



# St. Martin's Engineering College

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Dhulapally, Secunderabad-500 100

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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### I YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	MA101BS	Matrices and Calculus	3	1	0	4	40	60	100
2	CH102BS	Engineering Chemistry	3	1	0	4	40	60	100
3	CS104ES	C Programming and Data Structures	3	0	0	3	40	60	100
4	EE105ES	Electrical Circuit Analysis – I	3	0	0	3	40	60	100
5	ME108ES	Computer Aided Engineering Graphics	1	0	4	3	40	60	100
6	EE107ES	Elements of Electrical and Electronics Engineering	0	0	2	1	50	-	50
7	CH104BS	Engineering Chemistry Laboratory	0	0	2	1	40	60	100
8	CS103ES	C Programming and Data Structures Laboratory	0	0	2	1	40	60	100
9		Induction Program							
<b>Total</b>			<b>13</b>	<b>2</b>	<b>10</b>	<b>20</b>	<b>330</b>	<b>420</b>	<b>750</b>

### I YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4	40	60	100
2	AP202BS	Applied Physics	3	1	0	4	40	60	100
3	ME207ES	Engineering Workshop	0	1	3	2.5	40	60	100
4	EN204HS	English for Skill Enhancement	2	0	0	2	40	60	100
5	EE209ES	Electrical Circuit Analysis - II	2	0	0	2	40	60	100
6	AP203BS	Applied Physics Laboratory	0	0	3	1.5	40	60	100
7	EN205HS	English Language and Communication Skills Laboratory	0	0	2	1	40	60	100
8	CS208ES	Applied Python Programming Laboratory	0	1	2	2	40	60	100
9	EE210ES	Electrical Circuit Analysis Laboratory	0	0	2	1	40	60	100
<b>Total</b>			<b>10</b>	<b>4</b>	<b>12</b>	<b>20</b>	<b>360</b>	<b>540</b>	<b>900</b>
10	*CH209MC	Environmental Science	3	0	0	0	40	60	100

\*MC – Satisfied/Unsatisfied



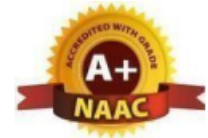
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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### II B. Tech-I-Semester

S. No.	Course Code	Course Title	Hours Per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1.	MA301BS	Numerical Methods and Complex Variables	3	1	0	4	40	60	100
2.	EE301PC	Electrical Machines – I	3	1	0	4	40	60	100
3.	EC308PC	Analog Electronic Circuits	3	0	0	3	40	60	100
4.	EE302PC	Power Systems - I	3	0	0	3	40	60	100
5.	EE303PC	Electro Magnetic Fields	3	0	0	3	40	60	100
6.	EE304PC	Electrical Machines Laboratory – I	0	0	2	1	40	60	100
7.	EC309PC	Analog Electronic Circuit Laboratory	0	0	2	1	40	60	100
8.	EE305PC	Electrical Simulation Laboratory	0	0	2	1	40	60	100
<b>Total</b>			<b>15</b>	<b>2</b>	<b>6</b>	<b>20</b>	<b>320</b>	<b>480</b>	<b>800</b>
Mandatory Course (Non-Credit)									
9.	*GS309MC	Gender Sensitization Laboratory	0	0	2	0	100	-	100

\*MC – Satisfied/Unsatisfied

### II B. Tech-II-Semester

S. No.	Course Code	Course Title	Hours Per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1.	ME411PC	Solid Mechanics and Hydraulic Machines	3	1	0	4	40	60	100
2.	EE402PC	Measurements and Instrumentation	3	0	0	3	40	60	100
3.	EE403PC	Electrical Machines – II	3	0	0	3	40	60	100
4.	EC410PC	Digital Electronics	2	0	0	2	40	60	100
5.	EE404PC	Power Systems – II	3	0	0	3	40	60	100
6.	EC411PC	Digital Electronics Laboratory	0	0	2	1	40	60	100
7.	EE405PC	Measurements and Instrumentation Laboratory	0	0	2	1	40	60	100
8.	EE406PC	Electrical Machines Laboratory - II	0	0	2	1	40	60	100
9.	EE407PC	Real Time Research Project / Field Based Project	0	0	4	2	50	-	50
<b>Total</b>			<b>14</b>	<b>1</b>	<b>10</b>	<b>20</b>	<b>370</b>	<b>480</b>	<b>850</b>
Mandatory Course (Non-Credit)									
10.	*CI409MC	Constitution of India	3	0	0	0	100	-	100

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## MATRICES AND CALCULUS

I B. TECH- I SEMESTER (R 22)								
Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
MA101BS	B. Tech	3	1	0	4	40	60	100
<b>COURSE OBJECTIVES</b>								
To learn								
<ol style="list-style-type: none"> <li>Types of matrices and their properties.</li> <li>Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.</li> <li>Concept of eigen-values and eigenvectors and to reduce the quadratic form to canonical form</li> <li>Geometrical approach to the mean value theorems and their application to the mathematical problems</li> <li>Evaluation of surface areas and volumes of revolutions of curves.</li> <li>Evaluation of improper integrals using Beta and Gamma functions.</li> <li>Partial differentiation, concept of total derivative</li> <li>Finding maxima and minima of function of two and three variables.</li> <li>Evaluation of multiple integrals and their applications</li> </ol>								
<b>COURSE OUTCOMES</b>								
Upon successful completion of the course, the student is able to								
<ol style="list-style-type: none"> <li>Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations</li> <li>Find the Eigen-values and Eigen vectors</li> <li>Reduce the quadratic form to canonical form using orthogonal transformations.</li> <li>Solve the applications on the mean value theorems.</li> <li>Evaluate the improper integrals using Beta and Gamma functions</li> <li>Find the extreme values of functions of two variables with/ without constraints.</li> <li>Evaluate the multiple integrals and apply the concept to find areas, volumes</li> </ol>								
<b>UNIT-I</b>	<b>MATRICES</b>						<b>Classes: 10</b>	
Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.								
<b>UNIT-II</b>	<b>EIGEN VALUES AND EIGEN VECTORS</b>						<b>Classes:10</b>	
Linear Transformation and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.								

<b>UNIT-III</b>	<b>CALCULUS</b>	<b>Classes:10</b>
<p>Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series.</p> <p>Applications of definite integrals to evaluate surface areas and volumes of revolutions of curve (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma function and their applications.</p>		
<b>UNIT-IV</b>	<b>MULTIVARIABLE CALCULUS (PARTIAL DIFFERENTIATION AND APPLICATIONS)</b>	<b>Classes: 10</b>
<p>Definitions of Limit and continuity.</p> <p>Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence &amp; independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.</p>		
<b>UNIT-V</b>	<b>MULTIVARIABLE CALCULUS (INTEGRATION)</b>	<b>Classes: 10</b>
<p>Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.</p> <p>Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).</p>		
<b>TEXT BOOKS</b>		
<ol style="list-style-type: none"> <li>1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.</li> <li>2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr. D. Ranadheer Reddy, Mr. K Upender Reddy &amp; Mr. G Chandra Mohan, A First Course in Linear Algebra and Calculus for Engineers, M/s Students Helpline Publishing House Pvt. Ltd, First Edition-2020.</li> <li>2. Erwin kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, John Wiley &amp; Sons, 2006.</li> <li>3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9<sup>th</sup> Edition, Pearson, Reprint, 2002.</li> <li>4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.</li> <li>5. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.efunda.com/math/gamma/index.cfm">https://www.efunda.com/math/gamma/index.cfm</a></li> <li>2. <a href="https://mathworld.wolfram.com/CanonicalForm.html">https://mathworld.wolfram.com/CanonicalForm.html</a></li> <li>3. <a href="https://mathworld.wolfram.com/Binomial.html">https://mathworld.wolfram.com/Binomial.html</a></li> <li>4. <a href="https://www.mathworld.wolfram.com/">https://www.mathworld.wolfram.com/</a></li> </ol>		
<b>E -TEXT BOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.e-booksdirectory.com/listing.php?category=4">https://www.e-booksdirectory.com/listing.php?category=4</a></li> <li>2. <a href="https://www.e-booksdirectory.com/details.php?ebook=10830">https://www.e-booksdirectory.com/details.php?ebook=10830</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://onlinecourses.nptel.ac.in/noc22_ma75/preview">https://onlinecourses.nptel.ac.in/noc22_ma75/preview</a></li> <li>2. <a href="https://onlinecourses.swayam2.ac.in/cec20_ma22/preview">https://onlinecourses.swayam2.ac.in/cec20_ma22/preview</a></li> </ol>		



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## ENGINEERING CHEMISTRY

### I B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
CH102BS	B. Tech	3	1	0	4	40	60	100

### COURSE OBJECTIVES

To learn

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion its control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

### COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

### UNIT-I

### WATER AND ITS TREATMENT

Classes: 10

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination. Defluoridation- Determination of F<sup>-</sup> ion by ion- selective electrode method. Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

<b>UNIT-II</b>	<b>BATTERY CHEMISTRY &amp; CORROSION</b>	<b>Classes: 10</b>
<p>Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.</p> <p><b>Corrosion:</b> Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods.</p>		
<b>UNIT-III</b>	<b>POLYMERIC MATERIALS</b>	<b>Classes: 10</b>
<p>Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene</p> <p><b>Plastics:</b> Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). <b>Rubbers:</b> Natural rubber and its vulcanization.</p> <p><b>Elastomers:</b> Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.</p> <p><b>Conducting polymers:</b> Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.</p> <p><b>Biodegradable polymers:</b> Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.</p>		
<b>UNIT-IV</b>	<b>ENERGY SOURCES</b>	<b>Classes: 10</b>
<p>Introduction, Calorific value of fuel – HCV, LCV- Dulong's formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages.</p>		
<b>UNIT-V</b>	<b>ENGINEERING MATERIALS</b>	<b>Classes: 10</b>
<p><b>Cement:</b> Portland cement, its composition, setting and hardening.</p> <p><b>Smart materials and their engineering applications</b> Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinylamides</p> <p><b>Lubricants:</b> Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.</p>		

### **TEXT BOOKS**

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K.Shashikala, Pearson Publications, 2021.
4. Text book of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

### **REFERENCE BOOKS**

1. A. Aditya Prasad , S.Hemambika and N.V.V. PandurangaRao “Engineering Chemistry”, Spectrum Medico Plus Pharma Publishers., Hyderabad, 1 st edition(2020)
2. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
3. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)
4. Engineering Chemistry by A. Aditya Prasad, S. Hemambika and N. V. V. Panduranga Rao, Spectrum Medico Plus Pharma Publishers., Hyderabad, 1<sup>st</sup> edition (2020)
5. Engineering Chemistry by Thirumala Chary Laxminarayana, Shashikala, Pearson Publications (2020)

### **WEB REFERENCES**

1. <https://www.wileyindia.com/engineering-chemistry-as-per-aicte.html>
2. <https://www.wileyindia.com/wiley-engineering-chemistry-second-edition.html>
3. <https://www.wyzant.com/resources/lessons/science/chemistry>
4. <http://www.chem1.com/acad/webtext/virtualtextbook.html>

### **E -TEXT BOOKS**

1. <https://www.pdfdrive.com/engineering-chemistry-e33546326.html>
2. <https://www.pdfdrive.com/engineering-chemistry-fundamentals-and-applications-2nd-edition-e191456798.html>
3. <https://www.pdfdrive.com/engineering-chemistry-e48867824.html>

### **MOOCS COURSE**

1. <https://nptel.ac.in/courses/122101001>
2. <https://nptel.ac.in/courses/105106205>



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## C PROGRAMMING AND DATA STRUCTURES

### I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
CS104ES	B. Tech	3	0	0	3	40	60	100

#### COURSEOBJECTIVES

To learn

Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

#### COURSEOUTCOMES

Upon successful completion of the course, the student is able to

1. Understand the various steps in Program development.
2. Explore the basic concepts in C Programming Language.
3. Develop modular and readable C Programs
4. Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Datastructures.
5. Apply data structures such as stacks, queues in problem solving
6. To understand and analyze various searching and sorting algorithms.

<b>UNIT-I</b>	<b>INTRODUCTION TO COMPUTERS</b>	<b>Classes:12</b>
<p><b>Introduction to Computers</b> – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development  <b>Introduction to C Language</b> – Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output  <b>Structure of a C Program</b> – Operators, Bit-wise operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements.</p>		
<b>UNIT-II</b>	<b>STATEMENTS, DESIGNING STRUCTURED PROGRAMS, ARRAYS</b>	<b>Classes:12</b>
<p><b>Statements</b> – if and switch statements, Repetition statements – while, for, do-while statements, Loopexamples, other statements related to looping – break, continue, go to, Recursion.  <b>Designing Structured Programs</b>- Functions, basics, user defined functions, inter functioncommunication, standard functions.  <b>Arrays</b> – Concepts, using arrays in C, inter function communication, array applications, two –dimensional arrays, multidimensional arrays.</p>		
<b>UNIT-III</b>	<b>POINTERS, POINTER APPLICATIONS</b>	<b>Classes:12</b>
<p><b>Pointers</b> – Introduction, Pointers for inter function communication, pointers to pointers, compatibility,  <b>Pointer Applications</b> – Passing an array to a function, Memory allocation functions, array of pointers  <b>Strings</b> – Concepts, C Strings, String Input / Output functions, arrays of strings, string</p>		



manipulation functions, string / data conversion.		
<b>UNIT-IV</b>	<b>DERIVED TYPES</b>	<b>Classes:12</b>
<p><b>Derived types</b> – The Typedef, enumerated types, Structures – Declaration, definition and initialization of structures, accessing structures, operations on structures, complex structures. Unions – Referencing unions, initializers, unions and structures.</p> <p><b>Input and Output</b> – Text vs Binary streams, standard library functions for files, converting file types, File programs – copy, merge files.</p>		
<b>UNIT-V</b>	<b>SORTING, SORTING AND DATA STRUCTURES</b>	<b>Classes:12</b>
<p><b>Sorting-</b> selection sort, bubble sort, insertion sort,</p> <p><b>Searching-</b>linear and binary search methods.</p> <p><b>Data Structures</b> – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operation array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.</p>		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. C Programming &amp; Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, CengageLearning.</li> <li>2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, PearsonEducation.</li> <li>3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education</li> </ol>		
<b>REFERENCEBOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr.P.Santosh Kumar Patra, “Programming for Problem Solving in C”, Amaravati Publicatoins.</li> <li>2. C &amp; Data structures – P. Padmanabham, 3<sup>rd</sup> Edition, B.S. Publications.</li> <li>3. C Programming with problem solving, J.A. Jones &amp; K. Harrow, Dreamtech Press</li> <li>3 Programming in C – Stephen G. Kochan, III Edition, Pearson Education.</li> <li>4. C for Engineers and Scientists, H. Cheng, McGraw-Hill International Edition</li> <li>5. Data Structures using C – A. M. Tanenbaum, Y. Langsam, and M.J. Augenstein, PearsonEducation / PHI</li> <li>6. C Programming &amp; Data Structures, E. Balagurusamy, TMH.</li> <li>7. C Programming &amp; Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press</li> <li>8. C &amp; Data structures – E V Prasad and N B Venkateswarlu, S. Chand &amp; Co.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.tutorialspoint.com/cprogramming/">https://www.tutorialspoint.com/cprogramming/</a></li> <li>2. <a href="https://www.tutorialspoint.com/cplusplus/">https://www.tutorialspoint.com/cplusplus/</a></li> <li>3. <a href="https://www.cprogramming.com/tutorial/c-tutorial.html">https://www.cprogramming.com/tutorial/c-tutorial.html</a></li> </ol>		
<b>E –TEXT BOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.amazon.com/Problem-Solving-Program-Design-7th/dp/0132936496">https://www.amazon.com/Problem-Solving-Program-Design-7th/dp/0132936496</a></li> <li>2. <a href="https://www.goodreads.com/book/show/36011306-c-programming-data-structures-for-jntu-with-cd">https://www.goodreads.com/book/show/36011306-c-programming-data-structures-for-jntu-with-cd</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/106105085/4">nptel.ac.in/courses/106105085/4</a></li> <li>2. <a href="https://www.quora.com/Are-IIT-NPTEL-videos-good-to-learn-basic-C-programming">https://www.quora.com/Are-IIT-NPTEL-videos-good-to-learn-basic-C-programming</a></li> </ol>		



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## ELECTRICAL CIRCUIT ANALYSIS –I

### I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	Total
EE105ES	B. Tech	3	0	0	3	40	60	100

### COURSE OBJECTIVES

To learn

1. To gain knowledge in circuits and to understand the fundamentals of derived circuit laws.
2. To learn steady state and transient analysis of single phase and 3-phase circuits.
3. To understand Theorems and concepts of coupled circuits.

### COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand network analysis, techniques using mesh and node analysis.
2. Evaluate steadystate and transient behavior of circuits for DC and AC excitations.
3. Analyze electric circuits using network theorems and concepts of coupled circuits.

<b>UNIT-I</b>	<b>NETWORK ELEMENTS &amp; LAWS</b>	<b>Classes:10</b>
Active elements, Independent and dependent sources. Passive elements — R, L and C, Energy stored in inductance and capacitance, Kirchoff's laws, Source transformations, Star-delta transformations, Node voltage method, Mesh current method including super node and super mesh analysis.		
<b>UNIT-II</b>	<b>SINGLE-PHASE CIRCUITS</b>	<b>Classes:10</b>
RMS and average values of periodic sinusoidal and non- sinusoidal waveforms, Phasor representation, Steady-state response of series, parallel and series-parallel circuits. Impedance, Admittance, Current locus diagrams of RL and RC series and parallel circuits with variation of various parameters. Resonance: Series and parallel circuits, Bandwidth and Q-factor.		
<b>UNIT-III</b>	<b>NETWORK THEOREMS</b>	<b>Classes:10</b>
Superposition theorem, Thevinin's theorem, Norton's theorems, Maximum power transfer theorem, Tellegen's theorem, Compensation theorem, Milliman's theorem and Reciprocity theorem. (AC & DC).		
<b>UNIT-IV</b>	<b>POLY-PHASE CIRCUITS</b>	<b>Classes:10</b>
Analysis of balanced and unbalanced 3-phase circuits, Star and delta connections, Measurement of three-phase power for balanced and unbalanced loads.		

