RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem.

L	T	P	C
3	0	0	3

(A0001231) ENGINEERING PHYSICS

Course Composition	**Basic Science (BS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To identify the importance of the optical phenomenon like interference, diffraction etc,
2. To enlighten the periodic arrangement of atoms in crystalline solids.
3. To illustrate the phenomena of quantum mechanics and derive Schrodinger
4. To introduce novel concepts of dielectric and magnetic materials
5. To develop novel electronic devices with the knowledge on semiconductors.

COURSE OUTCOMES:

1. Analyze the signal interference and diffraction effects
2. Familiarize with the basics of crystals and assess their structures.
3. Classify various types of polarization of dielectrics and magnetic materials.
4. Understand fundamentals of quantum mechanics and apply to the motion of particles in energy bands of solids.
5. Identify the type of semiconductor using Hall effect

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	3 2 1 1		2	1	1							1			
CO2	3	2	1	2	2										
CO3	2	3	1	2	2							1			
CO4	2	3	2	1	2		1								
CO5	2	2	3	2	1							1			

UNIT-I Wave Optics

Interference: introduction - principle of superposition –interference of light – types of interference - interference in thin films (reflection geometry) - its path difference - applications - colors in thin films- newton's rings experiment - determination of wavelength and refractive index. Diffraction: introduction - fresnel and fraunhofer diffractions - fraunhofer diffraction due to single slit, double slit & n-slits (qualitative) – diffraction grating - dispersive power and resolving power of grating (qualitative). Engineering applications of diffraction. Polarization: introduction -types of polarization - polarization by reflection, refraction and double refraction - nicol's prism -half wave and quarter wave plates – applications of polarization.

UNIT-II Crystallography and X-ray diffraction

Crystal and amorphous solids, lattice, space lattice, basis, unit cell and lattice parameters – bravais lattices – crystal systems (3d) – coordination number - packing fraction of sc, bcc & fcc – packing fraction of diamond - calculation of lattice constant. Directions and planes of a crystal - miller indices – separation between successive (hkl) planes. X-ray diffraction: bragg's law - x-ray diffractometer – crystal structure determination by laue's and powder methods.

UNIT-III Dielectric and Magnetic Materials

Dielectric materials: introduction - dielectric polarization - dielectric polarizability, susceptibility, dielectric constant and displacement vector – relation between the electric vectors - types of polarizations- electronic (quantitative), ionic (quantitative) and orientation polarizations (qualitative) - lorentz internal field - clausius- mossotti equation - complex dielectric constant – frequency dependence of polarization – dielectric loss - applications of dielectrics. Magnetic materials: introduction - magnetic dipole moment - magnetization-magnetic susceptibility and permeability – atomic origin of magnetism - classification of magnetic materials: dia, para, ferro, anti-ferro & ferri magnetic materials - domain concept for ferromagnetism & domain walls (qualitative) - hysteresis - soft and hard magnetic materials - applications of magnetic materials.

UNIT-IV Quantum Mechanics and Free electron theory

Quantum mechanics: dual nature of matter – de broglie's wavelength - heisenberg's uncertainty principle – significance and properties of wave function – schrodinger's time independent and dependent wave equations– particle in a one-dimensional infinite potential well – energies, wave functions and probability densities of the particle. Free electron theory: classical free electron theory (qualitative with discussion of merits and demerits) – quantum free electron theory – electrical conductivity based on quantum free electron theory – sources of electrical resistivity - fermi-dirac distribution - density of states - fermi energy.

UNIT-V Semiconductors

Semiconductors: formation of energy bands – classification of crystalline solids - intrinsic semiconductors: density of charge carriers – electrical conductivity – fermi level – extrinsic semiconductors: density of charge carriers – dependence of fermi energy on carrier concentration and temperature – drift and diffusion currents – einstein's equation - hall effect and its applications. Working principle of a p-n junction diode with its band diagram – working principle of a solar cell.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" AText book of EngineeringPhysics"- S. Chand Publications, 11thEdition 2019.
2. R. K. Gaur and S.C. Gupta, "Engineering Physics", Dhanpat Rai Publications, New Delhi.

