



INSTITUTE OF ENGINEERING & MANAGEMENT

Affiliated to UEM

DEPARTMENT OF ELECTRICAL ENGINEERING

SEMESTER WISE CURRICULAM

2nd YEAR- 3rd SEMESTER

Syllabus for B. Tech Admission Batch 2023



University of Engineering & Management

Institute of Engineering & Management, Salt Lake

Campus Institute of Engineering & Management, New Town

Campus University of Engineering & Management, Jaipur



Syllabus for B.Tech Admission Batch 2023

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Syllabus Structure:

SlNo	Type of Course	Course Code	Course Name	L	T	P	Total Contact Hours	Credit Points
1	Basic Science Courses	BSM301	Mathematics-III	2	1	0	3	3
2	Professional Core Courses	PCCEE301	Electrical Circuit Analysis	2	1	0	3	3
3	Professional Core Courses	PCCEE302	Analog Electronics	3	0	0	3	3
4	Professional Core Courses	PCCEE303	Electromagnetic Field theory	3	1	0	3	4
5	Professional Core Courses	PCCEE304	Data Structure and Algorithm	2	1	0	3	3
6	Humanities and social sciences including Management	MC301	Indian Constitution	2	0	0	2	0
7	Humanities and social sciences including Management	ESP301	Essential Studies for Professionals III	2	0	0	2	0.5
8	Professional Core Courses	PCCEE391	Electrical Circuit Analysis Laboratory	0	0	2	2	1
9	Professional Core Courses	PCCEE392	Analog Electronics Lab	0	0	2	2	1
10	Professional Core Courses	PCCEE394	Data Structure and Algorithm Lab	0	0	2	2	1
11	Humanities and social sciences including Management	SDP381	Skill Development for Professionals III			2	2	0.5
12	Project, Seminar and Industrial Training	PWEE381	Mini Project I			1	1	1
13	Massive Open Online Courses (MOOCs)	MOOCs	Massive Open Online Courses (MOOCs)					
14	Industry and Foreign Certification (IFC)	IFC	Industry and Foreign Certification (IFC)					
15	Mandatory Additional Requirements (MAR)	MAR381	Mandatory Additional Requirements (MAR)					
Total Credit Points of Semester				16	4	9	28	21



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Mathematics-III

Credit: 3

Lecture Hours:

42 Subject Code: BSM301

Pre-requisite: Permutation & Combination, Concept of Basic Probability, Evaluation of definite, improper and infinite integrals, Concept of β & Γ functions.

Relevant Links: [Study material](#) [NPTEL](#) [Coursera](#)

Course Objectives:

1. The syllabus will prepare the learners for Engineering Exit Examinations, ESE and campus placements.
2. The Transform techniques will enable the students to construct new circuits for the communication industry.
3. After completion of the course, the students will be able to process data in Electronic Industry and constructing circuits.
4. The students will be eligible to work in the Data domain which is the emerging technology of the future and create more opportunities for creative work.
5. Students will be able to describe and quantify the uncertainty inherent in predictions made by machine learning models.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- CO1. Illustrate the ideas of probability and random variables, various discrete and continuous probability distributions with their properties and their applications in physical and engineering environment.
- CO2. Find the inter-relation between two or more phenomena with the help of curve fitting.
- CO3. Understand the basic components of sampling and have the knowledge on exact sampling distributions which are essential for estimating and testing hypothetical statements. Know the various sampling methodologies and their efficiencies in theoretical and practical aspects.

CO4. Apply the statistical tools in business, economical and commercial areas for analyzing problems and to make better decisions for future in their fields.

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	Random Variables & Probability Distributions	Discrete Random Variable; Discrete Probability Distribution, Expectation and Variance of random variables; Binomial and Poisson Distributions; Mean, Variance and Moment Generating Functions of Binomial and Poisson Variates; Convergence of Binomial to Poisson Variate. Continuous Random Variable; Continuous Probability Distributions, Expectation and Variance of random variables, Exponential, Normal and Gamma Distributions; Mean, Variance and Moment Generating Functions of the corresponding variates. Tchebycheff's Inequality and Weak Law of Large Numbers (Statement only)	International Academia: https://ocw.mit.edu/courses/18-05-introduction-to-probability-and-statistics-spring-2022/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf Industry Mapping: N/A	12	"R" software for statistical computing
2	Method of Least Squares and Curve Fitting	Principle of Least Squares, Curve fitting by the method of Least Squares - fitting of straight lines, second degree parabolas and exponential curves.	International Standards : https://ocw.mit.edu/courses/18-05-introduction-to-probability-and-statistics-spring-2022/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf	4	"stata": statistical software for data science