UNIT-V	COUPLED CIRCUITS	Classes:10
<p><b>Coupled circuits:</b> Concept of self and mutual inductance, Dot convention, Coefficient of coupling, Analysis of circuits with mutual inductance.</p> <p><b>Topological Description of Networks:</b> Graph, tree, chord, cut-set, incident matrix, circuit matrix and cut-set matrix,</p>		
<p><b>TEXTBOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. Van Valkenburg M.E, “Network Analysis”, Prentice Hall of India, 3<sup>rd</sup> Edition, 2000.</li> <li>2. Ravish R Singh, “Network Analysis and Synthesis”, McGrawHill, 2<sup>nd</sup> Edition, 2019.</li> </ol>		
<p><b>REFERENCEBOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. Dr. N. Ramchandra, T.V. Sai Kalyani, K. V. Govardhan Rao, “Electrical Circuit Analysis”, Sri Krishna Techno Publishers, 2021.</li> <li>2. B. Subramanyam, “Electric Circuit Analysis”, Dreamtech Press &amp; Wiley, 2021.</li> <li>3. James W. Nilsson, Susan A. Riedel, “Electric Circuits”, Pearson, 11<sup>th</sup> Edition, 2020.</li> <li>4. A Sudhakar, Shyammoan S Palli, “Circuits and Networks: Analysis and Synthesis”, McGrawHill, 5<sup>th</sup> Edition, 2017.</li> <li>5. Jagan N.C, Lakshminarayana C., “Network Analysis”, B.S. Publications, 3<sup>rd</sup> Edition, 2014.</li> <li>6. William Hayt H, Kimmerly Jack E. and Steven Durbin M, “Engineering Circuit Analysis”, McGrawHill, 6<sup>th</sup> Edition, 2002.</li> <li>7. Chakravarthy A., “Circuit Theory”, Dhanpat Rai &amp; Co., First Edition, 1999.</li> </ol>		
<p><b>WEB REFERENCES</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.electrical4u.com/">https://www.electrical4u.com/</a></li> <li>2. <a href="http://www.basicsofelectricalengineering.com/">http://www.basicsofelectricalengineering.com/</a></li> <li>3. <a href="https://www.khanacademy.org/science/physics/circuits-topic/circuits">https://www.khanacademy.org/science/physics/circuits-topic/circuits</a></li> <li>4. <a href="https://circuitglobe.com/">https://circuitglobe.com/</a></li> </ol>		
<p><b>E –TEXT BOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="https://menglim498.files.wordpress.com/2013/04/schaum_s_outlines_basic_circuit_analysis/">https://menglim498.files.wordpress.com/2013/04/schaum_s_outlines_basic_circuit_analysis/</a></li> <li>2. <a href="https://bookboon.com/en/electrical-electronic-engineering-ebooks">https://bookboon.com/en/electrical-electronic-engineering-ebooks</a></li> <li>3. <a href="https://easyengineering.net/basic-electrical-engineering-by-wadhwa/">https://easyengineering.net/basic-electrical-engineering-by-wadhwa/</a></li> <li>4. <a href="https://easyengineering.net/objective-electrical-technology-by-mehta">https://easyengineering.net/objective-electrical-technology-by-mehta</a></li> </ol>		
<p><b>MOOCS COURSE</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.courses.com/electrical-engineering">https://www.courses.com/electrical-engineering</a></li> <li>2. <a href="https://www.edx.org/course/circuits-and-electronics-1-basic-circuit-analysis-2?index=product_value_experiment_a&amp;queryID=51bcb65ff605e392abde9ced516b66fa&amp;position=1">https://www.edx.org/course/circuits-and-electronics-1-basic-circuit-analysis-2?index=product_value_experiment_a&amp;queryID=51bcb65ff605e392abde9ced516b66fa&amp;position=1</a></li> <li>3. <a href="https://nptel.ac.in/courses/108108076/1">https://nptel.ac.in/courses/108108076/1</a></li> <li>4. <a href="https://nptel.ac.in/courses/108102146/">https://nptel.ac.in/courses/108102146/</a></li> <li>5. <a href="https://nptel.ac.in/courses/108108076/35">https://nptel.ac.in/courses/108108076/35</a></li> </ol>		



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## COMPUTER AIDED ENGINEERING GRAPHICS

### I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
ME108ES	B. Tech	1	0	4	3	40	60	100

#### COURSEOBJECTIVES

To learn

1. To develop the ability of visualization of different objects through technical drawings
2. To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products

#### COURSEOUTCOMES

Upon successful completion of the course, the student is able to

1. Apply computer aided drafting tools to create 2D and 3D objects
2. Sketch conics and different types of solids
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpret engineering drawings
5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

<b>UNIT-I</b>	<b>INTRODUCTION TO ENGINEERING GRAPHICS</b>	<b>Classes:15</b>
Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Introduction to Computer aided drafting – views, commands and conics		
<b>UNIT-II</b>	<b>ORTHOGRAPHIC PROJECTIONS</b>	<b>Classes:15</b>
Principles of Orthographic Projections – Conventions – Projections of Points and Lines Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections – points, lines and planes		
<b>UNIT-III</b>	<b>PROJECTIONS OF REGULAR SOLIDS</b>	<b>Classes:15</b>
Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views, Computer aided projections of solids – sectional views		
<b>UNIT-IV</b>	<b>DEVELOPMENT OF SURFACES OF RIGHT REGULAR SOLIDS</b>	<b>Classes:15</b>
Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Development of surfaces using computer aided drafting		

UNIT-V	ISOMETRIC PROJECTIONS	Classes:10
<p>Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa –Conventions. Conversion of orthographic projection into isometric view using computer aided drafting.</p>		
<p><b>TEXT BOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. Engineering Drawing N.D. Bhatt / Charotar</li> <li>2. Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S.Chand and company Ltd.</li> </ol>		
<p><b>REFERENCE BOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. Dr.D.V.Sreekanth, Dr.M.BhojendraNaik and S.Amith Kumar, “Engineering Graphics” Spectrum University Press, First Edition,(2020)</li> <li>2. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill</li> <li>3. Engineering Graphics and Design, WILEY, Edition 2020</li> <li>4. Engineering Drawing, M. B. Shah, B.C. Rane / Pearson.</li> <li>5. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford</li> <li>6. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers</li> </ol>		
<p><b>Note:</b> External examination is conducted in conventional mode and internal evaluation to be done byboth conventional as well as using computer aided drafting.</p>		
<p><b>WEB REFERENCES</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="http://freevideolectures.com/Course/3420/Engineering-Drawing">http://freevideolectures.com/Course/3420/Engineering-Drawing</a></li> <li>2. <a href="https://www.slideshare.net/search/slideshow?searchfrom=header&amp;q=engineering+drawing">https://www.slideshare.net/search/slideshow?searchfrom=header&amp;q=engineering+drawing</a></li> <li>3. <a href="https://www.wiziq.com/tutorials/engineering-drawing">https://www.wiziq.com/tutorials/engineering-drawing</a></li> <li>4. <a href="http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics">http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics</a></li> </ol>		
<p><b>E -TEXTBOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="http://rgpv-ed.blogspot.com/2009/09/development-of-surfaces.html">http://rgpv-ed.blogspot.com/2009/09/development-of-surfaces.html</a></li> <li>2. <a href="http://www.techdrawingtools.com/12/11201.htm">http://www.techdrawingtools.com/12/11201.htm</a></li> </ol>		
<p><b>MOOCS COURSE</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/course.php">https://nptel.ac.in/course.php</a></li> <li>2. <a href="https://swayam.gov.in/explorer">https://swayam.gov.in/explorer</a></li> </ol>		



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## ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING

### I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	Total
EE107ES	B. Tech	0	0	2	1	50	-	50

### COURSE OBJECTIVES

To learn

1. To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
2. To study the transient response of various R, L and C circuits using different excitations.
3. To determine the performance of different types of DC machines and Transformers.

### COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Verify the basic Electrical circuits through different experiments.
2. Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
3. Analyze the transient responses of R, L and C circuits for different input conditions.

### LIST OF EXPERIMENTS/DEMONSTRATIONS

#### PART-A (compulsory)

1. Verification Ohm's Law
2. Verification of KVL and KCL
3. Verification of Thevenin's and Norton's theorem
4. Verification of Superposition theorem
5. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Open Circuit and Short Circuit Tests on 1-phase Transformer

#### PART-B (any two experiments from the given list)

1. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
2. Verification of Reciprocity and Milliman's Theorem.
3. Verification of Maximum Power Transfer Theorem.
4. Determination of form factor for non-sinusoidal waveform
5. Transient Response of Series RL and RC circuits for DC excitation

## TEXTBOOKS

1. D.P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 4<sup>th</sup> Edition, 2019.
2. MS Naidu and S Kamakshiah, “Basic Electrical Engineering”, Tata McGraw Hill, 2<sup>nd</sup> Edition, 2008.

## REFERENCEBOOKS

1. P.Ramana, M.Suryakalavathi, G.T.Chandrashekar, “Basic Electrical Engineering”, S.Chand, 2<sup>nd</sup> Edition, 2019.
2. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009
3. M.S.Sukhija, T.K.Nagsarkar, “Basic Electrical and Electronics Engineering”, Oxford, 1<sup>st</sup> Edition, 2012.
4. Abhijit Chakrabarthy, Sudipta Debnath, Chandan Kumar Chanda, “Basic Electrical Engineering”, 2<sup>nd</sup> Edition, McGraw Hill, 2021.
5. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
6. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
7. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.

## WEB REFERENCES

1. <https://www.electrical4u.com/>
2. <http://www.basicsofelectricalengineering.com/>
3. <https://www.khanacademy.org/science/physics/circuits-topic/circuits>
4. <https://circuitglobe.com/>

## E –TEXT BOOKS

1. [https://menglim498.files.wordpress.com/2013/04/schaum\\_s\\_outlines\\_basic\\_circuit\\_analysis](https://menglim498.files.wordpress.com/2013/04/schaum_s_outlines_basic_circuit_analysis)
2. <https://bookboon.com/en/electrical-electronic-engineering-ebooks>
3. <https://easyengineering.net/basic-electrical-engineering-by-wadhwa/>
4. <https://easyengineering.net/objective-electrical-technology-by-mehta>

## MOOCS COURSE

1. <https://www.courses.com/electrical-engineering>
2. [https://www.edx.org/course/circuits-and-electronics-1-basic-circuit-analysis-2?index=product\\_value\\_experiment\\_a&queryID=51bcb65ff605e392abde9ced516b66fa&position=1](https://www.edx.org/course/circuits-and-electronics-1-basic-circuit-analysis-2?index=product_value_experiment_a&queryID=51bcb65ff605e392abde9ced516b66fa&position=1)
3. <https://nptel.ac.in/courses/108108076/1>
4. <https://nptel.ac.in/courses/108102146/>
5. <https://nptel.ac.in/courses/108108076/35>



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## ENGINEERING CHEMISTRY LABORATORY

### I B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
CH104BS	B. Tech	0	0	2	1	40	60	100

### COURSE OBJECTIVES

To learn

1. Estimation of hardness of water to check its suitability for drinking purpose.
2. Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
3. Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
4. Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

### COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
2. Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
3. Students are able to prepare polymers like bakelite and nylon-6.
4. Estimations saponification value, surface tension and viscosity of lubricant oils.

### LIST OF EXPERIMENTS

**I. Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.

**II. Conductometry:** Estimation of the concentration of an acid by Conductometry.

**III. Potentiometry:** Estimation of the amount of  $\text{Fe}^{+2}$  by Potentiometry.

**IV. pH Metry:** Determination of an acid concentration using pH meter.

**V. Preparations:**

1. Preparation of Bakelite.
2. Preparation Nylon – 6.

**VI. Lubricants:**

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

**VII. Corrosion:** Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

**VIII. Virtual lab experiments**

1. Construction of Fuel cell and its working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.



### **TEXT BOOKS**

1. Senior practical physical chemistry, B. D. Khosla, A. Gulati and V. Garg (R. Chand and Co., Delhi)
2. An introduction to practical; chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, New Delhi)
3. Vogel's text book of practical organic chemistry, 5<sup>th</sup> edition

### **REFERENCE BOOKS**

1. S.Hemambika, V.Rajasekhar Reddy, "Engineering Chemistry Lab", Spectrum Publications., Hyderabad, 1<sup>st</sup> Edition (2020)
2. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
3. Vogel's text book of practical organic chemistry 5th edition
4. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
5. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

### **WEB REFERENCES**

1. [https://www.academia.edu/39911915/Engineering\\_Chemistry\\_Laboratory\\_Manual\\_and\\_Observation\\_Subject\\_Code\\_18CHEL16\\_26](https://www.academia.edu/39911915/Engineering_Chemistry_Laboratory_Manual_and_Observation_Subject_Code_18CHEL16_26)
2. <https://www.vlab.co.in/broad-area-chemical-engineering>

### **E -TEXT BOOKS**

1. <https://www.pdfdrive.com/engineering-chemistry-lab-manual-e51801253.html>
2. <https://www.pdfdrive.com/engineering-chemistry-lab-manual-autonomous-2015-16-e37927940.html>

### **MOOCS COURSE**

1. <https://www.coursera.org/browse/physical-science-and-engineering/chemistry>
2. <https://libguides.mines.edu/chem/online-course-resources>
3. <https://ecampus.oregonstate.edu/online-degrees/undergraduate/online-chemistry-lab-course/>



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## C PROGRAMMING AND DATA STRUCTURES LABORATORY

### I B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
CS103ES	B. Tech	0	0	2	1	40	60	100

#### COURSE OBJECTIVES:

To train students

1. To work with an IDE to create, edit, compile, run and debug programs
2. To analyze the various steps in program development.
3. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
4. To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
5. To write programs using the Dynamic Memory Allocation concept.
6. To create, read from and write to text and binary files

#### COURSE OUTCOMES:

Upon successful completion of the course, student will be able to

1. formulate the algorithms for simple problems
2. translate given algorithms to a working and correct program
3. correct syntax errors as reported by the compilers
4. identify and correct logical errors encountered during execution
5. represent and manipulate data with arrays, strings and structures
6. use pointers of different types
7. create, read and write to and from simple text and binary files
8. modularize the code with functions so that they can be reused

#### LIST OF EXPERIMENTS:

##### Practice sessions:

- a. Write a simple program that prints the results of all the operators available in C (including pre/post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
- b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

##### Simple numeric problems:

- a. Write a program for finding the max and min from the three numbers.
- b. Write the program for the simple, compound interest.
- c. Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
- d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
- e.  $5 \times 1 = 5$

- f.  $5 \times 2 = 10$
- g.  $5 \times 3 = 15$
- h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

### Expression Evaluation:

- a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula  $s = ut + \frac{1}{2}at^2$  where  $u$  and  $a$  are the initial velocity in m/sec ( $= 0$ ) and acceleration in  $\text{m/sec}^2$  ( $= 9.8 \text{ m/s}^2$ )).
- b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators  $+$ ,  $-$ ,  $*$ ,  $/$ ,  $\%$  and use Switch Statement)
- c. Write a program that finds if a given number is a prime number
- d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
- e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first  $n$  terms of the sequence.
- f. Write a C program to generate all the prime numbers between 1 and  $n$ , where  $n$  is a value supplied by the user.
- g. Write a C program to find the roots of a Quadratic equation.
- h. Write a C program to calculate the following, where  $x$  is a fractional value. i.  $1 - x/2 + x^2/4 - x^3/6$
- j. Write a C program to read in two numbers,  $x$  and  $n$ , and then compute the sum of this geometric progression:  $1 + x + x^2 + x^3 + \dots + x^n$ . For example: if  $n$  is 3 and  $x$  is 5, then the program computes  $1 + 5 + 25 + 125$ .

### Arrays, Pointers and Functions:

- a. Write a C program to find the minimum, maximum and average in an array of integers.
- b. Write a function to compute mean, variance, Standard Deviation, sorting of  $n$  elements in a single dimension array.
- c. Write a C program that uses functions to perform the following:
- d. Addition of Two Matrices
- e. Multiplication of Two Matrices
- f. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be the same.
- g. Write C programs that use both recursive and non-recursive functions
- h. To find the factorial of a given integer.
- i. To find the GCD (greatest common divisor) of two given integers.
- j. To find  $x^n$
- k. Write a program for reading elements using a pointer into an array and display the values using the array.
- l. Write a program for display values reverse order from an array using a pointer.
- m. Write a program through a pointer variable to sum of  $n$  elements from an array.

### Files:

- a. Write a C program to display the contents of a file to standard output device.
- b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
- c. Write a C program to count the number of times a character occurs in a text file. The file

name and the character are supplied as command line arguments.

- d. Write a C program that does the following:  
It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function)  
Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)  
The program should then read all 10 values and print them back.
- e. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

### Strings:

- a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
- b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
- c. Write a C program that uses functions to perform the following operations:
- d. To insert a sub-string into a given main string from a given position.
- e. To delete n Characters from a given position in a given string.
- f. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
- g. Write a C program that displays the position of a character ch in the string S or - 1 if S doesn't contain ch.
- h. Write a C program to count the lines, words and characters in a given text.