REFERENCE BOOKS:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).
5. "Concepts of Modern Physics", Arthus Beiser, Tata Mc Graw Hill Publications, New Delhi.
6. "Physics Volume – II", Resnick, Halliday and Krane, Wiley, New Delhi.

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem.

L	T	P	C
3	0	0	3

(A0002231) LINEAR ALGEBRA & CALCULUS

Course Composition	**Basic Science (BS)**
Course Category	**Employability**
Developmental Needs	**Global**

COURSE OBJECTIVES:

1. To familiarize the concepts of matrices and mean value theorems and their applications in engineering
2. To equip the students to solve various application problems in engineering through evaluation of multiple integrals etc.,
3. To equip the students with standard concepts and tools of mathematics to handle various real-world problems and their applications.

COURSE OUTCOMES:

1. Develop a matrix algebra technique that is needed by engineers for practical applications.
2. Familiarize with functions of several variables which is useful in optimization.
3. Learn important tools of calculus in higher dimensions.
4. Familiarize with double and triple integrals of functions of several variables in two and three dimensions.
5. Identify the applications of advanced calculus & Linear algebra in electro-magnetic theory and in telecommunication engineering

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	2	2										
CO2	3	1	2	2	1										
CO3	2	2	2	2	1										
CO4	3	2	1	3	2										
CO5	2	3	2	1	2										

UNIT-I MATRICES

Introduction to matrices - elementary transformations - rank of a matrix by echelon form, normal form and paq form - cauchy – binet formulae (without proof) - 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 (rank test) - gauss seidel iteration method.

UNIT-II LINEAR TRANSFORMATION AND ORTHOGONAL TRANSFORMATION

Eigenvalues- eigenvectors and their properties-diagonalization of a matrix- cayley-hamilton theorem (without proof) - finding inverse and powers of a matrix by cayley-hamilton theorem. Quadratic forms and nature of the quadratic forms- reduction of quadratic form to canonical form - similar transformation and orthogonal transformation.

UNIT-III CALCULUS

Mean value theorems: rolle's theorem- lagrange's mean value theorem with their geometrical interpretation – inequalities by using lagrange's mean value theorem-problems on the above theorems. Cauchy's mean value theorem - taylor's and maclaurin's theorems with remainders (without proof) - simple examples of taylor's and maclaurin's series.

UNIT-IV PARTIAL DIFFERENTIATION AND APPLICATIONS (MULTI VARIABLE CALCULUS)

Functions of several variables - partial derivatives- total derivatives-chain rule-change of variables- taylor's and maclaurin's series expansion of functions of two variables. Jacobians-maxima and minima of functions of two variables- lagrange method of multipliers with three variables only.

UNIT-V MULTIPLE INTEGRALS (MULTI VARIABLE CALCULUS)

Double integrals-evaluation of double integrals (cartesian and polar) - change of order of integration-evaluation of triple integrals-change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.
3. T.K.V. Iyengar, B. Krishna Gandhi, Mathematical Methods, S. Chand & Company.

REFERENCE BOOKS:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5/e, Alpha Science International Ltd., 2021 (9th reprint).
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 14/e, Pearson Publishers, 2018.
3. Glyn James, Advanced Modern Engineering Mathematics, 5/e, Pearson publishers, 2018.
4. Michael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn.
5. H. K Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand, 2021.
6. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

e-Resources and Digital Material:

1. https://onlinecourses.swayam2.ac.in/aic22_ts31/preview
2. https://onlinecourses.nptel.ac.in/noc23_ma88/preview

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem.