			<i>IndustryMapping:N/A</i>		
3	Sampling and Sampling Distributions	Population and Sample, Sampling With and Without Replacement (SRSWR and SRSWOR); Random Samples, Population Parameters, Sample Statistics, Sampling Distributions, Standard Error and Probable Error; Sample Mean, Sampling Distribution of Means; Sample Proportion, Sampling Distribution of Proportions, Sample Variances, Sampling Distribution of Variances; Case where Population Variance is unknown; Central Limit Theorem (Statement only); Degrees of freedom, Chi-square distribution, Mean & Variance of Chi-square variate.	InternationalStandards: https://www.cl.cam.ac.uk/teaching/2021/IntroProb/materials.html AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/ModelCurriculum/UG-1/ug-voll.pdf <i>IndustryMapping:N/A</i>	8	"stata": statistical software for data science
4	Estimation of Parameters	Point and Interval estimations, Biased and Unbiased estimators, Minimum Variance Unbiased Estimator (MVUE), Consistent Estimator, Maximum Likelihood Estimation of Parameters, Applications in populations following theoretical distributions (Binomial, Poisson and Normal), Calculation of confidence limits for population mean and population proportions.	International Standards: https://ocw.mit.edu/courses/1-010-uncertainty-in-engineering-fall-2008/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/ModelCurriculum/UG-1/ug-voll.pdf <i>IndustryMapping:N/A</i>	6	"R" software for statistical computing

5	Testing of Hypothesis	Large Sample Test: Statistical Hypotheses, Test Statistic, Best Critical Region, Test for single mean, difference of means, single proportion, difference of proportions, and difference of standard deviations. Small Sample Test: Test for single mean, difference of means and correlation coefficients, Test for ratio of variances, Chi-square test for goodness of fit and independence of attributes.	International Standards: https://ocw.mit.edu/courses/6-041-probabilistic-systems-analysis-and-applied-probability-fall-2010/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf IndustryMapping:N/A	12	"R" software for statistical computing
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Suggested Learning Resources:

TextBook:

1. [Saktipada Nanda and Sibashis Nanda](#), "A Course on Probability & Statistics", 1st Edition (2022), Mindprobooks

ReferenceBooks:

1. **Sheldon M. Ross**, "Introduction to Probability and Statistics for Engineers and Scientists", 6th Edition (2020), Academic
2. **N.G.Das**, "Statistical Methods", Combined Edition Vol. 1 &2 (2017) McGraw Hill Education
3. **Douglas C, Montgomery and George C. Runger**, Applied Statistics and Probability for Engineers, 7th edition (2018), John Wiley & Sons.
4. **Murray R. Spiegel, John J. Schiller and R. Alu Srinivasan**, "Schaum's Outline of Probability & Statistics" , 4th Edition (2012), McGraw Hill Education.



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Electrical Circuit Analysis

Credit: 3

Lecture Hours:

40 Subject Code: PCCEE301

Pre-requisite: Basic Electrical Engineering

Relevant Links:

[Study material](#)

[NPTEL](#)

[Coursera](#)

[LinkedIn Learning](#)

Course Objectives:

The purpose of learning this course is-

1. To solve D.C. networks by different circuit analysis methods.
2. To understand the transient and steady-state response of electrical circuits.
3. To analyze circuits in the sinusoidal steady-state (single-phase and three-phase).
4. To analyze two port circuit behavior.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- CO1. Apply the concept of network theorems and other network analysis methods to solve problems related with coupled circuits to develop simpler circuits for complex engineering problems.
- CO2. Apply differential equations to analyze and solve series and parallel circuit and their sinusoidal steady state analysis
- CO3. Apply powerful mathematical tools like Laplace transform to analyze and solve different circuit related problems.
- CO4. Explain the concept of two port networks to formulate network equations and solving circuit related problems.

