. Analyze circuits in the sinusoidal steady-state (single-phase and three phase).
3. Obtain the transient and steady-state response of electrical circuits.
4. Analyse two port circuit behavior.

Unit	Topics	No. of Hours
I	DC Circuit Analysis:Introduction, Star -Delta Transformation, Loop and Nodal methods of circuit analysis, Superposition theorem, Thevenin's and Norton's theorems, Maximum Power theorem, Millmans Theorem, Tellegans Theorem, Reciprocity theorem, Substitution Theorem,	12
II	AC Circuit Analysis: Phasor and complex number representation, solutions of sinusoidally excited RLC circuits, Power and energy relations in A.C. circuits, Series and parallel AC circuits(RL,RC,RLC), Applications of network theorems to A.C. circuits, Power factor and its improvement, Concepts of active & reactive powers. Resonance in series and parallel circuits	14
III	Steady State A.C 3-phases Circuits: Concept of a 3-phase voltage, wye (Y) circuits. Delta (Δ) circuits, Current and voltage relations in Y and Δ Circuits, Characteristics of a 3 -phase system	8
IV	Capacitive, Inductive Transients & First Order Circuits: Capacitive Transients, Inductive Transients, Combination of Capacitance & Inductance, Initial and Final Conditions, Exponential Functions, Timing Intervals of First and 2nd Order Circuits. Laplace Transform application to solve differential equations and analysis of electric circuits.	12
V	Two port parameters: Z Parameter, Y parameter, h – parameter, ABCD parameter, Equivalent circuit using these parameters. Condition for reciprocity and symmetry of two port networks in different parameters. Interconnection of two port networks. Cascade connection of two port networks parallel connection of two port networks. Series and series parallel connections. Inter conversion of parameters.	10
Total Number of Hours		**56**

Textbooks:

S. No.	Name of Book	Author	Publisher
1	Fundamentals of Electric Circuits	Alexander Sadiku McGraw-Hill	McGraw-Hill
2	Engineering circuit Analysis	Hayt& Kimberly	McGraw-Hill
3	Electric Engineering Fundamentals	Vincent Del Toro	PHI
4	Network Analysis	Van Valkenberg	Prentice Hall of India
5	Network Analysis and Synthesis	F. F. Kuo	John Wiley & Sons

Course Code	**PCCEE303L**			**Semester**	**THIRD**
Category	**Professional Core Course**				
Course Title	**Analog Electronics Circuits Lab**				
Scheme & Credits	**L**	**T**	**P**	**Credits**	**Max Marks: 100**
	0	**0**	**2**	**1**	
Prerequisites	**Nil**				

S. No.	**Experiment**
1	Study V-I characteristics of transistors (PNP and NPN) and calculate the performance parameters of a transistor in CB, CE and CC Configurations.
2	To assemble a CE amplifier and observe its performance.
3	To obtain frequency response of a RC coupled CE amplifier.
4	To assemble an emitter follower circuit and observe its performance.
5	To assemble a differential amplifier and obtain its CMRR
6	To study different applications of OP AMPS.: inverting amplifier, non-inverting amplifier, integrator, differentiator
7	To assemble an RC phase shift oscillator.
8	Study performance of multivibrator circuits using 555 chip in following Modes: Bistable, Astable, Monostable, Use of 555 chip as a timer circuit
9	To assemble a Schmitt trigger circuit. And to obtain its characteristics and to use it as a Squaring circuit.
10	To assemble a Class A power amplifier and to determine its power gain.
11	To study different applications of OP-AMPS. i. OP- AMP as an inverting amplifier. ii. OP-AMP as a non-inverting amplifier. iii. OP-AMP as an integrator. iv. OP-AMP as a differentiator.
12	To study the performance of a voltage regulator IC chip.
13	To measure the following parameters of a typical OP-AMP. i. I/P Impedance ii. O/P Impedance iii. Slew rate iv. CMRR v. Freq. response.

Course Code	**PCCEE305L**			**Semester**	**THIRD**
Category	**Professional Core Course**				
Course Title	**Circuit Analysis and Transients Lab**				
Scheme & Credits	**L**	**T**	**P**	**Credits**	**Max Marks: 100**
	0	**0**	**2**	**1**	
Prerequisites	**Nil**				

S. No.	**Experiment**
1	To verify Thevenin's Theorem.
2	To verify Norton's Theorem.
3	To verify Maximum Power Transfer Theorem.
4	To verify Superposition Theorem
5	To plot the Resonance curve for Series & Parallel Resonance
6	Transformation of star & Delta Network
7	Analysis of Circuits using MATLAB
8	To measure power factor and ac power in single phase circuits with different linear loads.

Course Code	**PCCEE306L**			**Semester**	**THIRD**
Category	**Professional Core Course**				
Course Title	**MATLAB**				
Scheme & Credits	**L**	**T**	**P**	**Credits**	**Max Marks: 100**
	0	**0**	**2**	**1**	
Prerequisites	**Nil**				

S. No.	**Experiment**
1	Introduction to MATLAB: basic concepts, language, programming and simulation
2	Programs to study · Basic commands and programs · Loops, conditional statements etc. · Example of Fibonacci series · Solution of differential equations · Functions
3	Plotting in MATLAB
4	Use of MATLAB in electrical engineering as in · Transient and steady state analysis of A.C/D.C circuits. · Analysis of Electric Machines and Transformers. Using both programming and simulation knowledge.
5	Use of MATLAB and SIMULINK Tool boxes.