L	T	P	C
3	0	0	3

(A0201231) BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**

COURSE OBJECTIVES:

1. To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.

COURSE OUTCOMES:

1. Understand the basic electrical circuits, AC and DC machines.
2. Analyze different electrical circuits, performance of AC and DC machines.
3. Explain the theory, construction, and operation of electronic devices.
4. Apply the concept of science and mathematics to explain the working of diodes, transistors, and their applications.
5. Analyze small signal amplifier circuits to find the amplifier parameters.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	-	-	3	-	2	-	-	-	2	--	-	2	3	2	-
CO2	3	-	3	-	-	2	-	-	-	-	2	-	3	2	-
CO3	3	2	-	-	-	-	3	-	-	-	-	-	3	2	-
CO4	-	3	-	-	-	-	2	-	-	-	-	-	3	2	-
CO5	3	3	2	-	-	2	3	-	-	-	-	-	3	2	-

UNIT-I DC & AC Circuits

Dc circuits: electrical circuit elements (r, l and c), classification of electrical sources (independent and dependent sources)ohm’s law and its limitations, kcl & kvl, series, parallel, series-parallel circuits, voltage division and current division rule ,super position theorem, simple numerical problems. Ac circuits: a. C. Fundamentals: equation of ac voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, rms value, form factor, peak factor, voltage and current relationship with phasor diagrams in r, l, and c circuits, concept of impedance, active power, reactive power and apparent power, concept of power factor (simple numerical problems).

UNIT-II Machines and Measuring Instruments

Machines: construction, principle and operation of (i) dc motor, (ii) dc generator, (iii) single phase transformer, (iv) production of rotating magnetic field, three phase induction motor and (v) alternator, applications of electrical machines. Important laws:- right hand thumb rule, fleming's right hand rule, fleming's left hand rule, lenz's law measuring instruments: construction and working principle of permanent magnet moving coil (pmmc), moving iron (mi) instruments and wheat stone bridge.

UNIT-III Energy Resources, Electricity Bill & Safety Measures

Energy resources: conventional and non-conventional energy resources; layout and operation of various power generation systems: hydel, nuclear, solar & wind power generation, phospheric acid fuel cell. Electricity bill: power rating of household appliances including air conditioners, pcs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. Equipment safety measures: working principle of fuse and miniature circuit breaker (mcb), merits and demerits. Personal safety measures: electric shock, earthing and its types, safety precautions to avoid shock.

UNIT-IV SEMICONDUCTOR DEVICES

Introduction - evolution of electronics – vacuum tubes to nano electronics – types of semiconductors (intrensic, extrensic-p type, n-type) characteristics of pn junction diode — zener effect — zener diode and its characteristics. Bipolar junction transistor — cb, ce, cc configurations and characteristics — elementary – treatment of small signal amplifier.

UNIT-V BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

Rectifiers and power supplies: block diagram description of a dc power supply, working of half wave rectifier, center tap full wave rectifier, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: block diagram of public address system, circuit diagram and working of common emitter (rc coupled) amplifier with its frequency response, concept of voltage divider biasing. Electronic instrumentation: block diagram of an electronic instrumentation system.

UNIT-VI DIGITAL ELECTRONICS

Number systems:- binary , decimal and their conversion. Logic gates including universal gates, bcd codes, excess-3 code, gray code, hamming code. Boolean algebra, basic theorems and properties of boolean algebra, truth tables and functionality of logic gates – not, or, and, nor, nand, xor and xnor integrated circuits (ics). Simple combinational circuits–half and full adders. Introduction to sequential circuits, flip flops, registers and counters.

TEXT BOOKS:

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011

3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.
4. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
5. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

REFERENCE BOOKS:

1. Principles of Power Systems by V.K. Mehtha, S.Chand Technical Publishers, 2020.
2. A textbook of Electrical Technology by B.L. Theraja, S. Chand and Company, reprint edition, 2014.
3. S. K. Bhatacharya, Basic Electrical and Electronics Engineering, Second Edition, Person Publications, 2018.
4. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
5. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
6. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem. L T P C

(A0301231) ENGINEERING GRAPHICS

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem. L T P C

(A0501231) INTRODUCTION TO PROGRAMMING

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem. L T P C

(A3271231) IT WORKSHOP

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2	PSO3

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem. L T P C

(A0071231) ENGINEERING PHYSICS LAB

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2	PSO3

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem.

L	T	P	C
0	0	3	1.5

(A0271231) ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**

COURSE OBJECTIVES:

1. To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.
2. To impart knowledge on the principles of digital electronics and fundamentals of electron devices.