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	Network Theorems	Superposition theorem, Thevenin theorem, Norton theorem, Maximum power transfer theorem, Reciprocity theorem, Compensation theorem. Analysis with dependent current and voltage sources. Node and Mesh Analysis. Concept of duality and dual networks.	International Academia: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf Industry Mapping: MATLAB, PSPICE	10	1. Verification of Network theorems using software & hardware 2. Transient response of R-L and R-C network: simulation with software & hardware
2	Solution of First and Second order networks	Solution of first and second order differential equations for Series and parallel R- L, R-C, R-L-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response.	International Academia: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf Industry Mapping: MATLAB, PSPICE	8	Transient response of R-L-C series and parallel circuit: simulation with software & hardware

3.	Sinusoidal steady state analysis	Representation of sine function as rotating phasor, phasor diagrams, impedances and admittances, AC circuit analysis, effective or RMS values, average power and complex power. Three-phase circuits. Mutual coupled circuits, Dot Convention in coupled circuits, Ideal Transformer.	International Academia: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf Industry Mapping: MATLAB, PSPICE	8	1. Frequency response of LP and HP filters: simulation & hardware. 2. Frequency response of BP and BR filters: simulation & hardware. 3. Generation of Periodic, Exponential, Sinusoidal, Damped Sinusoidal, Step, Impulse, Ramp signal using MATLAB in both discrete and analog form.
4	Electrical Circuit Analysis Using Laplace Transforms	Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros. Frequency response (magnitude and phase plots), series and parallel resonances.	International Academia: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf Industry Mapping: MATLAB, PSPICE	8	1. Determination of Laplace transform and Inverse Laplace transform using MATLAB. 2. Amplitude and Phase spectrum analysis of different signals using MATLAB.
5	Two Port Network and Network Functions	Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.	International Academia: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf	6	Determination of Impedance (Z) and Admittance (Y) parameter of two-port network: simulation & hardware.

			india.org/sites/default/files/Model Curriculum/UG-1/ug-voll.pdf <i>Industry Mapping:</i> MATLAB, PSPICE		
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Suggested Learning Resources:

Textbooks

1. A. Chakraborty, "Circuit Theory", Dhanpat Rai Publications, 2018.
2. D. Roy Choudhury, "Networks and Systems", New Age International Publications, 1998.

reference books:

1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
2. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Analog Electronics

Credit: 3

Lecture Hours:

42 Subject Code: PCCEE302

Pre-requisite: Physics (10+2)

Relevant Links:

[Study material](#)

[NPTEL](#)

[Coursera](#)

[LinkedIn Learning](#)

Course Objectives:

The purpose of learning this course is-

1. The capability to know Diode circuits, BJT circuits, MOSFET circuits,
2. The ability to know the Differential, multi-stage and operational amplifiers
3. The ability to know the linear applications of op-amp.
4. The ability to know the nonlinear applications of op-amp.
5. The ability to know the Feedback amplifier & Oscillators.

Course Outcomes:

- CO1. To appreciate the functioning of OP-AMP, oscillator and the characteristics of BJT and MOSFET.
- CO2. Design of sinusoidal and non-sinusoidal oscillators using OP-AMP, design of single stage amplifier using BJT and MOSFET.
- CO3. Analyze various rectifier and amplifier circuits based on diode, OP-AMP, BJT and MOSFET.
- CO4. To design and construct requirement based multi-stage amplifier using BJT and MOSFET circuits.

Module Number	Topic	Sub-topics	Mapping with Industries, National and International Academia	Lecture Hours	Corresponding Lab assignments
1	Regulators	Review of half wave and full wave rectifier, ripple factor, series and shunt voltage regulator, percentage regulation.	International Standards: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/video_galleries/video-lectures/ AICTE prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/Final_ECE.pdf Industry Mapping: Hardware Chipset (SCR) Software: Labview, P-Spice	4	- Study of ripple and regulation characteristics of full wave rectifier with and without capacitor filter. - Study of Zener diode as voltage regulator. - Study of Switched Mode Power Supply & construction of a linear voltage regulator using regulator IC chip
2	Operational amplifier, Application of Operational Amplifier	Ideal OPAMP, Differential amplifier, Constant current source (Current mirror etc), Level shifter, CMRR, Open & closed loop circuits, importance of feedback loop (positive & negative), inverting & non-inverting amplifiers, Voltage follower/Buffer circuits. Adder, Integrator & Differentiator, Comparator, Schmitt Trigger, Instrumentation Amplifier, Log & Antilog amplifier, Trans-conductance multiplier, Precision rectifier, Voltage to current & Current to voltage converter.	International Standards: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/video_galleries/video-lectures/ AICTE prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/Final_ECE.pdf Industry Mapping: Hardware Chipset (SCR) Software: Labview, P-Spice	16	- Realization of a V-to-I & I-to-V converter using Op-Amps. - Instrumentation Amplifier using Op-Amp. - Construction of a simple function generator using IC
3	BJT & FET circuits	Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: small-signal model, biasing circuits, current mirror; common-emitter, common-base and common-collector amplifiers; Small signal	International Standards: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/video_galleries/video-lectures/	15	Construction of a two-stage R-C coupled amplifier & study of its gain & Bandwidth.