### Miscellaneous:

- a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

- b. Write a C program to construct a pyramid of numbers as follows:

```
1           *           1           1           *
1 2        * *        2 3         2 2         * *
1 2 3      * * *      4 5 6       3 3 3       * *
                                     *
                                     * *
                                     4 4 4 4   * *
                                     *
```

### Sorting and Searching:

- a. Write a C program that uses non recursive function to search for a Key value in a given
- b. list of integers using linear search method.
- c. Write a C program that uses non recursive function to search for a Key value in a given
- d. sorted list of integers using binary search method.
- e. Write a C program that implements the Bubble sort method to sort a given list of
- f. integers in ascending order.
- g. Write a C program that sorts the given array of integers using selection sort in descending order
- h. Write a C program that sorts the given array of integers using insertion sort in ascending order
- i. Write a C program that sorts a given array of names

### **TEXTBOOKS:**

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)

### **REFERENCE BOOKS:**

1. D.Krishna and S.Mallibabu, "Programming for Problem Solving Lab Record", Spectrum Publications, 1 st Edition (2020).
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI
3. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
4. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
5. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
7. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
8. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

### **WEB REFERENCES**

1. <https://www.tutorialspoint.com/cprogramming/>
2. <https://www.tutorialspoint.com/cplusplus/>
3. <https://www.cprogramming.com/tutorial/c-tutorial.html>

### **E -TEXTBOOKS**

1. <https://www.amazon.com/Problem-Solving-Program-Design-7th/dp/0132936496>
2. <https://www.goodreads.com/book/show/36011306-c-programming-data-structures-for-intu-with-cd>

### **MOOCSCOURSE**

1. [nptel.ac.in/courses/106105085/4](https://nptel.ac.in/courses/106105085/4)
2. <https://www.quora.com/Are-IIT-NPTEL-videos-good-to-learn-basic-C-programming>



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## ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

I B. TECH - II SEMESTER (R 22)								
Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
MA201BS	B. Tech	3	1	0	4	40	60	100
<p><b>COURSE OBJECTIVES</b></p> <p>To learn</p> <ol style="list-style-type: none"> <li>1.Methods of solving the differential equations of first and higher order.</li> <li>2.Concept, properties of Laplace transforms</li> <li>3. Solving ordinary differential equations using Laplace transforms techniques.</li> <li>4. The physical quantities involved in engineering field related to vector valued functions</li> <li>5.The basic properties of vector valued functions and their applications to line, surface and volume integrals</li> </ol> <p><b>COURSE OUTCOMES</b></p> <p>Upon successful completion of the course, the student is able to</p> <ol style="list-style-type: none"> <li>1. Identify whether the given differential equation of first order is exact or not</li> <li>2. Solve higher differential equation and apply the concept of differential equation to real world problems.</li> <li>3. Use the Laplace transforms techniques for solving ODE's.</li> <li>4. Evaluate the line, surface and volume integrals and converting them from one to another</li> </ol>								
<b>UNIT-I</b>	<b>FIRST ORDER ODE</b>					<b>Classes:10</b>		
Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates). Applications: Newton's law of cooling, Law of natural growth and decay.								
<b>UNIT-II</b>	<b>ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER</b>					<b>Classes: 10</b>		
Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type $e^{ax}$ , $\sin ax$ , $\cos ax$ , polynomials in $x$ , $e^{ax}V(x)$ and $x V(x)$ , method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation. Applications: Electric Circuits								

<b>UNIT-III</b>	<b>LAPLACE TRANSFORMS</b>	<b>Classes:10</b>
Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.		
<b>UNIT-IV</b>	<b>VECTOR DIFFERENTIATION</b>	<b>Classes: 10</b>
Vector point functions and scalar point functions, Gradient, Divergence and Curl, Directional derivatives, Tangent plane and normal line, Vector Identities, Scalar potential functions, Solenoidal and Irrotational vectors.		
<b>UNIT-V</b>	<b>VECTOR INTEGRATION</b>	<b>Classes: 10</b>
Line, Surface and Volume Integrals, Theorems of Green, Gauss and Stokes (without proofs) and their applications.		
<b>TEXT BOOKS</b>		
<p>B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 50<sup>th</sup> Edition, 2010.  1. P. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.</p>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr. D. Ranadheer Reddy, Mr. K Upender Reddy &amp; Mr. G Chandra Mohan, A First Course in Linear Algebra and Calculus for Engineers, M/s Students Helpline Publishing House.</li> <li>2. Pvt. Ltd, First Edition-2020. Dr. D. Ranadheer Reddy, Dr. S. Someshwar &amp; Mrs. M. Jhansi Lakshmi, Advanced Calculus for Engineers, M/s Students Helpline Publishing House Pvt. Ltd, First Edition-2020.</li> <li>3. Erwin Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, John Wiley &amp; Sons, 2006.</li> <li>4. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9<sup>th</sup> Edition, Pearson, Reprint, 2002.</li> <li>5. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.</li> <li>6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.efunda.com/math/gamma/index.cfm">https://www.efunda.com/math/gamma/index.cfm</a></li> <li>2. <a href="https://www.mathworld.wolfram.com/">https://www.mathworld.wolfram.com/</a></li> <li>3. <a href="https://www.efunda.com/math/laplace_transform/index.cfm?search_string=laplace%20transforms">https://www.efunda.com/math/laplace_transform/index.cfm?search_string=laplace%20transforms</a></li> </ol>		
<b>E -TEXT BOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.e-booksdirectory.com/listing.php?category=4">https://www.e-booksdirectory.com/listing.php?category=4</a></li> <li>2. <a href="https://www.e-booksdirectory.com/details.php?ebook=10830">https://www.e-booksdirectory.com/details.php?ebook=10830</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://archive.nptel.ac.in/content/storage2/courses/122104018/node69.html">https://archive.nptel.ac.in/content/storage2/courses/122104018/node69.html</a></li> <li>2. <a href="https://archive.nptel.ac.in/courses/111/106/111106139/">https://archive.nptel.ac.in/courses/111/106/111106139/</a></li> <li>3. <a href="https://onlinecourses.nptel.ac.in/noc22_ma75/preview">https://onlinecourses.nptel.ac.in/noc22_ma75/preview</a></li> </ol>		



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## APPLIED PHYSICS

### I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	Total
AP202BS	B. Tech	3	1	0	4	40	60	100

#### COURSE OBJECTIVES

To learn

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibres.

#### COURSE OUTCOMES

Upon successful completion of the course, the student will be able to

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

<b>UNIT-I</b>	<b>QUANTUM PHYSICS AND SOLIDS</b>	<b>Classes: 12</b>
<p>Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function – time independent Schrodinger wave equation - particle in one dimensional potential box.</p> <p>Solids: Symmetry in solids, free electron theory (Drude &amp; Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron- origin of energy bands- classification of solids.</p>		
<b>UNIT-II</b>	<b>SEMICONDUCTORS AND DEVICES</b>	<b>Classes: 12</b>
<p>Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.</p>		



<b>UNIT-III</b>	<b>DIELECTRIC, MAGNETIC AND ENERGY MATERIALS</b>	<b>Classes: 12</b>
<p>Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.</p> <p>Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magneto resistance - applications - bubble memory devices, magnetic field sensors and multiferroics. Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.</p>		
<b>UNIT-IV</b>	<b>NANOTECHNOLOGY</b>	<b>Classes: 12</b>
<p>Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods – top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM &amp; TEM - applications of nonmaterial's.</p>		
<b>UNIT-V</b>	<b>LASER AND FIBER OPTICS</b>	<b>Classes: 12</b>
<p>Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations- lasing action - pumping methods- ruby laser, He-Ne laser , CO2 laser, Argon ion Laser, Nd:YAG laser- semiconductor laser-applications of laser.</p> <p>Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection- construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers- losses in optical fiber - optical fiber for communication system - applications.</p>		
<b>TEXT BOOKS</b>		
<ol style="list-style-type: none"> <li>1. M. N. Avadhanulu, P.G. Kshirsagar &amp; TVS Arun Murthy” A Text book of Engineering Physics”- S. Chand Publications, 11<sup>th</sup> Edition 2019.</li> <li>2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019</li> <li>3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4<sup>th</sup> Edition,2021.</li> <li>4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2<sup>nd</sup> Edition,2022.</li> <li>5. Essentials of Nanoscience &amp; Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1<sup>st</sup> Edition, 2021.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr. K. Venkanna and Dr. P. NageswarRao, Applied Physics, Seven Hills International Publishers, 2021.</li> <li>2. Quantum Physics, H.C. Verma, TBS Publication, 2<sup>nd</sup> Edition 2012.</li> <li>3. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &amp; Sons, 11<sup>th</sup> Edition, 2018.</li> <li>4. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.</li> <li>5. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.</li> <li>6. A.K. Bhandhopadhyaya - Nano Materials, New Age International, 1<sup>st</sup> Edition, 2007.</li> <li>7. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor &amp; Francis Group</li> <li>8. Energy Materials, Taylor &amp; Francis Group, 1<sup>st</sup> Edition, 2022.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://ocw.tudelft.nl/courses/solid-state-physics/subjects/3-quantum-theory-of-solids/">https://ocw.tudelft.nl/courses/solid-state-physics/subjects/3-quantum-theory-of-solids/</a></li> <li>2. <a href="https://byjus.com/physics/semiconductor-devices/">https://byjus.com/physics/semiconductor-devices/</a></li> <li>3. <a href="https://www.nano.gov/nanotech-101/what/definition">https://www.nano.gov/nanotech-101/what/definition</a></li> <li>4. <a href="https://www.studocu.com/in/document/delhi-technological-university/engineering-physics/fiber-optics-laser-notes/26618092">https://www.studocu.com/in/document/delhi-technological-university/engineering-physics/fiber-optics-laser-notes/26618092</a></li> </ol>		
<b>E -TEXT BOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.pdfdrive.com/physics-for-scientists-engineers-modern-physics-9th-ed-e51722698.html">https://www.pdfdrive.com/physics-for-scientists-engineers-modern-physics-9th-ed-e51722698.html</a></li> <li>2. <a href="https://www.pdfdrive.com/physics-for-scientists-engineers-modern-physics-9th-ed-e43567270.html">https://www.pdfdrive.com/physics-for-scientists-engineers-modern-physics-9th-ed-e43567270.html</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. Swayam: <a href="https://swayam.gov.in/nd1_noc19_ph13/preview">https://swayam.gov.in/nd1_noc19_ph13/preview</a></li> <li>2. Alison: <a href="https://alison.com/courses?&amp;category=physics">https://alison.com/courses?&amp;category=physics</a></li> </ol>		



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## ENGINEERING WORKSHOP

### I.B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	Total
ME207ES	B. Tech	0	1	3	2.5	40	60	100

### COURSE OBJECTIVES

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipment and machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed to lances.

### COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

### 1. TRADES FOR EXERCISES:

**At least two exercises from each trade:**

- I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
- II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
- III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
- IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
- V. Welding Practice – (Arc Welding & Gas Welding)
- VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
- VII. Black Smithy – (Round to Square, Fan Hook and S-Hook)

## **2. TRADES FOR DEMONSTRATION & EXPOSURE**

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working

### **TEXT BOOKS**

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

### **REFERENCE BOOKS**

1. Work shop Manual - R.HanumaNaik/R.SuvaranaBabu/Sun Techno Publications
2. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
3. Workshop Manual / Venkat Reddy/ BSP

### **WEB REFERENCES**

1. <https://nptel.ac.in/courses/112105126/>
2. <https://nptel.ac.in/downloads/112105127/>
3. <https://nptel.ac.in/courses/112107145/>
4. <https://nptel.ac.in/courses/122104015/>

### **E -TEXT BOOKS**

1. <http://103.135.169.82:81/fdScript/RootOfEBooks/MED/IntroductionWorkshop%20Technology>
2. <https://www.quora.com/Download-free-mechanical-engineering-ebooks-sites>

### **MOOCS COURSE**

1. [http://www.nits.ac.in/workshops/Workshop\\_on\\_MOOCS\\_26082017.pdf](http://www.nits.ac.in/workshops/Workshop_on_MOOCS_26082017.pdf)
2. <https://www.nitttrc.ac.in/swayam/index.html>



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## ENGLISH FOR SKILL ENHANCEMENT

### I B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EN204HS	B. Tech	2	0	0	2	40	60	100

#### COURSE OBJECTIVES

To learn

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

#### COURSE OUTCOMES

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

#### UNIT-I

Chapter entitled '*Toasted English*' by R.K.Narayan from "*English: Language, Context and Culture*" published by Orient BlackSwan, Hyderabad.

**Classes: 10**

**Vocabulary:** The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

**Grammar:** Identifying Common Errors in Writing with Reference to Articles and Prepositions.

**Reading:** Reading and Its Importance- Techniques for Effective Reading.

**Writing:** Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence- Organizing Principles of Paragraphs in Documents.

#### UNIT-II

Chapter entitled '*Appro JRD*' by Sudha Murthy from "*English: Language, Context and Culture*" published by Orient BlackSwan, Hyderabad.

**Classes:10**

**Vocabulary:** Words Often Misspelt - Homophones, Homonyms and Homographs

**Grammar:** Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

**Reading:** Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

**Writing:** Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

<b>UNIT-III</b>	Chapter entitled ' <b>Lessons from Online Learning</b> ' by F.Haider Alvi, Deborah Hurst et al from " <b>English: Language, Context and Culture</b> " published by Orient BlackSwan, Hyderabad.	<b>Classes:10</b>
<p><b>Grammar:</b> Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.</p> <p><b>Reading:</b> Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.</p> <p><b>Writing:</b> Format of a Formal Letter-Writing Formal Letters eg., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.</p>		
<b>UNIT-IV</b>	Chapter entitled ' <b>Art and Literature</b> ' by <b>Abdul Kalam</b> from " <b>English: Language, Context and Culture</b> " published by Orient BlackSwan, Hyderabad.	<b>Classes: 10</b>
<p><b>Vocabulary:</b> Standard Abbreviations in English</p> <p><b>Grammar:</b> Redundancies and Clichés in Oral and Written Communication.</p> <p><b>Reading:</b> Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice</p> <p><b>Writing:</b> Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.</p>		
<b>UNIT-V</b>	Chapter entitled ' <b>Go, Kiss the World</b> ' by <b>Subroto Bagehi</b> from " <b>English: Language, Context and Culture</b> " published by Orient BlackSwan, Hyderabad.	<b>Classes: 10</b>
<p><b>Vocabulary:</b> Technical Vocabulary and their Usage</p> <p><b>Grammar:</b> Common Errors in English (<i>Covering all the other aspects of grammar which were not covered in the previous units</i>)</p> <p><b>Reading:</b> Reading Comprehension-Exercises for Practice</p> <p><b>Writing:</b> Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.</p>		
<p><b>Note:</b> <i>Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.</i></p> <ul style="list-style-type: none"> <li>➤ <b>Note: 1.</b> As the syllabus of English given in AICTE Model Curriculum-2018 for B.Tech First Year is <b>Open-ended</b>, besides following the prescribed textbook, it is required to prepare teaching/learning materials <b>by the teachers collectively</b> in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.</li> <li>➤ <b>Note: 2.</b> Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents. They are advised to teach 40 percent of each topic from the syllabus in blended mode.</li> </ul>		

## **TEXT BOOKS**

1 “English: Language, Context and Culture” by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

## **REFERENCE BOOKS**

1. Mr. G. Laxmikanth, Dr. Ramchandra Kumar R, and Mr. Ch. Bhaskara Rao, Professional English, Sun Techno Publications, 1 st Edition, 2020.
2. Effective Academic Writing by Liss and Davis (OUP)
3. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
4. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
5. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2<sup>nd</sup> ed.,). Sage Publications India Pvt. Ltd.
6. (2019). Technical Communication. Wiley India Pvt. Ltd.
7. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
8. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

## **WEB REFERENCES**

1. [www.edufind.com](http://www.edufind.com)
2. [www.myenglishpages.com](http://www.myenglishpages.com)
3. <http://grammar.ccc.comment.edu>
4. <http://owl.english.purdue.edu>

## **E -TEXT BOOKS**

1. <http://bookboon.com/en/communication-ebooks-zip>
2. <http://learningenglishvocabularygrammar.com/files/idiomsandphraseswithmeaningsandexamplespdf.pdf>

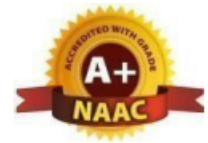
## **MOOCS Course**

1. <https://mooc.com/courses/grammar-guru-1>
2. <https://mooc.com/courses/learning-styles>



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## ELECTRICAL CIRCUIT ANALYSIS – II