COURSE OUTCOMES:

1. Get an exposure to common electrical & electronic components and their ratings.
2. Understand the usage of common electrical & electronic measuring instruments.
3. Understand the basic characteristics of electrical machines and perform energy calculations.
4. Plot and discuss the characteristics of various electron devices.
5. Explain the operation of a digital circuit.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	-	2	-	2	-	2	-	-	2	3	2	-
CO2	3	-	3	-	-	2	3	-	-	-	2	-	3	2	-
CO3	3	2	-	-	-	-	3	-	-	-	-	-	3	2	-
CO4	-	3	-	-	-	-	2	-	-	-	-	-	3	2	-
CO5	3	3	2	-	-	2	3	-	-	-	-	-	3	2	-

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises
8. **Verification of Resistors in series and parallel.**
9. **Resistor color coding.**

Note: Minimum Six Experiments to be performed.

PART B: BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.
9. **Study of C.R.O.**
10. **Verification of Truth Tables of T- flip flops using respective ICs.**

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.
Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

TEXT BOOKS:

REFERENCE BOOKS:

1. Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.
4. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
5. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
6. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem. L T P C

(A0571231) COMPUTER PROGRAMMING LAB

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises
8. **Verification of Resistors in series and parallel.**
9. **Resistor color coding.**

Note: Minimum Six Experiments to be performed.

PART B: BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations

5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.
9. **Study of C.R.O.**
10. **Verification of Truth Tables of T- flip flops using respective ICs.**

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.
Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. I Sem. L T P C

(A0072231) NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises
8. **Verification of Resistors in series and parallel.**
9. **Resistor color coding.**

Note: Minimum Six Experiments to be performed.

PART B: BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers

4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.
9. **Study of C.R.O.**
10. **Verification of Truth Tables of T- flip flops using respective ICs.**

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.
Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
2	0	0	2

(A0003232) COMMUNICATIVE ENGLISH

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**Global**
Course Enrichment Relevance as per NEP-2020	**Human Values**

COURSE OBJECTIVES:

1. The main objective of introducing this course, Communicative English, is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry-ready

COURSE OUTCOMES:

1. Understand the context, topic, and pieces of specific information from social or transactional dialogues.
2. Apply grammatical structures to formulate sentences and correct word forms.
3. Analyze discourse markers to speak clearly on a specific topic in informal discussions.
4. Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
5. Create a coherent paragraph, essay, and resume.

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1						2		3	2	3		2			
CO2									2	3		2			
CO3						2			2	3		2			
CO4						2			2	3		2			
CO5									2	2		2			

UNIT-I HUMAN VALUES

Listening: identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions – listing to ted talks speaking: asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. Reading: skimming to get the main idea of a text; scanning to look for specific pieces of information – book review – the monk who sold his ferrari. Writing: mechanics of writing - capitalization, spellings, punctuation, pre-writing techniques - parts of sentences. Grammar: parts of speech, basic sentence structures-forming questions. Vocabulary: synonyms, antonyms, affixes (prefixes/suffixes), root words

UNIT-II NATURE

:lesson: nature: the brook by alfred tennyson (poem) listening: answering a series of questions about main ideas and supporting ideas after listening to audio texts – listening techniques – chinese pictograph. Speaking: discussion in pairs/small groups on specific topics followed by short structure talks. Reading: identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together – sqr3 techniques. Writing: structure of a paragraph - paragraph writing (specific topics) - compare and contrast. Grammar; cohesive devices - linkers, use of articles and zero articles, prepositions. Vocabulary: homonyms, homophones, homographs

UNIT-III Lesson

Biography: elon musk:listening: listening for global comprehension and summarizing what is listened to – sample listening from- ielts (international english language testing system) speaking: discussing specific topics in pairs or small groups and reporting what is discussed. Reading: reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension – sample reading - chandrayaan-3 writing: summarizing, note-making, paraphrasing grammar: verbs - tenses; subject-verb agreement; vocabulary: compound words, collocations