		equivalent circuits, high-frequency equivalent circuits. MOSFET structure and I-V characteristics. MOSFET as a switch. MOSFET as an amplifier: small-signal model and biasing circuits, common-source, common-gate and common-drain amplifiers; small signal equivalent circuits - gain, input and output impedances, trans-conductance, high frequency equivalent circuit.	AICTE prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/Final_ECE.pdf Industry Mapping: Hardware Chipset (CMOS, IGBT) Software: P-Spice		2. V-I Characteristics of JFET and MOSFET
4	Feedback amplifier & Oscillators, Power amplifier, Oscillator, 555 Timer	Concept of feedback, Negative & Positive feedback, Voltage/Current, Series/Shunt feedback, Barkhausen criterion, Colpitts, Hartley's, Phase shift, Wien bridge, & Crystal oscillators. Capacitor filters, π-section filter Class A, B, AB, C, Conversion efficiency. Monostable, Bistable multivibrator, Monostable & Astable operation using 555 timer.	International Standards: https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/video_galleries/video-lectures/ AICTE prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/Final_ECE.pdf Industry Mapping: Software: P-Spice	7	1. Study of class A, C & Push-Pull amplifiers. 2. Study of timer circuit using NE555 & configuration for monostable & astable and bistable multivibrator. 3. Realization of a Phase Locked Loop using Voltage Controlled Oscillator (VCO).

Suggested Learning Resources:

Text Books

1. A. S. Sedra and K. C. Smith, "Microelectronic Circuits", New York, Oxford University Press.
2. J. V. Wait, L. P. Huelsman and G. A. Korn, "Introduction to Operational Amplifier theory and applications", McGraw Hill U. S.

Reference Books

1. P.R. Gray, R.G. Meyer, and S. Lewis, "Analysis and Design of Analog Integrated Circuits", John Wiley & Sons.
- Robert Boylestad Louis Nashelsky "Electronic Devices and Circuit Theory", Pearson



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Electromagnetic Field Theory

Credit: 4

Lecture Hours: 42

Subject Code: PCCEE303

Pre-requisite: Basic Electrical Engineering, Mathematics, Physics

Relevant Links: [Study material](#) [NPTEL](#) [Coursera](#)

Course Objectives:

The purpose of learning this course is to-

1. To understand the basic mathematical tools to deal with Electromagnetic field Problem.
2. To understand properties and application of Electric and magnetic field.
3. To analyze electromagnetic wave propagation.
4. To solve problem related to Electromagnetic field

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- CO1. To remember the basic laws of electromagnetism.
- CO2. To understand the static and time varying electromagnetic field
- CO3. To solve electric and magnetic field for different source distribution.
- CO4. To analyze electromagnetic wave propagation in different medium.

Module number	Topic	Sub-topics	MappingwithIndustry and InternationalAcademia	Lecture Hours	Corresponding LabAssignment
1	Review of Vector Calculus	Vector algebra - addition, subtraction, components of vectors, scalar and vector multiplications, triple products, three orthogonal coordinate systems (rectangular, cylindrical and spherical). Vector calculus - differentiation, partial differentiation, integration, vector operator del, gradient, divergence and curl; integral theorems of vectors. Conversion of a vector from one coordinate system to another.	International Academia: https://ocw.mit.edu/courses/8-07-electromagnetism-ii-fall-2012/ AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf Industry Mapping: Software: MATLAB, ANSYS	6	No corresponding lab
2	Static Electric Field	Coulomb's law, Electric field intensity, Electrical field due to point charges. Line, Surface and Volume charge distributions. Gauss law and its applications. Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric	International Standards: https://ocw.mit.edu/courses/6-013-electromagnetics-and-applications-spring-2009/ AICTE prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf	6	No corresponding lab