I B. TECH- II SEMESTER (R 22)								
Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE209ES	B. Tech	2	0	0	2	40	60	100
<p><b>COURSE OBJECTIVES</b></p> <p>To learn</p> <ol style="list-style-type: none"> <li>To study the transient analysis of various R, L and C circuits for different inputs</li> <li>To understand the Fourier series and Laplace transformation.</li> <li>To learn about two-port networks and concept of filters</li> </ol> <p><b>COURSE OUTCOMES</b></p> <ol style="list-style-type: none"> <li>Observe the response of various R, L and C circuits for different excitations.</li> <li>Examine the behavior of circuits using Fourier, Laplace transforms and transfer function of single port network.</li> <li>Obtain two port network parameters and applications and design of various filters.</li> </ol>								
<b>UNIT-I</b>	<b>TRANSIENT ANALYSIS</b>						<b>Classes: 10</b>	
Transient response of R, L & C circuits, Formulation of integral differential equations, Initial conditions, Transient Response of RL, RC and RLC (series and parallel) networks subjected to internal energy, Response to impulse, step, and ramp, exponential and sinusoidal excitations.								
<b>UNIT-II</b>	<b>ELECTRICAL CIRCUIT ANALYSIS USING LAPLACE TRANSFORMS</b>						<b>Classes:10</b>	
Application of Laplace Transforms to RL, RC and RLC (series and parallel) Networks for impulse, step, and ramp, exponential and sinusoidal excitations.								
<b>UNIT-III</b>	<b>TWO PORT NETWORK PARAMETERS</b>						<b>Classes:10</b>	
Open circuit impedance, short-circuit admittance, Transmission, Hybrid parameters & inter-relationships, Series, parallel and cascade connection of two port networks, System function, and Impedance and admittance functions.								
<b>UNIT-IV</b>	<b>FOURIER SERIES AND INTEGRAL</b>						<b>Classes:10</b>	
Fourier series representation of periodic functions, Symmetry conditions, Exponential Fourier series, Discrete spectrum, Fourier integral and its properties, Continuous spectrum, Application to simple networks								
<b>UNIT-V</b>	<b>FILTERS</b>						<b>Classes:10</b>	
Classification of filters – Low pass, High pass, Band pass and Band Elimination, Constant-k and M-derived filters-Low pass and High pass Filters and Band pass and Band elimination filters (Elementary treatment only)								

<b>TEXT BOOKS</b>
<ol style="list-style-type: none"> <li>1. Van Valkenburg M.E, “Network Analysis”, Prentice Hall of India, 3<sup>rd</sup> Edition, 2000.</li> <li>2. Ravish R Singh, “Network Analysis and Synthesis”, McGrawHill, 2<sup>nd</sup> Edition, 2019.</li> </ol>
<b>REFERENCE BOOKS</b>
<ol style="list-style-type: none"> <li>1. Dr. N. Ramchandra, T. V. Sai Kalyani, K. V. Govardhan Rao, “Electrical Circuit Analysis”, Sri Krishna Techno Publishers, 2021.</li> <li>2. B. Subramanyam, “Electric Circuit Analysis”, Dreamtech Press &amp; Wiley, 2021.</li> <li>3. James W. Nilsson, Susan A. Riedel, “Electric Circuits”, Pearson, 11<sup>th</sup> Edition, 2020.</li> <li>4. A Sudhakar, Shyammohan S Palli, “Circuits and Networks: Analysis and Synthesis”, McGrawHill, 5<sup>th</sup> Edition, 2017.</li> <li>5. Jagan N.C, Lakshrninarayana C., “Network Analysis”, B.S. Publications, 3<sup>rd</sup> Edition, 2014.</li> <li>6. William Hayt H, Kimmerly Jack E. and Steven Durbin M, “Engineering Circuit Analysis”, McGrawHill, 6<sup>th</sup> Edition, 2002.</li> <li>7. Chakravarthy A., “Circuit Theory”, Dhanpat Rai &amp; Co., First Edition, 1999.</li> </ol>
<b>WEB REFERENCES</b>
<ol style="list-style-type: none"> <li>1. <a href="https://books.google.co.in/books/about/Electric_Circuit_Analysis.html?id=nzIKPgAACA&amp;redir_esc=y">https://books.google.co.in/books/about/Electric_Circuit_Analysis.html?id=nzIKPgAACA&amp;redir_esc=y</a></li> <li>2. <a href="https://books.google.co.in/books/about/Electric_Circuits.html?id=SAUoAQAAMAAJ&amp;redir_esc=y">https://books.google.co.in/books/about/Electric_Circuits.html?id=SAUoAQAAMAAJ&amp;redir_esc=y</a></li> <li>3. <a href="https://books.google.co.in/books/about/Circuits_and_Networks_Analysis_and_Synth.html?id=JW5wCgAAQBAJ&amp;redir_esc=y">https://books.google.co.in/books/about/Circuits_and_Networks_Analysis_and_Synth.html?id=JW5wCgAAQBAJ&amp;redir_esc=y</a></li> <li>4. <a href="https://www.bookshopofindia.com/search.asp?action1=default&amp;bookid=9140917">https://www.bookshopofindia.com/search.asp?action1=default&amp;bookid=9140917</a></li> </ol>
<b>E -TEXT BOOKS</b>
<ol style="list-style-type: none"> <li>1. <a href="https://scholar.google.co.in/scholar?hl=en&amp;as_sdt=0%2C5&amp;as_vis=1&amp;q=network+analysis+van+valkenburg&amp;og=%E2%80%9CNetwork+Analysis+V">https://scholar.google.co.in/scholar?hl=en&amp;as_sdt=0%2C5&amp;as_vis=1&amp;q=network+analysis+van+valkenburg&amp;og=%E2%80%9CNetwork+Analysis+V</a></li> <li>2. <a href="https://bookboon.com/en/electrical-electronic-engineering-ebooks">https://bookboon.com/en/electrical-electronic-engineering-ebooks</a></li> <li>3. <a href="https://scholar.google.co.in/scholar?q=Network+Analysis+and+Synthesis&amp;hl=en&amp;as_sdt=0&amp;as_vis=1&amp;oi=scholar">https://scholar.google.co.in/scholar?q=Network+Analysis+and+Synthesis&amp;hl=en&amp;as_sdt=0&amp;as_vis=1&amp;oi=scholar</a></li> </ol>
<b>MOOCS COURSE</b>
<ol style="list-style-type: none"> <li>1. <a href="https://www.courses.com/indian-institute-of-technology-delhi/circuit-theory">https://www.courses.com/indian-institute-of-technology-delhi/circuit-theory</a></li> <li>2. <a href="https://www.edx.org/xseries/mitx-circuits-and-electronics">https://www.edx.org/xseries/mitx-circuits-and-electronics</a></li> </ol>





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## APPLIED PHYSICS LABORATORY

### I.B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
AP203BS	B. Tech	0	0	3	1.5	40	60	100

### COURSE OBJECTIVES

1. Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

### COURSE OUTCOMES

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

1. Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

### LIST OF EXPERIMENTS

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode
5. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)  
b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam  
b) Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
12. Understanding the method of least squares – torsional pendulum as an example.

**NOTE:** Any 8 experiments are to be performed

<b>TEXT BOOKS</b>
<ol style="list-style-type: none"> <li>1. B.K. Pandey, S. Chaturvedi, Engineering Physics, Cengage Learning.</li> <li>2. Halliday and Resnick, Physics, Wiley.</li> <li>3. Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar, A Textbook of Engineering Physics, S. Chand Publishers.</li> </ol>
<b>REFERENCE BOOKS</b>
<ol style="list-style-type: none"> <li>1. Dr. K. Venkanna and T. Vamshi Prasad, Applied pPhysics Lab Book, Spectrum Publishers, 2021.</li> <li>2. S. Balasubramanian, M.N. Srinivasan “A Text book of Practical Physics”- S Chand Publishers,2017.</li> </ol>
<b>WEB REFERENCES</b>
<ol style="list-style-type: none"> <li>1. Fundamental concepts of semi conductors: <a href="https://nptel.ac.in/courses/115102025/">https://nptel.ac.in/courses/115102025/</a></li> <li>2. Semi conductor Optoelectronics: <a href="https://nptel.ac.in/courses/115102103/">https://nptel.ac.in/courses/115102103/</a></li> </ol>
<b>E -TEXT BOOKS</b>
<ol style="list-style-type: none"> <li>1. <a href="http://www.lehman.edu/faculty/kabat/F2019-166168.pdf">http://www.lehman.edu/faculty/kabat/F2019-166168.pdf</a></li> <li>2. <a href="https://www.scribd.com/doc/143091652/ENGINEERING-PHYSICS-LAB-MANUAL">https://www.scribd.com/doc/143091652/ENGINEERING-PHYSICS-LAB-MANUAL</a></li> </ol>
<b>MOOCS COURSE</b>
<ol style="list-style-type: none"> <li>1. Swayam: <a href="https://swayam.gov.in/nd1_noc19_ph13/preview">https://swayam.gov.in/nd1_noc19_ph13/preview</a></li> <li>2. Alison: <a href="https://alison.com/courses?&amp;category=physics">https://alison.com/courses?&amp;category=physics</a></li> </ol>



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## ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

### I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits		Maximum Marks		
		L	T	P	C	CIE	SEE	Total	
EN205HS	B. Tech	0	0	2	1	40	60	100	

### COURSE OBJECTIVES

To learn

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize the impact of dialects.
5. To train students to use language appropriately for public speaking, group discussions and interviews

### COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand the nuances of English language through audio-visual experience and group activities
2. Neutralise their accent for intelligibility
3. Speak with clarity and confidence which in turn enhances their employability skills

**Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:**

- a. Computer Assisted Language Learning (CALL) Lab
- b. Interactive Communication Skills (ICS) Lab

### LISTENING SKILLS

Objectives

1. To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

## **SPEAKING SKILLS:**

- Objectives
  1. To involve students in speaking activities in various contexts
  2. To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities
- Just A Minute (JAM) Sessions

### **The following course content is prescribed for the English Language and Communication Skills Lab.**

#### **Exercise – I**

##### **CALL Lab:**

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker- Testing Exercises

##### **ICS Lab:**

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

##### **Exercise – II CALL Lab:**

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - Testing Exercises

##### **ICS Lab:**

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role Play- Expressions in Various Situations – Making Requests and Seeking Permissions - Telephone Etiquette.

##### **Exercise - III CALL Lab:**

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -Testing Exercises

##### **ICS Lab:**

Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

##### **Exercise – IV CALL Lab:**

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - Testing Exercises

##### **ICS Lab:**

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

##### **Exercise – V CALL Lab:**

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -Testing Exercises

##### **ICS Lab:**

Understand: Group Discussion

Practice: Group Discussion

## Minimum Requirement of infrastructural facilities for ELCS Lab

### 1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self-study by students.

#### System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

- i) Computers with Suitable Configuration
- ii) High Fidelity Headphones

### 2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- Exercises in Spoken English. Part 1,2,3. CIEFL and Oxford University Press

**Note:** Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

#### Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10<sup>th</sup> Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

## REFERENCE BOOKS

1. (2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). Communication Skills: A Workbook. Oxford University Press
4. Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). English Language Skills: A Practical Approach. Cambridge University Press

**WEB REFERENCES**

1. <https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935321&section=References>
2. <https://www.englishlab.co.in/blog/types-of-communication-skills-lab-english-language-lab/>

**E -TEXT BOOKS**

1. <https://www.pdfdrive.com/basic-english-grammar-for-english-language-learners-basic-english-grammar-for-english-language-learners-e158730664.html>
2. <https://www.pdfdrive.com/english-language-communication-skills-e53852464.html>

**MOOCS COURSE**

1. <https://www.coursera.org/specializations/improve-english>
2. <https://www.edx.org/professional-certificate/upvalenciax-upper-intermediate-english>

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## APPLIED PYTHON PROGRAMMING LABORATORY

### I B. TECH- II SEMESTER (R 22)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
CS208ES	B. Tech	0	1	2	2	40	60	100

### COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. Build basic programs using fundamental programming constructs
2. Write and execute python codes for different applications
3. Capable to implement on hardware boards

### LIST OF EXPERIMENTS

#### Cycle - 1

1. Downloading and Installing Python and Modules
  - a) Python 3 on Linux  
Follow the instructions given in the URL <https://docs.python-guide.org/starting/install3/linux/>
  - b) Python 3 on Windows  
Follow the instructions given in the URL <https://docs.python.org/3/using/windows.html> (Please remember that Windows installation of Python is harder!)
  - c) pip3 on Windows and Linux  
Install the Python package installer by following the instructions given in the URL <https://www.activestate.com/resources/quick-reads/how-to-install-and-use-pip3/>
  - d) Installing numpy and scipy  
You can install any python3 package using the command `pip3 install <packagename>`
  - e) Installing jupyterlab  
Install from pip using the command `pip install jupyterlab`
2. Introduction to Python3
  - a) Printing your biodata on the screen
  - b) Printing all the primes less than a given number
  - c) Finding all the factors of a number and show whether it is a *perfect* number, i.e., the sum of all its factors (excluding the number itself) is equal to the number itself
3. Defining and Using Functions
  - a) Write a function to read data from a file and display it on the screen
  - b) Define a boolean function *is palindrome*(<input>)
  - c) Write a function *collatz(x)* which does the following: if *x* is odd,  $x = 3x + 1$ ; if *x* is even, then  $x = x/2$ . Return the number of steps it takes for  $x = 1$
  - d) Write a function  $N(m, s) = \exp(-(x-m)^2/(2s^2))/\text{sqrt}(2\pi)s$  that

computes the Normal distribution

4. The package numpy
  - a) Creating a matrix of given order  $m \times n$  containing *random numbers* in the range 1 to 999999
  - b) Write a program that adds, subtracts and multiplies two matrices. Provide an interface such that, based on the prompt, the function (addition, subtraction, multiplication) should be performed
  - c) Write a program to solve a system of  $n$  linear equations in  $n$  variables using `matrixinverse`
5. The package scipy and pyplot
  - a) Finding if two sets of data have the same *mean value*
  - b) Plotting data read from a file
  - c) Fitting a function through a set of data points using `polyfit` function
  - d) Plotting a histogram of a given data set
6. The strings package
  - a) Read text from a file and print the number of lines, words and characters
  - b) Read text from a file and return a list of all  $n$  letter words beginning with a vowel
  - c) Finding a secret message hidden in a paragraph of text
  - d) Plot a histogram of words according to their length from text read from a file

## Cycle -2

### 7. Installing OS on Raspberry Pi

- a) Installation using PiImager
- b) Installation using image file
  - Downloading an Image
  - Writing the image to an SD card
  - using Linux
  - using Windows
  - Booting up

Follow the instructions given in the URL <https://www.raspberrypi.com/documentation/computers/getting-started.html>

### 8. Accessing GPIO pins using Python

- a) Installing GPIO Zero library.  
**First, update your repositories list:**  
`sudo apt update`  
**Then install the package for Python 3:**  
`sudo apt install python3-gpiozero`
- b) Blinking an LED connected to one of the GPIO pin
- c) Adjusting the brightness of an LED
- d) Adjust the brightness of an LED (0 to 100, where 100 means maximum brightness) using the in-built PWM wavelength.

### 9. Collecting Sensor Data

- a) DHT Sensor interface
  - Connect the terminals of DHT GPIO pins of Raspberry Pi.
  - Import the DHT library using `import Adafruit_DHT`
  - Read sensor data and display it on screen.



<b>TEXT BOOKS</b>
<ol style="list-style-type: none"> <li>1. Supercharged Python: Take your code to the next level, Overland</li> <li>2. Learning Python, Mark Lutz, O'reilly</li> </ol>
<b>REFERENCE BOOKS</b>
<ol style="list-style-type: none"> <li>1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson</li> <li>2. Python Programming A Modular Approach with Graphics, Database, Mobile, and WebApplications, Sheetal Taneja, Naveen Kumar, Pearson</li> <li>3. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition</li> <li>4. Think Python, Allen Downey, Green Tea Press</li> <li>5. Core Python Programming, W. Chun, Pearson</li> <li>6. Introduction to Python, Kenneth A. Lambert, Cengage</li> </ol>
<b>WEB REFERENCES</b>
<ol style="list-style-type: none"> <li>1. <a href="https://www.tutorialspoint.com/python3/">https://www.tutorialspoint.com/python3/</a></li> <li>2. <a href="https://www.udemy.com/machine-learning-using-r-and-python/">https://www.udemy.com/machine-learning-using-r-and-python/</a></li> <li>3. <a href="https://www.udemy.com/r-programming-language/">https://www.udemy.com/r-programming-language/</a></li> <li>4. <a href="https://www.simpliv.com/itcertification/data-analytics-using-r-programming">https://www.simpliv.com/itcertification/data-analytics-using-r-programming</a></li> <li>5. <a href="https://books.goalkicker.com/PythonBook/">https://books.goalkicker.com/PythonBook/</a></li> </ol>
<b>E -TEXT BOOKS</b>
<ol style="list-style-type: none"> <li>1. <a href="https://www.amazon.in/Advanced-Python-Programming-Brian-Overland/dp/0135159946">https://www.amazon.in/Advanced-Python-Programming-Brian-Overland/dp/0135159946</a></li> <li>2. <a href="https://www.oreilly.com/library/view/learning-python-5th/9781449355722/">https://www.oreilly.com/library/view/learning-python-5th/9781449355722/</a></li> </ol>
<b>MOOCS COURSE</b>
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/106106145">https://nptel.ac.in/courses/106106145</a></li> <li>2. <a href="https://nptel.ac.in/courses/106106182">https://nptel.ac.in/courses/106106182</a></li> </ol>



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## ELECTRICAL CIRCUIT ANALYSIS LABORATORY

### I B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	Total
EE210ES	B. Tech	0	0	2	1	40	60	100

#### COURSE OBJECTIVES

1. To design electrical systems and analyze them by applying various Network Theorems
2. To measure three phase Active and Reactive power.
3. To understand the locus diagrams and concept of resonance.

#### COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. Analyze complex DC and AC linear circuits
2. Apply concepts of electrical circuits across engineering
3. Evaluate response of a given network by using theorems.