UNIT-IV Lesson

Inspiration: the toys of peace by saki:listening: making predictions while listening to conversations/ transactional dialogues without video; listening with video. Speaking: role plays for practice of conversational english in academic contexts (formal and informal) - asking for and giving information/directions. Reading: studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data writing: letter writing - official letters, resumes - report writing - email writing grammar: reporting verbs, direct & indirect speech, active & passive voice vocabulary: words often confused, jargons - idioms & phrases

UNIT-V Lesson

Motivation: the power of intrapersonal communication (an essay):listening: identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. Speaking: formal oral presentations on topics from academic contexts - preparation of slides reading: reading comprehension - sample reading on engineering in society by sarah bell writing: writing structured essays on specific topics. Grammar: editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement) vocabulary: technical jargon

TEXT BOOKS:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1, 2 & 3)
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5)

REFERENCE BOOKS:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020.
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.
5. Practical English usage by Michall Swan, Oxford University Press.
6. The Definitive guide to IELTS Avademy writing, Oxford University Press 2019.

e-Resources and Digital Material:

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
3	0	0	3

(A0004232) CHEMISTRY

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To familiarize engineering chemistry and its applications
2. To train the students on the principles and applications of electrochemistry and polymers
3. To introduce about the applications of instrumental methods in characterization of materials

COURSE OUTCOMES:

1. Compare the materials of construction for battery and electrochemical sensors.
2. Explain the preparation, properties, and applications of thermoplastics & thermosetting &elastomers conducting polymers.
3. Explain the principles of spectrometry, SLC in separation of solid and liquid mixtures.
4. Apply the principle of Band diagrams in the application of conductors and semiconductors.
5. Summarize the concepts of Instrumental methods.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	1		1				2		1			1			
CO2	1	2			1	1		1							
CO3	2			1			1	1							
CO4	1	2		1	1	2		1		1					
CO5	2	1		2	1			1		1		1			

UNIT-I STRUCTURE AND BONDING MODELS

:fundamentals of quantum mechanics, schrodinger wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of o2 and co, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order. Crystal field theory and its salient features – splitting in octahedral and tetrahedral geometry.

UNIT-II MODERN ENGINEERING MATERIALS

Semiconductors – introduction, basic concept, application super conductors - introduction basic concept, applications. Supercapacitors: introduction, basic concept-classification – applications. Nano materials: introduction, classification, properties and applications of fullerenes, carbon nano tubes and graphene's nanoparticles. Preparation methods – sol-gel method, chemical reduction method.

UNIT-III ELECTROCHEMISTRY AND APPLICATIONS

Introduction – conductance, specific conductance, equivalent conductance and molar conductance – determination of equivalent conductance by wheatstone bridge method, electrochemical cell, nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples primary cells – zinc-air battery, secondary cells –lithium-ion batteries- working of the batteries including cell reactions; fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer electrolyte membrane fuel cells (pemfc).

UNIT-IV POLYMER CHEMISTRY

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization with specific examples and mechanisms of polymer formation. Plastics –thermo and thermosetting plastics, preparation, properties and applications of – pvc, teflon, bakelite, nylon-6,6, nylon 11, carbon fibres. Elastomers – buna-s, buna-n, butyl rubber, thiokol – preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-degradable polymers - poly glycolic acid (pga), polyl lactic acid (pla).

UNIT-V INSTRUMENTAL METHODS AND APPLICATIONS

Electromagnetic spectrum. Absorption of radiation: beer-lambert's law. Uv-visible spectroscopy, electronic transition, absorption and intensity shifts, instrumentation, applications of uv-visible spectroscopy, ir spectroscopies, fundamental modes and selection rules, instrumentation. Applications of ir spectroscopy, chromatography-basic principle, classification-hplc: principle, instrumentation and applications.

TEXT BOOKS:

1. 1) Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. 2) Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

REFERENCE BOOKS:

1. 1) Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. 2) J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. 3) Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition.