		dipole, Electrostatic Energy and Energy density.			
3	Conductors, Dielectrics and Capacitance	Current and current density, Ohms Law in Point form, Continuity of current, Boundary conditions of perfect dielectric materials. Permittivity of dielectric materials, Capacitance, Capacitance of a two wire line, Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation, Application of Laplace's and Poisson's equations.	International Standards: https://ocw.mit.edu/courses/6-013-electromagnetics-and-applications-spring-2009/ AICTE prescribed syllabus:https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf Industry Mapping: Software: MATLAB, ANSYS	6	No corresponding lab
4	Static Magnetic Fields	Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors.	International Standards: https://ocw.mit.edu/courses/6-641-electromagnetic-fields-forces-and-motion-spring-2005/ AICTE prescribed syllabus:https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf Industry Mapping: Software:	6	No corresponding lab

			MATLAB, ANSYS		
5	Magnetic Forces, Materials and Inductance	Force on a moving charge, Force on a differential current element, Force between differential current elements, Nature of magnetic materials, Magnetization and permeability, Magnetic boundary conditions, Magnetic circuits, inductances and mutual inductances.	International Standards: https://ocw.mit.edu/courses/6-641-electromagnetic-fields-forces-and-motion-spring-2005/ AICTE prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf Industry Mapping: Software: MATLAB, ANSYS	6	No corresponding lab
6	Time Varying Fields and Maxwell's Equations	Faraday's law for Electromagnetic induction, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations, Motional Electromotive forces. Boundary Conditions.	International Standards: https://ocw.mit.edu/courses/8-07-electromagnetism-ii-fall-2012/ AICTE prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf Industry Mapping: Software: MATLAB, ANSYS	6	No corresponding lab
7	Electromagnetic Waves	Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Wave	International Standards: https://ocw.mit.edu/courses/8-07-electromagnetism-ii-fall-2012/	6	No corresponding lab

		equation in Phasor form, Plane waves in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors, Skin effect. Poynting theorem.	AICTE prescribesyllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf Industry Mapping: Software: MATLAB, ANSYS		
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Suggested Learning Resources:

Text Books

1. M. N. O. Sadiku, “Elements of Electromagnetics”, Oxford University Publication, 2014.

Reference Books

1. W. Hayt, “Engineering Electromagnetics”, McGraw Hill Education, 2012.
2. Pramanik, “Electromagnetism - Theory and applications”, PHI Learning Pvt. Ltd, New Delhi, 2009.
3. Pramanik, “Electromagnetism-Problems with solution”, Prentice Hall India, 2012.
4. G.W. Carter, “The electromagnetic field in its engineering aspects”, Longmans, 1954.
5. W.J. Duffin, “Electricity and Magnetism”, McGraw Hill Publication, 1980.
6. W.J. Duffin, “Advanced Electricity and Magnetism”, McGraw Hill, 1968.
7. E.G. Cullwick, “The Fundamentals of Electromagnetism”, Cambridge University Press, 1966.
8. D. Popovic, “Introductory Engineering Electromagnetics”, Addison-Wesley Educational Publishers, International Edition, 1971.



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Data Structure & Algorithm Credit: 3

Lecture Hours: 40 Subject Code:

PCCEE403

Pre-requisite: Basic Computation and Principles of C, Engineering Mathematics

[Study Material](#)

[Coursera](#)

[NPTEL](#)

[Infosys Springboard](#)

[Linkedin learning](#)

Course Objectives:

The purpose of learning this course is to-

1. Understand the fundamentals of data structures and algorithms.
2. Familiarize the students with basic data structures and their use in fundamental algorithms.
3. Understand and design efficient algorithms for sorting and searching.
4. Be able to solve problem statements using algorithms.
5. Apply the skills to store and interpret data using defined structures and perform various operations.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

CO1: Students will be able to acquire and remember the knowledge of fundamental data structures

CO2: Students will be able to understand any data structure properly and to have knowledge on basics of computer hardware and number systems.

CO3: Students will be able to implement any problem by writing their own algorithms

CO4: Students will be able to analyze the algorithm for a given problem.