#### LIST OF EXPERIMENTS

**The following experiments are required to be conducted as compulsory**

1. To draw the locus Diagrams of RL (R-Varying) and RC (R-Varying) Series Circuits.
2. Verification of Series and Parallel Resonance.
3. Determination of Time response of first order RL and RC circuit for periodic non-sinusoidal inputs – Time Constant and Steady state error.
4. Determination of Two port network parameters – Z & Y parameters.
5. Determination of Two port network parameters – A, B, C, D parameters.
6. Determination of Co-efficient of Coupling and Separation of Self and Mutual inductance in a Coupled Circuits.
7. Frequency domain analysis of Low-pass filters.
8. Frequency domain analysis of Band-pass filters.

**In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted**

1. Harmonic Analysis of non-sinusoidal waveform signals using Harmonic Analyzer and plotting frequency spectrum.
2. Measurement of Active Power for Star and Delta connected balanced loads
3. Measurement of Reactive Power for Star and Delta connected balanced loads.
4. Frequency domain analysis of High-pass filter.
5. Determination of Two port network parameters -Hybrid parameters.
6. To draw the locus Diagrams of RL (L-Varying) and RC (C-Varying) Series Circuits.
7. Determination of Time response of first order RLC circuit for periodic non-sinusoidal inputs – Time Constant and Steady state error.

### **TEXT BOOKS**

1. Van Valkenburg M.E, “Network Analysis”, Prentice Hall of India, 3<sup>rd</sup> Edition, 2000.
2. Ravish R Singh, “Network Analysis and Synthesis”, McGrawHill, 2<sup>nd</sup> Edition, 2019.

### **REFERENCE BOOKS**

1. B. Subramanyam, “Electric Circuit Analysis”, Dreamtech Press & Wiley, 2021.
2. James W.Nilsson, Susan A. Riedel, “Electric Circuits”, Pearson, 11<sup>th</sup> Edition, 2020.
3. A Sudhakar, Shyammohan S Palli, “Circuits and Networks: Analysis and Synthesis”, McGrawHill, 5<sup>th</sup> Edition, 2017.
4. Jagan N.C, Lakshrninarayana C., “Network Analysis”, B.S. Publications, 3<sup>rd</sup> Edition, 2014.
5. William Hayt H, Kimmerly Jack E. and Steven Durbin M, “Engineering Circuit Analysis”, McGrawHill, 6<sup>th</sup> Edition, 2002.
6. Chakravarthy A., “Circuit Theory”, Dhanpat Rai & Co., First Edition, 1999.

### **WEB REFERENCES**

1. [https://books.google.co.in/books/about/Electric Circuit Analysis.html?id=nzIKPgAACAAJ&redir\\_esc=y](https://books.google.co.in/books/about/Electric+Circuit+Analysis.html?id=nzIKPgAACAAJ&redir_esc=y)
2. [https://books.google.co.in/books/about/Electric Circuits.html?id=SAUoAQAAMAAJ&redir\\_esc=y](https://books.google.co.in/books/about/Electric+Circuits.html?id=SAUoAQAAMAAJ&redir_esc=y)
3. [https://books.google.co.in/books/about/Circuits and Networks Analysis and Synth.html?id=JW5wCgAAQBAJ&redir\\_esc=y](https://books.google.co.in/books/about/Circuits+and+Networks+Analysis+and+Synth.html?id=JW5wCgAAQBAJ&redir_esc=y)
4. <https://www.bookshopofindia.com/search.asp?action1=default&bookid=9140917>

### **E -TEXT BOOKS**

1. [https://scholar.google.co.in/scholar?hl=en&as\\_sdt=0%2C5&as\\_vis=1&q=network+analysis+van+valkenburg&oq=%E2%80%9CNetwork+Analysis+V](https://scholar.google.co.in/scholar?hl=en&as_sdt=0%2C5&as_vis=1&q=network+analysis+van+valkenburg&oq=%E2%80%9CNetwork+Analysis+V)
2. <https://bookboon.com/en/electrical-electronic-engineering-ebooks>
3. [https://scholar.google.co.in/scholar?q=Network+Analysis+and+Synthesis&hl=en&as\\_sdt=0&as\\_vis=1&oi=scholart](https://scholar.google.co.in/scholar?q=Network+Analysis+and+Synthesis&hl=en&as_sdt=0&as_vis=1&oi=scholart)

### **MOOCS COURSE**

1. <https://www.courses.com/indian-institute-of-technology-delhi/circuit-theory>
2. <https://www.edx.org/xseries/mitx-circuits-and-electronics>



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## ENVIRONMENTAL SCIENCE

### I B. TECH- II SEMESTER (R 22)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
*CH209MC	B. Tech	3	0	0	0	40	60	100

#### COURSE OBJECTIVES

To learn

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

#### COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

<b>UNIT-I</b>	<b>ECOSYSTEMS</b>	<b>Classes: 10</b>
Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.		
<b>UNIT-II</b>	<b>NATURAL RESOURCES:</b>	<b>Classes:10</b>
<b>Classification Of Resources:</b> Living and Non-Living resources, <b>water resources:</b> use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. <b>Mineral resources:</b> use and exploitation, environmental effects of extracting and using mineral resources, <b>Land resources:</b> Forest resources, <b>Energy resources:</b> growing energy needs renewable and non-renewable energy sources, use of alternate energy source, case studies.		
<b>UNIT-III</b>	<b>BIODIVERSITY AND BIOTIC RESOURCES</b>	<b>Classes:10</b>
Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity consumptive use, productive use, social, ethical, aesthetic and optional values. India as a meg diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In- Situ and Ex-sit conservation. National Biodiversity act.		
<b>UNIT-IV</b>	<b>ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES</b>	<b>Classes: 10</b>
<b>Environmental Pollution:</b> Classification of pollution, <b>Air Pollution:</b> Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. <b>Water pollution:</b> Sources and types of pollution, drinking water quality standards. <b>Soil Pollution</b> Sources and types, Impacts of modern agriculture, degradation of soil. <b>Noise Pollution:</b> Source and Health hazards, standards, <b>Solid waste:</b> Municipal Solid Waste management, composition and characteristics of e-Waste and its management. <b>Pollution control technologies</b> Wastewater Treatment methods: Primary, secondary and Tertiary.		

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

**UNIT-V**

**ENVIRONMENTAL POLICY,  
LEGISLATION & EIA**

**Classes: 10**

Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

**TEXT BOOKS**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

**REFERENCE BOOKS**

1. A. Aditya Prasad, S. Hemambika, A. Rambabu, "Environmental Science", Spectrum Educatiaonal Books, Hyderabad, 1<sup>st</sup> edition (2021).
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHLLearning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHILearning Pvt. Ltd.
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
5. Environmental Studies by Anubha Kaushik, 4<sup>th</sup> Edition, New age international publishers.
6. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
7. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

**WEB REFERENCES**

1. <https://education.nationalgeographic.org/resource/ecosystem>
2. <https://byjus.com/chemistry/natural-resources-pdf/>

**E-TEXT BOOKS**

1. <https://www.pdfdrive.com/biodiversity-inventories-in-high-gear-dna-barcoding-facilitates-a-rapid-biotic-survey-of-a-temperate-d149274581.html>
2. <https://www.pdfdrive.com/pollution-causes-effects-and-control-e159560577.html>

**MOOCS COURSE**

1. <https://nptel.ac.in/courses/120108004>
2. <https://archive.nptel.ac.in/content/storage2/courses/122102006/mod1/Overview%20of%20ecology.htm>



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## NUMERICAL METHODS AND COMPLEX VARIABLES

II B. TECH- I SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
MA301BS	B. Tech	3	1	0	4	40	60	100
<b>COURSE OBJECTIVES</b>								
To learn								
<ol style="list-style-type: none"> <li>Expressing periodic function by Fourier series and a non-periodic function by Fourier transforms</li> <li>Various numerical methods to find roots of polynomial and transcendental equations.</li> <li>Concept of finite differences and to estimate the value for the given data using interpolation.</li> <li>Evaluation of integrals using numerical techniques</li> <li>Solving ordinary differential equations of first order using numerical techniques.</li> <li>Differentiation and integration of complex valued functions.</li> <li>Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.</li> <li>Expansion of complex functions using Taylor's and Laurent's series.</li> </ol>								
<b>UNIT-I</b>	<b>FOURIER SERIES AND FOURIER TRANSFORM</b>					<b>Classes:10</b>		
Fourier series - Dirichlet's Conditions - Half-range Fourier series - Fourier Transforms: Fourier Sine and cosine transforms - Inverse Fourier transforms								
<b>UNIT-II</b>	<b>NUMERICAL METHODS - I</b>					<b>Classes:10</b>		
Solution of polynomial and transcendental equations: Bisection method, Iteration Method, Newton Raphson method and Regula-Falsi method. Jacobi and Gauss-Seidal iteration methods for solving linear systems of equations. Finite differences: forward differences, backward differences, central differences, symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae. Central difference interpolation: Gauss's forward and backward formulae, Lagrange's method of interpolation.								
<b>UNIT-III</b>	<b>NUMERICAL METHODS - II</b>					<b>Classes:8</b>		
Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8th rules. Ordinary differential equations: Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order for first order ODE								
<b>UNIT - IV</b>	<b>COMPLEX DIFFERENTIATION</b>					<b>Classes: 10</b>		
Limit, Continuity and Differentiation of Complex functions. Cauchy-Riemann equations (without proof), Milne- Thomson methods, analytic functions, harmonic functions, finding harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithm) and their properties. (All theorems without Proofs), Conformal mappings, Mobius transformations.								

<b>UNIT-V</b>	<b>COMPLEX INTEGRATION</b>	<b>Classes:13</b>
Line integrals, Cauchy's theorem, Cauchy's Integral formula, zeros of analytic functions, singularities, Taylor's series, Laurent's series, Residues, Cauchy Residue theorem. and their properties. (All theorems without Proofs)		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. Higher Engineering Mathematics By Dr.B.S Grewal, Khanna Publishers.</li> <li>2. S. S. Sastry, Introductory methods of numerical analysis, PHI, 4<sup>th</sup> edition, 2005.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr.P. Santosh Kumar Patra,Dr. D. Ranadheer Reddy, G.Chandra Mohan &amp; Mrs. G.Vanaja, Transformations , Complex variables &amp; Numerical Techniques , M/s SevenHills International Publishers, First Edition-2022.</li> <li>2. M.K.Jain , SRK Iyenger, R.K.Jain ,Numerical methods for Scientific and Engineering Computations, New Age International publishers.</li> <li>3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &amp; Sons, 2006.</li> <li>4. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Edition, Mc-Graw Hill, 2004.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.efunda.com/math/laplace_transform/index.cfm">https://www.efunda.com/math/laplace_transform/index.cfm</a></li> <li>2. <a href="https://www.efunda.com/math/fourier_transform/index.cfm">https://www.efunda.com/math/fourier_transform/index.cfm</a></li> <li>3. <a href="https://www.efunda.com/math/complex_numbers/complex.cfm">https://www.efunda.com/math/complex_numbers/complex.cfm</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.e-booksdirectory.com/details.php?ebook=10602">https://www.e-booksdirectory.com/details.php?ebook=10602</a></li> <li>2. <a href="https://www.e-booksdirectory.com/details.php?ebook=4708">https://www.e-booksdirectory.com/details.php?ebook=4708</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://swayam.gov.in/">https://swayam.gov.in/</a></li> <li>2. <a href="https://swayam.gov.in/NPTEL">https://swayam.gov.in/NPTEL</a></li> </ol>		



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## ELECTRICAL MACHINES - I

II B. TECH- I SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE301PC	B. Tech	3	1	0	4	40	60	100
<b>COURSE OBJECTIVES</b>								
1. To study and understand different types of DC machines and their performance evaluation through various testing methods. 2. To understand the operation of single and ploy-phase Transformers 3. To analyse the performance of transformers through various testing methods.								
<b>UNIT-I</b>	<b>DC GENERATORS</b>						<b>Classes:10</b>	
Principle of operation – Action of commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated armature – E.M.F Equation. Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation. Methods of Excitation – separately excited and self-excited generators – build-up of E.M.F critical field resistance and critical speed - causes for failure to self-excited and remedial measures Load characteristics and applications of shunt, series and compound generators.								
<b>UNIT-II</b>	<b>DC MOTORS</b>						<b>Classes:10</b>	
Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation. Speed control of D.C. Motors - Armature voltage and field flux control methods. Motor starters (3-point and 4- point starters) Testing of D.C. machines - Losses – Constant & Variable losses – calculation of efficiency – condition for maximum efficiency.								
<b>UNIT-III</b>	<b>TESTING OF DC MACHINES</b>						<b>Classes:15</b>	
Methods of Testing – direct, indirect, and regenerative testing – Brake test – Swinburne's test – Hopkinson's test – Field's test - separation of stray losses in a D.C. motor test.								
<b>UNIT – IV</b>	<b>SINGLE PHASE TRANSFORMERS</b>						<b>Classes: 15</b>	
Types - constructional details-minimization of hysteresis and eddy current losses- EMF equation - operation on no load and on load - phasor diagrams and Applications. Equivalent circuit - losses and efficiency – regulation - All day efficiency - effect of variations of frequency & supply voltage on iron losses.								



UNIT-V	TESTING OF TRANSFORMERS AND POLY PHASE TRANSFORMERS	Classes:13
<p>Open Circuit and Short Circuit tests - Sumpner's test - predetermination of efficiency and regulation-separation of losses test parallel operation with equal and unequal voltage ratios - auto transformers-equivalent circuit - comparison with two winding transformers.</p> <p><b>Poly-phase transformers</b> – Poly-phase connections - Y/Y, Y/<math>\Delta</math>, <math>\Delta</math>/Y, <math>\Delta</math>/<math>\Delta</math> and open <math>\Delta</math>, Scott connection and Applications.</p>		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.</li> <li>2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr. N. Ramchandra, CH. Srinivas, V. Bharath Kumar, "Electrical Machines – I", M/s Seven Hills International Publishers, 2022.</li> <li>2. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.</li> <li>3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.</li> <li>4. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.</li> <li>5. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.oreilly.com › library › view › electrical-machines-2nd › 25_ref">https://www.oreilly.com › library › view › electrical-machines-2nd › 25_ref</a></li> <li>2. <a href="https://swayam.gov.in › nd1_noc19_ee602">https://swayam.gov.in › nd1_noc19_ee602</a>.</li> <li>3. <a href="https://www.sanfoundry.com › best-reference-books-advance-electrical-machines">https://www.sanfoundry.com › best-reference-books-advance-electrical-machines</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. Electrical Machines-I By U.A.Bakshi, V.U.Bakshi Technical Publications, 2009 PrintISBN:9783527340224 OnlineISBN:9783527698523  DOI:10.1002/9783527698523</li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/108105017/">https://nptel.ac.in/courses/108105017/</a></li> <li>2. <a href="https://swayam.gov.in/nd1_noc19_ee60/preview">https://swayam.gov.in/nd1_noc19_ee60/preview</a></li> </ol>		



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## POWER SYSTEMS - I

II B. TECH- I SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE302PC	B. Tech	3	0	0	3	40	60	100
<b>COURSE OBJECTIVES</b>								
1. To understand the power generation through conventional and non-conventional sources. 2. To illustrate the economic aspects of power generation and tariff methods. 3. To know about Overhead line insulators, substations and AC & DC distribution systems.								
<b>UNIT-I</b>	<b>GENERATION OF ELECTRIC POWER</b>						<b>Classes:10</b>	
<b>Conventional Sources (Qualitative):</b> Hydro station, Steam Power Plant, Nuclear Power Plant and Gas Turbine Plant. <b>Non-Conventional Sources (Elementary Treatment):</b> Solar Energy, Wind Energy, Fuel Cells, Ocean Energy, Tidal Energy, Wave Energy, Cogeneration, Energy conservation and storage.								
<b>UNIT-II</b>	<b>ECONOMICS OF POWER GENERATION</b>						<b>Classes:10</b>	
Introduction, definitions of connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants. Cost of electrical energy-fixed cost, running cost, Tariff on charge to customer.								
<b>UNIT-III</b>	<b>OVER HEAD TRANSMISSION LINES</b>						<b>Classes:15</b>	
<b>OVER HEAD TRANSMISSION LINES:</b> Line conductors, inductance and capacitance of single phase and three phase lines with symmetrical and unsymmetrical spacing, Composite conductors transposition, bundled conductors, and effect of earth on capacitance, skin and proximity effects. <b>OVERHEAD LINE INSULATORS:</b> Introduction, types of insulators, Potential distribution over a string of suspension insulators, Methods of equalizing the potential, testing of insulators, Sag and tension calculations								
<b>UNIT-IV</b>	<b>SUBSTATIONS</b>						<b>Classes: 15</b>	
<b>AIR INSULATED SUBSTATIONS (AIS):</b> Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams. <b>GAS INSULATED SUBSTATIONS (GIS):</b> Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, bus bar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.								