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
3	0	0	3

(A0005232) DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

Course Composition	**Basic Science (BS)**
Course Category	**Employability**
Developmental Needs	**Global**

COURSE OBJECTIVES:

1. To enlighten the learners in the concept of differential equations and multivariable calculus.
2. To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

COURSE OUTCOMES:

1. Solve the differential equations related to various engineering fields.
2. Identify solution methods for partial differential equations that model physical processes.
3. Interpret the physical meaning of different operators such as gradient, curl and divergence.
4. Estimate the work done against a field, circulation and flux using vector calculus.
5. Apply the concept of vector integration to solve many problems in field theory, Electromagnetic theory and transmission lines.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	3	1	2										
CO2	3	2	2	2	1										
CO3	2	2	1	2	1										
CO4	3	2	2	1	2										
CO5	2	1	2	1	3										

UNIT-I Differential equations of first order and first degree Formation of ODEs

Formation of odes - solution of odes - linear differential equations – bernoulli’s equations- exact equations and equations reducible to exact form. Applications: newton’s law of cooling – law of natural growth and decay- electrical circuits. (l – r & c – r circuits).

UNIT-II Linear differential equations of higher order (Constant Coefficients)
Definitions- homogenous and non-homogenous- complimentary function(c. F)- general solution,-particular integral(p. I) with rhs term of the type,e^ax, sin ax, cos ax, polynomials in x, e^ax v(x), xv(x). Wronskean-method of variation of parameters-simultaneous linear equations-applications to l-c-r circuit problems and simple harmonic motion.

UNIT-III Partial Differential Equations
Introduction - formation of partial differential equations by elimination of arbitrary constants and arbitrary functions-solutions of first order linear equations using lagrange's method. Homogeneous linear partial differential equations with constant coefficients- method of separation of variables.

UNIT-IV Vector differentiation
Introduction of vector differentiation - scalar and vector point functions-vector operator del,-del applied to scalar point functions, - gradient - directional derivatives. Del applied to vector point functions-divergence and curl- vector identities – del applied twice to point functions.

UNIT-V Vector integration
Line integral-circulation, work done-surface integral,flux-volume integral. Green's theorem in the plane (without proof)- stoke's theorem (without proof)- divergence theorem (without proof) - verification of green's, stoke's and gauss theorems.

TEXT BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.
3. T.K.V. Iyengar, B. Krishna Gandhi, A Text Book of Engineering Mathematics, Vol – I, S. Chand & Company.

REFERENCE BOOKS:

1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2018.
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 14/e, Pearson Publishers, 2018.
4. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5/e, Alpha Science International Ltd., 2021 (9th reprint).
5. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education, 2017.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

e-Resources and Digital Material:

1. https://onlinecourses.nptel.ac.in/noc23_ma86/preview
2. https://onlinecourses.nptel.ac.in/noc23_ma90/preview

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
3	0	0	3

(A0101232) BASIC CIVIL & MECHANICAL ENGINEERING

Course Composition	**Engineering Science (ES)**
Course Category	**Skill Development**
Developmental Needs	**Global**

COURSE OBJECTIVES:

1. Get familiarized with the scope and importance of Civil Engineering sub-divisions. Introduce the preliminary concepts of surveying. Acquire preliminary knowledge on Transportation and its importance in nation's economy. Get familiarized with the importance of quality, conveyance and storage of water. Introduction to basic civil engineering materials and construction techniques..

COURSE OUTCOMES:

1. Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society
2. Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying
3. Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
4. Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated
5. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1			2				1		1			
CO2	3	2	1			2				1		1			
CO3	3	2	1		2	2				1		1			
CO4	3	2	1			2	2			1		1			
CO5	3	2	1			2				1		1			

UNIT-I Basics of Civil Engineering

Role of civil engineers in society- various disciplines of civil engineering- structural engineering- geo-technical engineering- transportation engineering - hydraulics and water resources engineering - environmental engineering -scope of each discipline- building construction and planning- construction materials-cement - aggregate - bricks - cement building bye laws: floor area ratio, carpet area, built up area, super built up area, standard dimensions of residential buildingconcrete- steel-introduction to prefabricated construction techniques

UNIT-II Surveying

Objectives of surveying- horizontal measurements: instruments used in chain survey and its functions - vertical measurements: component parts of levelling instrument and its functions - angular measurements: components of prismatic compass and its functions- levelling instruments used for levelling- introduction to bearings-simple problems on levelling(finding out the r. L.) and bearings(whole circle bearing system and reduced bearing)-contour mapping. - global positioning system (gps) and its applications.