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	Introduction to Data Structures in C programming	Arrays 1D array, 2D array, multi-dimensional arrays Operations in array Algorithms Flowchart and pseudo-code Time and Space complexity	<i>AICTE-prescribed syllabus:</i> https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf <i>International Academia:</i> Lecture Notes Advanced Data Structures Electrical Engineering and Computer Science MIT OpenCourseWare	8	Find largest/smallest element in an array. Add the elements of two 3x3 matrices into one 3x3 matrix.
2	Linear Data Structures	Linked Lists Singly linked list Doubly linked list Circular linked list Stack Queue	<i>AICTE-prescribed syllabus:</i> https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf <i>International Academia:</i> Lecture Notes Advanced Data Structures Electrical Engineering and Computer Science MIT OpenCourseWare	10	Declare a linked list and perform the various operations like searching and sorting on the stored elements. Implement Stack/Queue using arrays to insert-delete/display the elements.
3	Non-Linear Data Structures	Trees Binary tree Binary tree - operations Height and depth of B-Tree	<i>AICTE-prescribed syllabus:</i> https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf	10	Implement a Binary Tree to perform traversal, insertion and deletion of values.

		Graphs Definition and concepts Types of graphs Graph traversals – BFS, DFS, Shortest path	International Academia: Lecture Notes Advanced Data Structures Electrical Engineering and Computer Science MIT OpenCourseWare		Find the depth and height of a B-Tree.
4	Searching and Sorting	Hashing, Collision resolution techniques Linear search, binary search, sequential search Bubble sort, Insertion sort, Selection sort, Quick sort, Merge sort	AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Model_Curriculum/UG-1/ug-vol1.pdf International Academia: Lecture Notes Advanced Data Structures Electrical Engineering and Computer Science MIT OpenCourseWare	8	Implement collision resolution in hashing. Implement Bubble sort and Selection sort with user defined values. Compare their time-complexities.

Suggested Learning Resources:

Text Books

1. “Fundamentals of Data Structures of C” by Ellis Horowitz, Sartaj Sahni, Susan Anderson-freed.
2. “Data Structures Using C” by Reema Thareja.
3. “Data Structures” by S. Lipschutz.

Reference Books

1. “Data Structures And Program Design In C”, 2/E by Robert L. Kruse, Bruce P Leung.
2. “Data Structure Through C in Depth” by S.K. Srivastava and Deepali Srivastava; published by BPB Publications.
3. “Introduction to Algorithms” by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Indian Constitution

Credit: 0

Lecture Hours:

35 Subject Code: MCEE301

Pre-requisite: School history

Relevant Links:

[Study Material](#)

[Coursera](#)

[NPTEL](#)

Course Objectives:

The purpose of learning this course is-

1. Understand different features of Indian constitution. Power and functioning of Union, state and local self-government.
2. Understand basics of PIL and guideline for admission of PIL.
3. Analyze of local administration starting from block to Municipal Corporation.
4. Study the identification of authority to redress a problem in the profession and in the society.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- CO1. Recall the meaning and significance of the Indian Constitution as the fundamental law of the land.
- CO2. Understand the Indian political system, the powers and functions of the Union, State and Local Governments in detail.
- CO3. Exercise their fundamental rights in proper sense and analyze the outcomes of the Electoral Process, Emergency provisions, Amendment procedure and the basics of PIL and guideline for admission of PIL.
- CO4. Access the Functioning of local administration starting from block to Municipal Corporation.

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	Indian Constitution	Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy	International Academia: https://mnit.ac.in/dept_hss/downloads/Syllabus/UG/21HST808.pdf AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Vol.%20II%20%20AICTE%20UG%20%20Curriculum.pdf Industry Mapping: https://byjus.com/ias/upsc-syllabus/	5	Designing of a small set of rules and regulations (constitution) for an educational institution
2	Union government and its administration	Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha. State government and its administration: Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions,	International Academia: https://www.iitg.ac.in/hss/page_syllabus_details.php?sno=YzdtOS9VVGHIV25PNDZkMWh1ZkdXdz09 http://unipune.ac.in/university_files/Constitution/All%20PG%20Compulsory%20Paper%20Introduction%20to%20Constitution_13.012021.pdf AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Vol.%20II%20%20AICTE%20UG%20%20Curriculum.pdf	10	Queries on the following – 1. Union Govt. 2. President of India 3. Role of PM 4. Centre-State Relationship 5. State Govt. 6. CMs of States 7. Council of Ministers 8. Latest Developments in States' Politics