<b>UNIT-V</b>	<b>DISTRIBUTION NETWORK</b>	<b>Classes:13</b>
<p><b>DC DISTRIBUTION:</b> Classification of Distribution Systems. - Comparison of DC vs. AC and Under- Ground vs. Over- Head Distribution Systems. - Requirements and Design features o Distribution Systems. -Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequa Voltages) and Ring Main Distributor.</p> <p><b>A.C. DISTRIBUTION:</b> Introduction, AC distribution, Single phase, 3-phase, 3 phase 4 wire system, bus bar arrangement, Selection of site for substation. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.</p>		
<p><b>TEXTBOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. C.L. Wadhwa, “Generation, Distribution and Utilization of Electrical Energy”, 2nd Edition, New Age International, 2009.</li> <li>2. V.K Mehta and Rohit Mehta, “Principles of Power Systems”, S. Chand &amp; Company Ltd, New Delhi, 2004.</li> </ol>		
<p><b>REFERENCE BOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. Dr. P. Santosh Kumar Patra, Dr. N. Ramchandra, G. Esha, N. Daniel Manoj, “Power Systems – I”, Amaravathi Publishers, 2022.</li> <li>2. A. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, “A Text book on Power System Engineering”, Dhanpat Rai Publishing Company (P) Ltd, 2008.</li> <li>3. C.L. Wadhwa, “Electrical Power Systems”, 5th Edition, New Age International, 2009.</li> <li>4. M.V. Deshpande, “Elements of Electrical Power Station Design”, 3rd Edition, Wheeler Pub. 1998.</li> <li>5. H.Cotton &amp; H. Barber, “The Transmission and Distribution of Electrical Energy”, 3rd Edition, 1970.</li> <li>6. W.D.Stevenson, “Elements of Power System Analysis”, 4th Edition, McGraw Hill, 1984.</li> </ol>		
<p><b>WEB REFERENCES</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/112/107/112107216/">https://nptel.ac.in/courses/112/107/112107216/</a>.</li> <li>2. <a href="https://nptel.ac.in/content/storage2/courses/112107216/3%20assignment%20solution.Pdf">https://nptel.ac.in/content/storage2/courses/112107216/3%20assignment%20solution.Pdf</a></li> <li>3. <a href="https://nptel.ac.in/content/storage2/courses/112107216/Assignment6%20questions.pdf">https://nptel.ac.in/content/storage2/courses/112107216/Assignment6%20questions.pdf</a></li> </ol>		
<p><b>E -TEXTBOOKS</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.electricalengineeringinfo.com/2017/06/principles-power-systems-vkmehta-ebook-pdf-download.html">https://www.electricalengineeringinfo.com/2017/06/principles-power-systems-vkmehta-ebook-pdf-download.html</a></li> <li>2. 2 A Text Book On Power System Engineering, A. Chakrabarti, Soni MI, P. V. Gupta, DhanpatRai Publishing Company (P) Limited, 2008, ISBN 8177000209</li> <li>3. 9788177000207 <a href="https://www.scribd.com/doc/192018739/A-Textbook-of-Power-System-Engineeringby-R-K-Rajput-Google-Book">https://www.scribd.com/doc/192018739/A-Textbook-of-Power-System-Engineeringby-R-K-Rajput-Google-Book</a></li> </ol>		
<p><b>MOOCS COURSE</b></p>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/112/107/112107216/">https://nptel.ac.in/courses/112/107/112107216/</a></li> <li>2. <a href="https://nptel.ac.in/courses/112/103/112103243/">https://nptel.ac.in/courses/112/103/112103243/</a></li> </ol>		



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## ANALOG ELECTRONIC CIRCUITS

II B. TECH- I SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EC308PC	B. Tech	3	0	0	3	40	60	100
<p><b>COURSE OBJECTIVES</b></p> <ol style="list-style-type: none"> <li>To introduce components such as diodes, BJTs and FETs their switching characteristics, applications.</li> <li>Learn the concepts of high frequency analysis of transistors.</li> <li>To give understanding of various types of basic and feedback amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.</li> <li>To introduce the basic building blocks of linear integrated circuits.</li> <li>To introduce the concepts of waveform generation and introduce some special function ICs.</li> </ol>								
<b>UNIT-I</b>	<b>DIODE AND BIPOLAR TRANSISTOR CIRCUITS</b>					<b>Classes:10</b>		
P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, clamping and clipping circuits. Input output characteristics of BJT in CB, CE, CC configurations, biasing circuits, Load line analysis, common-emitter, common-base and common collector amplifiers; Small signal equivalent circuits,								
<b>UNIT-II</b>	<b>FET CIRCUIT</b>					<b>Classes:10</b>		
FET Structure and VI Characteristics, MOSFET structure and I-V characteristics. MOSFET as a switch. small signal equivalent circuits - gain, input and output impedances, small-signal model and common-source, common-gate and common-drain amplifiers, trans conductance, high frequency equivalent circuit.								
<b>UNIT-III</b>	<b>MULTI- STAGE AND POWER AMPLIFIERS</b>					<b>Classes:15</b>		
Direct coupled and RC Coupled multi-stage amplifiers; Differential Amplifiers, Power amplifiers - Class A, Class B, Class C								
<b>UNIT-IV</b>	<b>FEEDBACK AMPLIFIERS AND OSCILLATORS</b>					<b>Classes: 15</b>		
<p><b>Feedback Amplifiers:</b> Concepts of feedback – Classification of feedback amplifiers – General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems.</p> <p><b>Oscillators:</b> Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators.</p>								

<b>UNIT-V</b>	<b>OPERATIONAL AMPLIFIERS</b>	<b>Classes:13</b>
<p>Ideal op-amp, Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product, Inverting and non-inverting amplifier, Differentiator, integrator, Square-wave and triangular- wave generators.</p>		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education, 2nd edition 2010</li> <li>2. Op-Amps &amp; Linear ICs – Ramakanth A. Gayakwad, PHI, 2003.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Electronic Devices Conventional and current version -Thomas L. Floyd 2015, pearson.</li> <li>2. J. Millman and A. Grabel, “Microelectronics”, McGraw Hill Education, 1988.</li> <li>3. P. Horowitz and W. Hill, “The Art of Electronics”, Cambridge University Press, 1989.</li> <li>4. P. R. Gray, R. G. Meyer and S. Lewis, “Analysis and Design of Analog Integrated Circuits”, John Wiley &amp; Sons, 2001.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/113/106/113106062/">https://nptel.ac.in/courses/113/106/113106062/</a></li> <li>2. <a href="https://nptel.ac.in/courses/113/106/113106065/">https://nptel.ac.in/courses/113/106/113106065/</a></li> <li>3. <a href="https://nptel.ac.in/courses/108/108/108108122/">https://nptel.ac.in/courses/108/108/108108122/</a></li> <li>4. <a href="https://nptel.ac.in/courses/117107094/">https://nptel.ac.in/courses/117107094/</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. ELECTRONIC DEVICES AND CIRCUITS, 2nd Edition Jacob Millmanand Christos C</li> <li>2. ELECTRONIC DEVICES AND CIRCUITS, 2 nd Edition David A.Bell.</li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.edx.org/course/principle-of-semiconductor-devices-part-ii-field-effecttransistors-and-mosfets-2">https://www.edx.org/course/principle-of-semiconductor-devices-part-ii-field-effecttransistors-and-mosfets-2</a></li> <li>2. <a href="https://www.coursera.org/lecture/electronics/4-1-introduction-to-pn-junctions-xr0ZQ">https://www.coursera.org/lecture/electronics/4-1-introduction-to-pn-junctions-xr0ZQ</a></li> <li>3. <a href="https://www.coursera.org/lecture/electronics/2-1-introduction-to-op-amps-and-idealbehavior-Q5Di2">https://www.coursera.org/lecture/electronics/2-1-introduction-to-op-amps-and-idealbehavior-Q5Di2</a></li> </ol>		



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## ELECTRO MAGNETIC FIELDS

II B. TECH- I SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE303PC	B. Tech	3	0	0	3	40	60	100
<b>COURSE OBJECTIVES</b>								
1. To introduce the concepts of electric field and magnetic field. 2. To know Applications of electric and magnetic fields in the development of the theory for power transmission lines and electrical machines. 3. To study about electromagnetic waves.								
<b>UNIT-I</b>	<b>STATIC ELECTRIC FIELD</b>						<b>Classes:10</b>	
Review of conversion of a vector from one coordinate system to another coordinate system 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 dipole, Electrostatic Energy and Energy density.								
<b>UNIT-II</b>	<b>CONDUCTORS, DIELECTRICS AND CAPACITANCE</b>						<b>Classes:10</b>	
Current and current density, Ohms Law in Point form, Continuity equation, Boundary conditions of conductors and dielectric materials. Capacitance, Capacitance of a two-wire line, Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation.								
<b>UNIT-III</b>	<b>STATIC MAGNETIC FIELDS AND MAGNETIC FORCES</b>						<b>Classes:15</b>	
Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors. Force on a moving charge, Force on a differential current element, Force between differential current elements, Magnetic boundary conditions, Magnetic circuits, Self-inductances and mutual inductances.								
<b>UNIT – IV</b>	<b>TIME VARYING FIELDS AND MAXWELL'S EQUATIONS</b>						<b>Classes: 15</b>	
Faraday's law for Electromagnetic induction, Displacement current, Point form of Maxwell's Equation, Integral form of Maxwell's equations, Motional Electromotive forces.								

<b>UNIT-V</b>	<b>ELECTROMAGNETIC WAVES</b>	<b>Classes:13</b>
Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Wave equation in Phasor form, Plane wave in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors. Poynting theorem.		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. M. N. O. Sadiku, "Elements of Electromagnetics", Oxford University Publication, 2014.</li> <li>2. W. Hayt, "Engineering Electromagnetics", McGraw Hill Education, 2012.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr. N. Ramchandra, CH. Nirosha, "Electromagnetic Fields", Spectrum Publishers, 2021.</li> <li>2. Pramanik, "Electromagnetism-Problems with solution", Prentice Hall India, 2012.</li> <li>3. G. W. Carter, "The electromagnetic field in its engineering aspects", Longmans, 1954.</li> <li>4. W. J. Duffin, "Electricity and Magnetism", McGraw Hill Publication, 1980.</li> <li>5. W. J. Duffin, "Advanced Electricity and Magnetism", McGraw Hill, 1968.</li> <li>6. E. G. Cullwick, "The Fundamentals of Electromagnetism", Cambridge University Press, 1966.</li> <li>7. B. D. Popovic, "Introductory Engineering Electromagnetics", Addison-Wesley Educational Publishers, International Edition, 1971.</li> <li>8. A. Pramanik, "Electromagnetism - Theory and applications", PHI Learning Pvt. Ltd, New Delhi, 2009.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.khanacademy.org/science/physics/magnetic-forces-and-magneticfields/magnetic-field-current-carrying-wire/v/magnetism-6-magnetic-field-due-to-current">https://www.khanacademy.org/science/physics/magnetic-forces-and-magneticfields/magnetic-field-current-carrying-wire/v/magnetism-6-magnetic-field-due-to-current</a></li> <li>2. <a href="https://nptel.ac.in/courses/108106073/">https://nptel.ac.in/courses/108106073/</a></li> <li>3. <a href="https://www.youtube.com/watch?v=pGdr9WLto4A">https://www.youtube.com/watch?v=pGdr9WLto4A</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. Electromagnetic Field Theory and Transmission Lines 1st Edition, Kindle Edition.</li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.classcentral.com/course/edx-electricity-and-magnetism-magnetic-fieldsand-forces-10280">https://www.classcentral.com/course/edx-electricity-and-magnetism-magnetic-fieldsand-forces-10280</a> 2. <a href="https://www.classcentral.com/course/nptel-electromagnetic-theory-5223">https://www.classcentral.com/course/nptel-electromagnetic-theory-5223</a></li> </ol>		



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## ELECTRICAL MACHINES LABORATORY - I

### II B. TECH- I SEMESTER (R 22)

Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE304PC	B. Tech	0	0	2	1	40	60	100

### COURSE OBJECTIVES

1. To expose the students to the operation of DC Generators.
2. To know the operation of various types of DC Motors.
3. To examine the performance of Single and Three Phase Transformers

### The following experiments are required to be conducted compulsory experiments:

1. Magnetization characteristics of DC shunt generator (Determination of critical field resistance and critical speed).
2. Load test on DC shunt generator (Determination of characteristics).
3. Load test on DC series generator (Determination of characteristics).
4. Hopkinson's test on DC shunt machines (Predetermination of efficiency).
5. Swinburne's test and speed control of DC shunt motor (Predetermination of efficiencies).
6. Brake test on DC compound motor (Determination of performance curves).
7. OC and SC Test on Single Phase Transformer.
8. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta- Delta, Delta-star, Star-Star)

### In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

1. Brake test on DC shunt motor (Determination of performance curves)
2. Load test on DC compound generator (Determination of characteristics).
3. Fields test on DC series machines (Determination of efficiency)
4. Retardation test on DC shunt motor (Determination of losses at rated speed)
5. Separation of losses in DC shunt motor.
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of Single-Phase Transformer.
7. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)

### TEXTBOOKS

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.



**REFERENCE BOOKS**

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.

**WEB REFERENCES**

1. <https://www.oreilly.com> › library › view › electrical-machines-2nd › 25\_ref
2. <https://swayam.gov.in> › nd1\_noc19\_ee60
3. <https://www.sanfoundry.com> › best-reference-books-advance-electrical-machines

**E -TEXTBOOKS**

1. Electrical Machines-I By U.A.Bakshi, V.U.Bakshi Technical Publications, 2009  
PrintISBN:9783527340224 Online ISBN:9783527698523 |DOI:10.1002/9783527698523

**MOOCS COURSE**

1. <https://nptel.ac.in/courses/108105017/>
2. [https://swayam.gov.in/nd1\\_noc19\\_ee60/preview](https://swayam.gov.in/nd1_noc19_ee60/preview)



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## ANALOG ELECTRONIC CIRCUIT LABORATORY

### II B. TECH- I SEMESTER (R 22)

Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EC309PC	B. Tech	0	0	2	1	40	60	100

### COURSE OBJECTIVES

1. To introduce components such as diodes, BJTs and FETs their switching characteristics, applications.
2. Learn the concepts of high frequency analysis of transistors.
3. To give understanding of various types of basic and feedback amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
4. To introduce the basic building blocks of linear integrated circuits.
5. To introduce the concepts of waveform generation and introduce some special function ICs.

### The following experiments are required to be conducted compulsory experiments:

1. Draw the VI Characteristics of given PN Junction diode. Determine the Static and Dynamic resistance of the Diode.
  2. Determine the Ripple factor, % Regulation PIV and TUF of the given Rectifier with & without filter.
  3. Obtain the I/O Characteristics of CE configurations of BJT. Calculate h-parameters from the Characteristics.
  4. Obtain the I/O Characteristics of CB configurations of BJT. Calculate h-parameters from the Characteristics.
  5. Obtain the I/O Characteristics of CC configurations of BJT. Calculate h-parameters from the Characteristics.
  6. Obtain the Drain and Transfer characteristics of CD,CS configuration of JFET. Calculate  $g_m$ ,  $r_d$  from the Characteristics Adder and Subtractor using Op Amp.
  7. Inverting and Non-inverting Amplifiers using Op Amps
  8. Adder and Subtractor using Op Amp
  9. Integrator Circuit using IC 741.
  10. Differentiator circuit using Op Amp.
  11. Current Shunt Feedback amplifier
  12. Design an RC phase shift oscillator circuit and derive the gain condition for oscillations practically for given frequency.
  13. Design a Colpitts oscillator circuit for the given frequency and draw the output waveform.
  14. Design transformer coupled class A power amplifier and draw the input and output waveforms, find its efficiency
- Experiments related to MOSFET may be included

### **TEXT BOOKS**

1. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education, 2nd edition 2010
2. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 2003.

### **REFERENCE BOOKS**

1. Electronic Devices Conventional and current version -Thomas L. Floyd 2015, Pearson.
2. J. Millman and A. Grabel, "Microelectronics", McGraw Hill Education, 1988.
3. P. Horowitz and W. Hill, "The Art of Electronics", Cambridge University Press, 1989.
4. P. R. Gray, R. G. Meyer and S. Lewis, "Analysis and Design of Analog Integrated Circuits", John Wiley & Sons, 2001.

### **WEB REFERENCES**

1. [https://nptel.ac.in/noc/individual\\_course.php?id=noc19-ee07](https://nptel.ac.in/noc/individual_course.php?id=noc19-ee07)
2. <https://nptel.ac.in/courses/117101106/>
3. <https://nptel.ac.in/courses/108102095/>
4. <https://nptel.ac.in/courses/108102112/>

### **E -TEXTBOOKS**

1. <https://easyengineering.net/analog-electronics-by-bakshi-and-godse/>
2. Electronic circuits: Analysis and Design by Donald Neamen

### **MOOCS COURSE**

1. <https://www.classcentral.com/course/swayam-analog-circuits-7957>
2. <https://www.edx.org/learn/electronics>



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## ELECTRICAL SIMULATION LABORATORY

### II B. TECH- I SEMESTER (R 22)

Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE305PC	B. Tech	0	0	2	1	40	60	100

### COURSE OBJECTIVES

1. To understand basic block sets of different simulation platform used in electrical/electronic circuit design.
2. To understand use and coding in different software tools used in electrical/ electronic circuit design.
3. To understand the simulation of electric machines/circuits for performance analysis.

### The following experiments need to be performed from various subject domains.

1. Introduction to basic block sets of simulation platforms. Basic matrix operations, Generation of standard test signals
2. Solving the linear and nonlinear differential equations
3. Measurement of Voltage, Current and Power in DC circuits.
4. Verification of different network theorems with dependent and independent sources using suitable simulation tools.
5. Verification of performance characteristics of basic Electronic Devices using suitable simulation tools.
6. Analysis of series and parallel resonance circuits using suitable simulation tools
7. Obtaining the response of electrical network for standard test signals using suitable simulation tools.
8. Modeling and Analysis of Low pass and High pass Filters using suitable simulation tools
9. Performance analysis of DC motor using suitable simulation tools
10. Modeling and analysis of Equivalent circuit of transformer using suitable simulation tools.
11. Analysis of single-phase bridge rectifier with and without filter using suitable Simulation tools.
12. Modeling and Verification of Voltage Regulator using suitable simulation tools.
13. Modeling of transmission line using simulation tools.
14. Performance analysis of Solar PV model using suitable simulation tools

### TEXTBOOKS

1. Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma, "MATLAB and its applications in Engineeirng", Person Educations.
2. Duane Hanselman, Bruce Little field, "Mastering MATLAB". Person Education 3. "PSPICER , includes PSPICE A/D, Basics", Cadence publication, 2012.

## REFERENCE BOOKS

1. David Hocuque,, “Introduction to MATLAB for engineering students”, North Western University.
2. Muhammed H Rasheed, “Introduction to PSPICE using ORCAD for circuits and electronics”, Eastern Economy Edition.
3. Huei-Huang Lee “programming and engineering computing with MATLAB2018”, SDC Publications

## E -TEXTBOOKS

1. Stormy Attaway, “Matlab: A Practical Introduction to Programming and Problem Solving”, Elsiever Publications.
2. Mathworks “MATLAB programming Fundamentals”, Mathworks products.
3. Paul W.Tuinenga“SPICE A guide to circuit simulation & Analysis using PSPICE”Prentice Hall Publications

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## GENDER SENSITIZATION LAB

II B. TECH- I SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
*GS309MC	B. Tech	0	0	2	0	100	-	100
<b>COURSE OBJECTIVES</b>								
<ol style="list-style-type: none"> <li>1. To develop students' sensibility with regard to issues of gender in contemporary India.</li> <li>2. To provide a critical perspective on the socialization of men and women.</li> <li>3. To introduce students to information about some key biological aspects of genders.</li> <li>4. To expose the students to debates on the politics and economics of work.</li> <li>5. To help students reflect critically on gender violence.</li> <li>6. To expose students to more egalitarian interactions between men and women.</li> </ol>								
<b>UNIT-I</b>	<b>UNDERSTANDING GENDER</b>						<b>Classes:10</b>	
Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.								
<b>UNIT-II</b>	<b>GENDER ROLES AND RELATIONS</b>						<b>Classes:10</b>	
Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary								
<b>UNIT-III</b>	<b>GENDER AND LABOUR</b>						<b>Classes:15</b>	
Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming								
<b>UNIT – IV</b>	<b>GENDER – BASED VIOLENCE</b>						<b>Classes: 15</b>	
The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu". Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life...."								

<b>UNIT-V</b>	<b>GENDER AND CULTURE</b>	<b>Classes:13</b>
Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu, The Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by published by Telugu Akademi, Telangana Government (2015).</li> <li>2. Raj Pal Singh, Anupama Sihag, "Gender Sensitization: A World of Equals", Raj Publications (Dist.), ISBN: 9789386695123, 938669512X (2019)</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. S. Benhabib. Situating the Self: Gender, Community, Gender and Post modernism in Contemporary Ethics, London; Routledge, 1992.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.researchgate.net/publication/329541569_EMPOWERING_WOMEN_THROUGH_GENDER_SENSITIZATION">https://www.researchgate.net/publication/329541569_EMPOWERING_WOMEN_THROUGH_GENDER_SENSITIZATION</a></li> <li>2. <a href="https://eige.europa.eu/gender-mainstreaming/toolkits/gender-sensitive-">https://eige.europa.eu/gender-mainstreaming/toolkits/gender-sensitive-</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://harpercollins.co.in/BookDetail.asp?BookCode=3732">https://harpercollins.co.in/BookDetail.asp?BookCode=3732</a></li> <li>2. <a href="https://unesdoc.unesco.org/ark:/48223/pf0000158897_eng">https://unesdoc.unesco.org/ark:/48223/pf0000158897_eng</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.mooc-list.com/course/sustainable-development-goal-5-gender-equality-canopylab">https://www.mooc-list.com/course/sustainable-development-goal-5-gender-equality-canopylab</a></li> <li>2. <a href="https://www.coursera.org/learn/gender-sexuality">https://www.coursera.org/learn/gender-sexuality</a></li> </ol>		



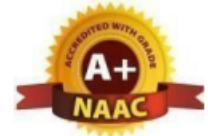
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## SOLID MECHANICS AND HYDRAULIC MACHINES

### II B. TECH- II SEMESTER (R 22)

Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
ME411PC	B. Tech	3	1	0	4	40	60	100

### COURSE OBJECTIVES

1. To identify an appropriate structural system and work comfortably with basic engineering mechanics and types of loading & support conditions that act on structural systems.
2. To Understand the meaning of centers of gravity, centroids, moments of Inertia and rigid body dynamics.
3. To Study the characteristics of hydroelectric power plant and Design of hydraulic machinery.

#### UNIT-I

#### INTRODUCTION OF ENGINEERING MECHANICS

Classes:10

Basic concepts of System of Forces-Coplanar Forces-Components in Space-Resultant- Moment of Forces and its Application – Couples and Resultant of Force System-Equilibrium of System of Forces-Free body diagrams-Direction of Force Equations of Equilibrium of Coplanar Systems and Spatial Systems – Vector cross product- Support reactions different beams for different types of loading – concentrated, uniformly distributed and uniformly varying loading. Types of friction – Limiting friction – Laws of Friction – static and Dynamic Frictions – Angle of Friction –Cone of limiting friction

#### UNIT-II

#### CENTROID AND CENTER OF GRAVITY

Classes:10

**CENTROID AND CENTER OF GRAVITY:** Centroids – Theorem of Pappus- Centroids of Composite figures – Centre of Gravity of Bodies – Area moment of Inertia:-polar Moment of Inertia-Transfer- Theorems - Moments of Inertia of Composite Figures.

**SIMPLE STRESSES AND STRAINS ANALYSIS:** Concept of stress and strain- St. Venant's Principle- Stress and Strain Diagram - Elasticity and plasticity – Types of stresses and strains Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Pure shear and Complementary shear - Elastic moduli, Elastic constants and the relationship between them

#### UNIT-III

#### KINEMATICS AND KINETICS

Classes:15

Introduction – Rectilinear motion – Motion with uniform and variable acceleration-Curvilinear motion- Components of motion- Circular motion Kinetics of a particle – D'Alembert's principle – Motion in a curved path – work, energy and power. Principle of conservation of energy – Kinetics of a rigid body in translation, rotation – work done – Principle of work- energy – Impulse-momentum.

#### UNIT – IV

#### BASICS OF HYDRAULIC MACHINERY

Classes: 15

Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency Elements of a typical Hydropower installation – Heads and efficiencies



<b>UNIT-V</b>	<b>TURBINES AND PUMPS</b>	<b>Classes:13</b>
Classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine – working, working proportions, velocity diagram, work done and efficiency, hydraulic design. Draft tube – Classification, functions and efficiency. Governing of turbines, Performance of turbines Pump installation details – classification – work done – Manometric head – minimum starting speed – losses and efficiencies – specific speed. Multistage pumps – pumps in parallel		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. M.V. Seshagirao and Durgaih, “Engineering Mechanics”, University Press.</li> <li>2. P.N Modi and Seth, “Fluid Mechanics and Hydraulic Machinery”, standard Book House</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr. D. V, Sreekanth, T. Paramesh, B. Ashok Kumar, “Engineering Mechanics”, Amaravati Publishers, 2022.</li> <li>2. B. Bhattacharya, “Engineering Mechanics”, Oxford University Publications.</li> <li>3. Hibbler, “Engineering Mechanics (Statics and Dynamics)”, Pearson Education.</li> <li>4. Fedrinand L. Singer, “Engineering Mechanics” Harper Collings Publishers.</li> <li>5. A.K.Tayal, “Engineering Mechanics” , Umesh Publication.</li> <li>6. Domkundwar &amp; Domkundwar, “Fluid mechanics &amp; Hydraulic Machines”, Dhanpat Rai &amp; C</li> <li>7. R.C.Hibbeler, “Fluid Mechanics”, Pearson India Education Servicees Pvt. Ltd</li> <li>8. D.S.Kumar, “Fluid Mechanic &amp; Fluid Power Engineering”, Kataria &amp; Sons Publications Pvt. Ltd.</li> <li>9. Banga &amp; Sharma, “Hydraulic Machines” Khanna Publishers.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://www.mlipsett.com/blog/">http://www.mlipsett.com/blog/</a></li> <li>2. <a href="http://jntuh-elsdm.in/">http://jntuh-elsdm.in/</a></li> <li>3. <a href="https://www.sciencedirect.com/science/book/9781857180336">https://www.sciencedirect.com/science/book/9781857180336</a></li> <li>4. <a href="https://onlinelibrary.wiley.com/doi/abs/10.1046/j.0266-4909.2002.00225.x">https://onlinelibrary.wiley.com/doi/abs/10.1046/j.0266-4909.2002.00225.x</a></li> <li>5. <a href="https://www.coursera.org/learn/3d-cad-fundamental">https://www.coursera.org/learn/3d-cad-fundamental</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://akuengineers.files.wordpress.com/2016/12/engineering-mechanics-rs-khurmi.pdf">https://akuengineers.files.wordpress.com/2016/12/engineering-mechanics-rs-khurmi.pdf</a></li> <li>2. <a href="http://clkmein.com/q2KmTm">http://clkmein.com/q2KmTm</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/112103109/2">https://nptel.ac.in/courses/112103109/2</a></li> </ol>		



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## MEASUREMENTS AND INSTRUMENTATION

### II B. TECH- II SEMESTER (R 22)

Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE402PC	B. Tech	3	0	0	3	40	60	100

### COURSE OBJECTIVES

1. To introduce the basic principles of all measuring instruments.
2. To deal with the measurement of voltage, current, Power factor, power, energy and magnetic measurements.
3. To understand the basic concepts of smart and digital metering.

#### UNIT-I

#### INTRODUCTION TO MEASURING INSTRUMENTS

Classes:10

Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – extension of range of E.S. Voltmeters.

#### UNIT-II

#### POTENTIOMETERS AND INSTRUMENT TRANSFORMERS

Classes:10

Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors

#### UNIT-III

#### MEASUREMENT OF POWER AND ENERGY

Classes:15

Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeters, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems.

Single phase induction type energy meter – driving and braking torques – errors and compensations –testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter maximum demand meters.

#### UNIT – IV

#### DC AND AC BRIDGES

Classes: 15

Method of measuring low, medium and high resistance – sensitivity of Wheatstone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method.

Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge - Owen's bridge Measurement of capacitance and loss angle –Desauty's Bridge - Wien's bridge – Schering Bridge.

<b>UNIT-V</b>	<b>TRANSDUCERS</b>	<b>Classes:13</b>
Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, and photo diodes. <b>INTRODUCTION TO SMART AND DIGITAL METERING:</b> Digital Multi-meter, True RMS meters, Clamp- on meters, Digital Energy Meter, Cathode Ray Oscilloscope, Digital Storage Oscilloscope.		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. A. K. Sawhney, "Electrical &amp; Electronic Measurement &amp; Instruments", Dhanpat Rai &amp; Co. Publications, 2005.</li> <li>2. Dr. Rajendra Prasad, "Electrical Measurements &amp; Measuring Instruments", Khanna Publishers, 1989.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. G. K. Banerjee, "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016.</li> <li>2. R. K. Rajput, "Electrical &amp; Electronic Measurement &amp; Instrumentation", S. Chand and Company Ltd., 2007.</li> <li>3. S. C. Bhargava, "Electrical Measuring Instruments and Measurements", BS Publications, 2012.</li> <li>4. Buckingham and Price, "Electrical Measurements", Prentice – Hall, 1988.</li> <li>5. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.</li> <li>6. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.electrical4u.com/">https://www.electrical4u.com/</a></li> <li>2. <a href="http://www.basicsofelectricalengineering.com/">http://www.basicsofelectricalengineering.com/</a></li> <li>3. <a href="https://www.electricaldeck.com">https://www.electricaldeck.com</a></li> <li>4. <a href="https://circuitglobe.com/">https://circuitglobe.com/</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://easyengineering.net/a-course-in-electronic-measurements-and-instrumentation-by-sawhney/">https://easyengineering.net/a-course-in-electronic-measurements-and-instrumentation-by-sawhney/</a></li> <li>2. <a href="https://easyengineering.net/a-textbook-of-electrical-technology-by-rajput/">https://easyengineering.net/a-textbook-of-electrical-technology-by-rajput/</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/108/105/108105153/">https://nptel.ac.in/courses/108/105/108105153/</a></li> <li>2. <a href="https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ee44/">https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ee44/</a></li> </ol>		



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## ELECTRICAL MACHINES - II

II B. TECH- II SEMESTER (R 22)									
Course Code	Category	Hours /Week			Credits	Maximum Marks			
		L	T	P		C	CIE	SEE	Total
EE403PC	B. Tech	3	0	0	3	40	60	100	
<b>COURSE OBJECTIVES</b>									
<ol style="list-style-type: none"> <li>1. To deal with the detailed analysis of poly-phase induction motors &amp; Alternators.</li> <li>2. To understand operation, construction and types of single-phase motors and their applications in household appliances and control systems.</li> <li>3. To introduce the concept of parallel operation of alternators.</li> </ol>									
<b>UNIT-I</b>	<b>POLY PHASE INDUCTION MACHINES</b>						<b>Classes:10</b>		
Constructional details of cage and wound rotor machines production of a rotating magnetic field - principle of operation - rotor EMF and rotor frequency – rotor reactance, rotor current and Power factor at standstill and during operation. Rotor power input, rotor copper loss and mechanical power developed and their inter relation.									
<b>UNIT-II</b>	<b>CHARACTERISTICS OF INDUCTION MACHINES</b>						<b>Classes:10</b>		
Torque equation-expressions for maximum torque and starting torque - torque slip characteristic - equivalent circuit - phasor diagram - crawling and cogging, No-load Test and Blocked rotor test – Predetermination of performance-Methods of starting and starting current and Torque calculations Applications. <b>SPEED CONTROL METHODS:</b> Change of voltage, change of frequency, voltage/frequency, injection of an EMF into rotor circuit (qualitative treatment only)-induction generator-principle of operation.									
<b>UNIT-III</b>	<b>SYNCHRONOUS MACHINES</b>						<b>Classes:15</b>		
Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation. Harmonics in generated e.m.f. – suppression of harmonics – armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics. Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two reaction analysis – experimental determination of $X_d$ and $X_q$ (Slip test) Phasor diagrams – Regulation of salient pole alternators									

<b>UNIT – IV</b>	<b>PARALLEL OPERATION OF SYNCHRONOUS MACHINES</b>	<b>Classes: 15</b>
<p>Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactance's and Applications.</p> <p><b>SYNCHRONOUS MOTORS:</b> Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed. – Hunting and its suppression – Methods of starting – synchronous induction motor.</p>		
<b>UNIT-V</b>	<b>SINGLE PHASE MACHINES</b>	<b>Classes:13</b>
<p>Single phase induction motor – Constructional Features-Double revolving field theory – split-phase motors – AC series motor- Universal Motor- -Shaded pole motor and Applications.</p>		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. P. S. Bimbhra, “Electrical Machinery”, Khanna Publishers, 2011.</li> <li>2. I.J. Nagrath and D. P. Kothari, “Electric Machines”, McGraw Hill Education, 2010.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Dr. P. Santosh Kumar Patra, Dr. N. Ramchandra, V. Bharath Kumar, V. Vishnu Vardhan, “Electrical Machines – II”, Spectrum Techno Press, 2022.</li> <li>2. Prithwiraj Purkait, Indrayudh Bandyopadhyay, “Electrical Machines”, Oxford, 2017.</li> <li>3. M. G. Say, “Performance and design of AC machines”, CBS Publishers, 2002.</li> <li>4. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.</li> <li>5. A. E. Clayton and N. N. Hancock, “Performance and design of DC machines”, CBS Publishers, 2004.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.scribd.com › doc › Electrical-Machines-2-AC-Machines">https://www.scribd.com › doc › Electrical-Machines-2-AC-Machines</a></li> <li>2. <a href="https://www.slideshare.net › karthi1017 › electrical-machines-ii">https://www.slideshare.net › karthi1017 › electrical-machines-ii</a></li> <li>3. <a href="https://www.cet.edu.in › notice files › 226_Electrical_Machine-II">https://www.cet.edu.in › notice files › 226_Electrical_Machine-II</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. Electrical Machines - II. Authors, U.A.Bakshi, M.V. Bakshi. Publisher, Technical Publications, 2009. ISBN, 8184316070, 9788184316070.</li> <li>2. Electrical Machines 2 by J b Gupta. ISBN: 9350141604, 9789350141601</li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.classcentral.com/course/swayam-electrical-machines-II-12948">https://www.classcentral.com/course/swayam-electrical-machines-II-12948</a></li> <li>2. <a href="https://nptel.ac.in/courses/108106072/">https://nptel.ac.in/courses/108106072/</a></li> </ol>		



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## DIGITAL ELECTRONICS

II B. TECH- II SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EC410PC	B. Tech	3	1	0	4	40	60	100
<b>COURSE OBJECTIVES</b>								
1. To learn fundamental concepts of digital system design and common forms of number representations and their conversions. 2. To implement and design logical operations using combinational logic circuits and sequential logic circuits. 3. To understand the semiconductor memories and programmable logic devices.								
<b>UNIT-I</b>	<b>FUNDAMENTALS OF DIGITAL SYSTEMS AND LOGIC FAMILIES</b>					<b>Classes:10</b>		
Digital signals, Digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, Examples of IC gates, Number systems-binary, Signed binary, Octal hexadecimal number, Binary arithmetic, One's and Two's complements arithmetic.								
<b>UNIT-II</b>	<b>COMBINATIONAL CIRCUITS - I</b>					<b>Classes:10</b>		
Standard representation for logic functions, K-map representation and simplification of logic functions using K- map, Minimization of logical functions, Don't care conditions, Multiplexer, De-Multiplexer								
<b>UNIT-III</b>	<b>COMBINATIONAL CIRCUITS - II</b>					<b>Classes:15</b>		
Adders, Subtractors, Carry look ahead adder, Digital comparator, Parity checker/generator, Code converters, Priority encoders, Decoders/Drivers for display devices, Q-M method of function realization.								
<b>UNIT – IV</b>	<b>SEQUENTIAL CIRCUITS</b>					<b>Classes: 15</b>		
Introduction to flip-flops, SR, JK, T and D type's flip-flops, Shift registers, Conversion of flip-flops, Ring counter, Ripple (Asynchronous) counters, Synchronous counters.								
<b>UNIT-V</b>	<b>SEMICONDUCTOR MEMORIES AND PROGRAMMABLE LOGIC DEVICES</b>					<b>Classes:13</b>		
Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read-only memory (ROM), ROM types, Read and write memory (RAM) types, Programmable logic array, Programmable array logic, Field Programmable Gate Array (FPGA).								