			G%20%20Curriculum.pdf IndustryMapping: https://www.drishtiias.com/pdf/1593776909-uttar-pradesh-pcs-preliminary-mains-syllabus.pdf		
3	Supreme court	Organization of supreme court, procedure of the court, independence of the court, jurisdiction and power of supreme court. High court: Organization of high court, procedure of the court, independence of the court, jurisdiction and power of supreme court. Subordinate courts: constitutional provision, structure and jurisdiction. National legal services authority, Lokadalats, family courts, gramnyayalays. Public interest litigation (PIL): meaning of PIL, features of PIL, scope of PIL, principle of PIL, guidelines for admitting PIL	InternationalAcademia: 1. https://www.kuk.ac.in/lms/syllabus?did=NDE=&sid=NDUxNQ==&pn=TS5UZWNoLiBDb2lwdXRlciBFbmdpbmVlcmluZyAoVUlfVCk= AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Vol.%20II%20%20AICTE%20UG%20%20Curriculum.pdf IndustryMapping: https://www.shiksha.com/exams/wbcs-exam-syllabus	10	Queries on Lok Adalats, Family courts and PIL

4	Local Administration:	District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: ZilaPachayat, Elected officials and their roles, CEO ZilaPachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.	InternationalAcademia: 1. https://www.amrita.edu/course/indian-constitution/ 2. https://www.kud.ac.in/fileupload/nep/3-4%20Sem%20NEP/Revised%20Syllabus%20of%20A11%20UG%204th%20Semester%20for%20India%20&%20Indian%20Constitution%20Compulsory%20Subject%20under%20NEP.pdf AICTE-prescribed syllabus: https://www.aicte-india.org/sites/default/files/Vol.%20II%20%20AICTE%20UG%20%20Curriculum.pdf IndustryMapping: https://rpsc.rajasthan.gov.in/Static/Syllabus/5A186FF9-57DB-46D0-A1FA-126B4AA87639.pdf	10	Make a list of Local-District Administrators, Major Officials of District and Their role
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Suggested Learning Resources:

Text Books

1. Introduction to the constitution of India, DD Basu, 21st Edition, Lexis Nexis Books Publication ltd, India

Reference Books

1. Indian polity, M, Laxmikanth, MC Graw Hill education, 5th Edition.



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Electrical Circuit Analysis Laboratory Credit: 1

Lecture Hours: 18

Subject Code: PCCEE391

Pre-requisite: Basic Electrical Laboratory

Course Objectives:

The purpose of learning this course is-

1. To solve D.C. networks by different circuit analysis methods.
2. To understand the transient and steady-state response of electrical circuits.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- CO1. Determine transient response of different electrical circuit, parameters of two port network, frequency response of filters, Laplace transform and inverse Laplace transform
- CO2. Generate different signals in both discrete and analog form. Analyze amplitude and phase spectrum of different signals.
- CO3. Verify network theorems, construct circuits with appropriate instruments and safety precautions.
- CO4. Simulate electrical circuit experiments using suitable software.

LaboratoryExperiments

Module No	Description	Lecture Hours
1	Transient response of R-L and R-C network: simulation with software & hardware	2
2	Transient response of R-L-C series and parallel circuit: simulation with software & hardware	2
3	Determination of Impedance (Z) and Admittance (Y) parameter of two-port network: simulation & hardware.	2
4	Frequency response of LP and HP filters: simulation & hardware.	2
5	Frequency response of BP and BR filters: simulation & hardware.	2
6	Generation of Periodic, Exponential, Sinusoidal, Damped Sinusoidal, Step, Impulse, Ramp signal using MATLAB in both discrete and analog form.	2
7	Determination of Laplace transform and Inverse Laplace transform using MATLAB.	2
8	Amplitude and Phase spectrum analysis of different signals using MATLAB.	2
9	Verification of Network theorems using software & hardware	2
Total		18



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Analog Electronics Laboratory

Credit: 1

Lecture Hours: 16

Subject Code: PCCEE392

Pre-requisite: Basic Electronics Laboratory

Course Objective(s):

The purpose of learning this course is to-

1. To identify appropriate equipment and instruments for the experiment.
2. To study the various characteristics of different electronic components.
3. To work effectively in a team.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- CO1. Explain principle of operation of analog electronic components, filters, regulators and analog electronic circuits.
- CO2. Compute parameters and operating points of analog electronic circuits.
- CO3. Determine response of analog electronic circuits.
- CO4. To design and construct requirement based multi-stage amplifier using BJT and MOSFET circuits.