### **TEXTBOOKS**

1. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

### **REFERENCE BOOKS**

1. Dr. P. Santosh Kumar Patra, K. Anitha, Dr. P. Joel Joesphson, S. P. Manikanta, "Digital System Design", Seven Hills International Publishers, 2022.
2. R.S. Sedha, "A Textbook of Digital Electronics", S.Chand, 2005
3. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.

### **WEB REFERENCES**

1. <http://blog.digitalelectronics.co.in/>
2. [www.nesoacademy.org/electronics-engineering/digital-electronics/digital](http://www.nesoacademy.org/electronics-engineering/digital-electronics/digital)
3. <https://www.slideshare.net/JournalsPubwwwjourna/international-journal-of-digitalelectronics-vol-2-issue-2>
4. <https://lecturenotes.in/subject/203/switching-theory-and-logic-design-stld>
5. <http://www.infocobuild.com/education/audio-videocourses/electronics/DigitalCircuitsSystems>
6. <https://nptel.ac.in/courses/117105080/>

### **E -TEXTBOOKS**

1. <https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf>
2. <https://easyengineering.net/fundamentals-of-digital-circuits-by-anand-kumar/>

### **MOOCS COURSE**

1. <https://www.smartworld.com/notes/digital-logic-design-dld/>
2. <https://swayam.gov.in/courses/1392-digital-circuits-and-systems>
3. <https://swayam.gov.in/courses/4410-synthesis-of-digital-systems>



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## POWER SYSTEMS - II

II B. TECH- II SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE404PC	B. Tech	3	0	0	3	40	60	100
<p><b>COURSE OBJECTIVES</b></p> <ol style="list-style-type: none"> <li>To study the performance of transmission lines and travelling waves.</li> <li>To understand the concept of voltage control, compensation methods and per unit representation of power systems.</li> <li>To know the methods of overvoltage protection, Insulation coordination, Symmetrical components and fault calculation analysis./2</li> </ol>								
<b>UNIT-I</b>	<b>PERFORMANCE OF LINES</b>					<b>Classes:10</b>		
<p>Representation of lines, short transmission lines, medium length lines, nominal T and PI representations, long transmission lines. The equivalent circuit representation of a long Line, A, B, C, D constants, Ferranti Effect.</p> <p><b>Corona:</b> Introduction, disruptive critical voltage, corona loss, Factors affecting corona loss and methods of reducing corona loss, Disadvantages of corona, interference between power and Communication lines.</p>								
<b>UNIT-II</b>	<b>VOLTAGE CORRECTION AND POWER FACTOR IMPROVEMENT</b>					<b>Classes:10</b>		
<p><b>VOLTAGE CONTROL &amp; POWER FACTOR IMPROVEMENT:</b> Introduction – methods of voltage control, shunt and series capacitors / Inductors, tap changing transformers, synchronous phase modifiers, power factor improvement methods.</p> <p><b>COMPENSATION IN POWER SYSTEMS:</b> Introduction - Concepts of Load compensation – Load ability characteristics of overhead lines – Uncompensated transmission line – Symmetrical line – Radial line with asynchronous load – Compensation of lines.</p>								
<b>UNIT-III</b>	<b>PER UNIT REPRESENTATION OF POWER SYSTEMS</b>					<b>Classes:15</b>		
<p><b>PER UNIT REPRESENTATION OF POWER SYSTEMS:</b> The one-line diagram, impedance and reactance diagrams, per unit quantities, changing the base of per unit quantities, advantages of per unit system.</p> <p><b>TRAVELLING WAVES ON TRANSMISSION LINES:</b> Production of travelling waves, open circuited line, short-circuited line, line terminated through a resistance, line connected to a cable, reflection and refraction at T-junction line terminated through a capacitance, capacitor connection at a T-junction, Attenuation of travelling waves.</p>								
<b>UNIT – IV</b>	<b>OVER VOLTAGE PROTECTION AND INSULATION COORDINATION</b>					<b>Classes: 15</b>		
<p>Over voltage due to arcing ground and Peterson coil, lightning, horn gaps, surge diverters, rod gaps, expulsion type lightning arrester, valve type lightning arrester, ground wires, ground rods, counterpoise, surge absorbers, insulation coordination, volt-time curves.</p>								



UNIT-V	SYMMETRICAL COMPONENTS AND FAULT CALCULATIONS	Classes:13
Significance of positive, negative and zero sequence components, Average 3-phase power in terms of symmetrical components, sequence impedances and sequence networks, fault calculations sequence network equations, single line to ground fault, line to line fault, double line to ground fault, three phase fault, faults on power systems, faults with fault impedance, reactors and their location, short circuit capacity of a bus.		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. C.L. Wadhwa, "Electrical Power Systems", New Age International Pub. Co, Third Edition, 2001.</li> <li>2. D.P. Kothari and I.J. Nagrath, "Modern Power System Analysis", Tata Mc Graw Hill Pub. Co., New Delhi, Fourth edition, 2011.</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, "A Text book on Power System Engineering", Dhanpat Rai Publishing Company (P) Ltd, 2008.</li> <li>2. John J. Grainger &amp; W.D. Stevenson, "Power System Analysis", Mc Graw Hill International, 1994.</li> <li>3. Hadi Scadat, "Power System Analysis", Tata Mc Graw Hill Pub. Co. 2002.</li> <li>4. W.D. Stevenson, "Elements of Power system Analysis", McGraw Hill International Student Edition.</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.electrical4u.com/">https://www.electrical4u.com/</a></li> <li>2. Power System 2 (PS 2) Pdf Notes - Free Download 2020   SW (smartzworld.com)</li> <li>3. <a href="https://www.sanfoundry.com/1000-power-systems-questions-answers/">https://www.sanfoundry.com/1000-power-systems-questions-answers/</a></li> <li>4. Power Systems MCQ [Free PDF] - Obj</li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. Power Systems by Bakshi   PDF (scribd.com)</li> <li>2. Handbook of Power Systems II   SpringerLink</li> <li>3. <a href="https://easyengineering.net/objective-electrical-technology-by-mehta/">https://easyengineering.net/objective-electrical-technology-by-mehta/</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. NPTEL:: Electrical Engineering - NOC:Power System Engineering</li> <li>2. NPTEL:: Electrical Engineering - Power System Analysis</li> <li>3. Electric Power Systems   Coursera</li> </ol>		



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## DIGITAL ELECTRONICS LABORATORY

### II B. TECH- II SEMESTER (R 22)

Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EC411PC	B. Tech	0	0	2	1	40	60	100

### COURSE OBJECTIVES

1. To learn basic techniques for the design of digital circuits and number conversion systems.
2. To implement simple logical operations using combinational logic circuits.
3. To design combinational logic circuits, sequential logic circuits

### List of Experiments:

1. Realization of Boolean Expressions using Gates
2. Design and realization logic gates using universal gates
3. Generation of clock using NAND/NOR gates
4. Design a 4 – bit Adder / Subtractor
5. Design and realization a 4 – bit gray to Binary and Binary to Gray Converter
6. Design and realization of a 4-bit pseudo random sequence generator using logic gates.
7. Design and realization of an 8-bit parallel load and serial out shift register using flip-flops.
8. Design and realization Asynchronous and Synchronous counters using flip-flops
9. Design and realization 8x1 using 2x1 mux
10. Design and realization 2-bit comparator
11. Verification of truth tables and excitation tables
12. Realization of logic gates using DTL, TTL, ECL, etc.,

### TEXTBOOKS

1. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

### REFERENCE BOOKS

1. R.S. Sedha, "A Textbook of Digital Electronics", S.Chand, 2005
2. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.

### **WEB REFERENCES**

1. <http://blog.digitalelectronics.co.in/>
2. [www.nesoacademy.org/electronics-engineering/digital-electronics/digital](http://www.nesoacademy.org/electronics-engineering/digital-electronics/digital)
3. <https://www.slideshare.net/JournalsPubwwwjourn/international-journal-of-digitalelectronics-vol-2-issue-2>
4. <https://lecturenotes.in/subject/203/switching-theory-and-logic-design-stld>
5. <http://www.infocobuild.com/education/audio-videocourses/electronics/DigitalCircuitsSystems>
6. <https://nptel.ac.in/courses/117105080/>

### **E -TEXTBOOKS**

1. <https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf>
2. <https://easyengineering.net/fundamentals-of-digital-circuits-by-anand-kumar/>

### **MOOCS COURSE**

1. <https://www.smartworld.com/notes/digital-logic-design-dld/>
2. <https://swayam.gov.in/courses/1392-digital-circuits-and-systems>
3. <https://swayam.gov.in/courses/4410-synthesis-of-digital-systems>

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## MEASUREMENTS AND INSTRUMENTATION LABORATORY

### II B. TECH- II SEMESTER (R 22)

Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE405PC	B. Tech	0	0	2	1	40	60	100

### COURSE OBJECTIVES

1. To calibrate Watt, Energy and PF Meter and determination of three phase active & reactive powers.
2. To determine unknown inductance, resistance, capacitance by performing experiments D.C Bridges & A. C Bridges.
3. To determine the ratio and phase angle errors of Instrument transformers. .

### The following experiments are required to be conducted as compulsory experiments:

1. Calibration and Testing of single-phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
5. Dielectric oil testing using H.T. testing Kit.
6. Schering Bridge & Anderson Bridge.
7. Measurement of 3 - Phase reactive power with single-phase wattmeter.
8. Measurement of displacement with the help of LVDT.

### In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

1. Calibration LPF wattmeter – by Phantom testing.
2. Measurement of 3-phase power with single watt meter and two CTs.
3. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given CT by Null method.
4. PT testing by comparison – V. G. as Null detector – Measurement of % ratio error and phase angle of the given PT
5. Resistance strain gauge – strain measurements and Calibration.
6. Transformer turns ratio measurement using AC bridges.
7. Measurement of % ratio error and phase angle of given CT by comparison.

### TEXT BOOKS

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications, 2005.
2. Dr. Rajendra Prasad, "Electrical Measurements & Measuring Instruments", Khanna Publishers 1989.

## REFERENCE BOOKS

1. G. K. Banerjee, "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016.
2. R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007.
4. S. C. Bhargava, "Electrical Measuring Instruments and Measurements", BS Publications, 2012.
5. Buckingham and Price, "Electrical Measurements", Prentice – Hall, 1988.
6. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
7. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011.

## WEB REFERENCES

1. <https://www.te.com/usa-en/products/sensors/position-sensors/linear-position-sensors-lvdtlvit.html?tab=pgp-story>
2. <https://circuitglobe.com/schering-bridge.html>
3. <https://www.electricalengineeringinfo.com/2016/12/different-types-of-dc-potentiometerslaboratory-type-cromptons-vernier-brooks.html>
4. <https://www.electricalengineeringinfo.com/2016/12/different-types-of-dc-potentiometerslaboratory-type-cromptons-vernier-brooks.html>

## E -TEXTBOOKS

1. [https://www.academia.edu/8140873/A\\_K\\_Sawhney\\_A\\_course\\_in\\_Electrical\\_and\\_Electronic\\_Measurements\\_and\\_Instrumentation](https://www.academia.edu/8140873/A_K_Sawhney_A_course_in_Electrical_and_Electronic_Measurements_and_Instrumentation)
2. <https://easyengineering.net/a-textbook-of-electrical-technology-by-rajput/>

## MOOCS COURSE

1. <https://nptel.ac.in/courses/108108076/1>
2. <https://nptel.ac.in/courses/108102146/>
3. <https://nptel.ac.in/courses/108108076/35>



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## ELECTRICAL MACHINES LABORATORY - II

### II B. TECH- II SEMESTER (R 22)

Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
EE406PC	B. Tech	0	0	2	1	40	60	100

### COURSE OBJECTIVES

1. To understand the operation of Induction, Synchronous machines and Transformers.
2. To study the performance analysis of Induction and Synchronous Machines through various testing methods.
3. To analyze the performance of single and 3-phase phase transformer with experiments. .

### The following experiments are required to be conducted as compulsory experiments:

1. Sumpner's test on a pair of single-phase transformers
2. No-load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three –phase alternator by synchronous impedance & m.m.f. methods
4. 'V' and 'Inverted V' curves of a three—phase synchronous motor.
5. Equivalent Circuit of a single-phase induction motor
6. Determination of  $X_d$  and  $X_q$  of a salient pole synchronous machine
7. Load test on three phase Induction Motor
8. Regulation of three-phase alternator by Z.P.F. and A.S.A methods

### In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list:

1. Separation of core losses of a single-phase transformer
2. Efficiency of a three-phase alternator
3. Parallel operation of Single-phase Transformers
4. Heat run test on a bank of 3 Nos. of single-phase Delta connected transformers
5. Measurement of sequence impedance of a three-phase alternator.
6. Vector grouping of Three Transformer
7. Scott Connection of transformer

### TEXTBOOKS

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

### REFERENCE BOOKS

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.

### WEB REFERENCES

1. <https://www.sanfoundry.com> › best-reference-books-advance-electrical-ma
2. <https://swayam.gov.in> › nd1\_noc19\_ee60

### E -TEXTBOOKS

1. **Electrical Machines - II**. Authors, U.A.Bakshi, M.V.Bakshi. Publisher, Technical Publications, 2009. ISBN, 8184316070, 9788184316070.
2. **Electrical Machines 2** by J b Gupta. ISBN: 9350141604, 9789350141601.

### MOOCS COURSE

1. <https://www.classcentral.com/course/swayam-electrical-machines-ii-12948>
2. <https://nptel.ac.in/courses/108106072/>

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## CONSTITUTION OF INDIA

II B. TECH- II SEMESTER (R 22)								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
*CI409MC	B. Tech	3	0	0	0	100	-	100
<b>COURSE OBJECTIVES</b>								
<p>Students will be able to</p> <ol style="list-style-type: none"> <li>1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.</li> <li>2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.</li> <li>3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.</li> </ol>								
<b>UNIT-I</b>							<b>Classes:10</b>	
History of Making of the Indian Constitution- History of Drafting Committee.								
<b>UNIT-II</b>							<b>Classes:10</b>	
Philosophy of the Indian Constitution- Preamble Salient Features								
<b>UNIT-III</b>							<b>Classes:15</b>	
Contours of Constitutional Rights & Duties - Fundamental Rights <ol style="list-style-type: none"> <li>1. Right to Equality</li> <li>2. Right to Freedom</li> <li>3. Right against Exploitation</li> <li>4. Right to Freedom of Religion</li> <li>5. Cultural and Educational Rights</li> <li>6. Right to Constitutional Remedies</li> <li>7. Directive Principles of State Policy</li> <li>8. Fundamental Duties.</li> </ol>								
<b>UNIT – IV</b>							<b>Classes: 15</b>	
Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions								



<b>UNIT-V</b>		<b>Classes:13</b>
Local Administration: District's Administration head: Role and Importance, Municipalities Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO Zila Panchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level Role of Elected and Appointed officials, Importance of grass root democracy		
<b>UNIT-VI</b>		<b>Classes:13</b>
Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.		
<b>TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. H.M. Seervai: Constitutional Law of India</li> <li>2. M.P. Jain: Indian Constitutional Law</li> <li>3. Mahendra P. Singh: V. N. Shukla's Constitution of India</li> <li>4. Granville Austin: The Indian Constitution: Cornerstone of a Nation</li> </ol>		
<b>REFERENCE BOOKS</b>		
<ol style="list-style-type: none"> <li>1. A. Sarveswarareddy, K. Sathish, K. Sudha, Constitution of India, M/S Spectrum Publications, First Edition 2021.</li> <li>2. An Introduction to the Constitution of India by Dr.Durga Das Basu</li> <li>3. An Introduction to the Constitution of India by M.V.Pylee</li> <li>4. Indian Constitutional Law by M.P. Jain</li> </ol>		
<b>WEB REFERENCES</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.wdl.org/en/item/2672/">https://www.wdl.org/en/item/2672/</a></li> <li>2. <a href="https://nptel.ac.in/courses/109103135/24">https://nptel.ac.in/courses/109103135/24</a></li> </ol>		
<b>E -TEXTBOOKS</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://iasexamportal.com/ebook/the-constitution-of-india">https://iasexamportal.com/ebook/the-constitution-of-india</a></li> <li>2. <a href="https://www.india.gov.in/my-government/documents/e-books">https://www.india.gov.in/my-government/documents/e-books</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://nludelhi.ac.in/images/moocs/moocs-courses.pdf">http://nludelhi.ac.in/images/moocs/moocs-courses.pdf</a></li> <li>2. <a href="https://www.classcentral.com/tag/constitutional-law">https://www.classcentral.com/tag/constitutional-law</a></li> </ol>		