LaboratoryExperiments

Module No	Description	Lecture Hours
1	(a)Study of Ripple And Regulation Characteristics of Full Wave Rectifier With And Without Capacitor Filter. (b)Study of Zener Diode As Voltage Regulator. (c) Study of Switched Mode Power Supply & Construction of a Linear Voltage Regulator Using Regulator IC Chip	2
2	Study of Characteristics Curves of B.J.T & F.E.T .	2
3	Construction of A Two-Stage R-C Coupled Amplifier & Study of its Gain & Bandwidth.	2
4	Study of Timer Circuit Using NE555 & Configuration For Monostable&Astable And BistableMultivibrator	2
5	Realization of a V-To-I & I-To-V Converter Using Op-Amps.	2
6	Construction of a Simple Function Generator Using IC.	2
7	Realization of a Phase Locked Loop Using Voltage Controlled Oscillator (VCO).	2
8	Study of D.A.C & A.D.C.	2
TOTAL		16

VirtualLab. Details

Experiment Name	Web-Link/ Software Used
Study of Ripple and Regulation Characteristics of Full Wave Rectifier with and without Capacitor Filter.	http://vlabs.iitkgp.ernet.in/be/exp6/index.html http://vlabs.iitkgp.ernet.in/be/exp7/index.html http://vlabs.iitkgp.ernet.in/be/exp8/index.html
Study of Zener Diode as Voltage Regulator.	http://vlabs.iitkgp.ernet.in/be/exp10/index.html #
Study of Characteristics Curves of B.J.T	http://vlabs.iitkgp.ernet.in/be/exp11/index.html http://vlabs.iitkgp.ernet.in/be/exp12/index.html http://vlabs.iitkgp.ernet.in/be/exp13/index.html
Study of Timer Circuit Using NE555	http://he-

&Configuration For Monostable & Astable Multivibrator	coep.vlabs.ac.in/Experiment8/Aim.html?domain=ElectronicsandCommunications&lab=Hybrid%20Electronics%20Lab
Study of D.A.C & A.D.C.	http://he-coep.vlabs.ac.in/Experiment6/Aim.html?domain=ElectronicsandCommunications&lab=Hybrid%20Electronics%20Lab



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Syllabus for B.Tech Admission Batch 2023

Subject Name: Data Structure & Algorithm Laboratory Credit: 1

Lecture Hours: 18

Subject Code: PCCEE394

Course Objective(s):

The purpose of learning this course is-

1. To know about linear and nonlinear data structure types and usage.
2. To understand the concept of stack, Queue and linked list in data operation.
3. To apply the concept of tree and graph for data searching and sorting.
4. To analyse the complexity of different algorithms

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- CO1. Implement array operation using stack, Queue and linked list.
- CO2. Formation of Threaded binary tree, AVL tree and tree traversal.
- CO3. Verify Prim's and Kruskal's algorithm over graph.
- CO4. Use different searching and sorting technique over structured data.

LaboratoryExperiments

Experiment No.	Description	Hrs.
1.	Implementation of array operation in Stacks and Queues: adding, deleting elements.	2
2.	Implementation of array operation in Circular Queue: Adding & deleting elements.	2
3.	Implementation of array operation in Merging Problem: Evaluation of expressions operations on multiple Stacks & queues.	2
4.	Inserting, deleting, and inverting a linked list. Implementation of stacks & queues using linked lists.	2
5.	Polynomial addition, Polynomial multiplication, Sparse Matrices: Multiplication, addition.	2
6.	Recursive and Non recursive traversal of Trees, Threaded binary tree traversal, AVL tree implementation.	2
7.	BFS, DFS application over graph.	2
8.	Spanning tree by Prim's & Krushkal's algorithm application over graph	2
9.	Searching, inserting and deleting, searching & sorting techniques.	2
Total		18