UNIT-III Transportation Engineering

Importance of transportation in nation’s economic development- types of highway pavements- flexible pavements and rigid pavements(structure of pavement, function of pavement components) - simple differences. Basics of harbour, tunnel, airport, and railway engineering. Water resources and environmental engineering: introduction, sources of water- quality of water- specifications- introduction to hydrology–rain water harvesting - water storage and conveyance structures (simple introduction to dams and reservoirs). - cross drainage works: simple introduction to aqueduct, siphon aqueduct, super passage and canal siphon

UNIT-IV

UNIT-V

TEXT BOOKS:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, SatheeshGopi, Pearson Publications, 2009, First Edition.

REFERENCE BOOKS:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition

4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
3	0	0	3

(A0202232) ELECTRICAL CIRCUIT ANALYSIS-I

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**

COURSE OBJECTIVES:

1. To develop an understanding of the fundamental laws and elements of electrical circuits.
2. To develop the ability to apply circuit analysis to DC and AC circuits.

COURSE OUTCOMES:

1. Examine various electrical networks in presence of active and passive elements.
2. Analyze magnetic circuit with various dot conventions.
3. Calculate the parameters of R, L, C network with sinusoidal excitation.
4. Calculate the parameters of R, L, network with variation of any one of the parameters i.e R, L, C and f.
5. Solve Electrical networks by using principles of network theorems.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2		2		2			2	3	2	
CO2	3	2	3	2	3	2	3				2		3	2	
CO3	2	3	2	3	2		3						3	2	
CO4	3	2	2	3	2		2						3	2	
CO5	2	3	3	2	3	2	3						3	2	

UNIT-I Introduction to Electrical Circuits

Basic concepts of passive elements of r, l, c and their v-i relations, types of electrical elements. Sources (dependent and independent), kirchoff's laws, network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation),open circuits, short circuits, source transformation technique, nodal analysis and mesh analysis to dc networks with dependent and independent voltage and current sources, super mesh analysis and super nodal analysis. , node and mesh analysis.

UNIT-II Magnetic Circuits

Basic definition of mmf, flux, flux density, magntic field strength , relationship between magnetic field strength and magnetic flux density and reluctance, analogy between electrical and magnetic circuits, faraday's laws of electromagnetic induction –dynamically induced emf, statically induced emf , self induced emf , mutual induced emf , lenz's law concept of self and mutual inductance, dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.

UNIT-III Single Phase Circuits

Characteristics of periodic functions, average value, r. M. S. Value, form factor, peak factor, representation of a sine function, concept of phasor, phasor diagrams, node and mesh analysis. Steady state analysis of r, l and c circuits to sinusoidal excitations-response of pure resistance, inductance, capacitance, series rl circuit, series rc circuit, series rlc circuit, power triangle and impedance triangle of series rl, rc and rlc circuit. Parallel rl circuit, parallel rc circuit.

UNIT-IV Resonance and Locus Diagrams

Series resonance: characteristics of a series resonant circuit, q-factor, selectivity and bandwidth, expression for half power frequencies. Parallel resonance: q-factor, selectivity and bandwidth. Tank circuit locus diagram: rl, rc, rlc with r, l and c variables.

UNIT-V Network theorems (DC & AC Excitations)

Superposition theorem, thevenin's theorem, norton's theorem, maximum power transfer theorem, reciprocity theorem, millman's theorem and compensation theorem, tellegen's theorem.

TEXT BOOKS:

1. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerley, Mc GrawHill Company,6th edition.
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd

REFERENCE BOOKS:

1. Fundamentals of Electrical Circuits by Charles K. Alexander and Mathew N.O. Sadiku, Mc Graw Hill Education (India)
2. Linear Circuit Analysis by De Carlo, Lin, Oxford publications
3. Electric Circuits – (Schaum's outlines) by Mahmood Nahvi& Joseph Edminister, Adapted by Kuma Rao, 5th Edition – Mc Graw Hill.
4. Electric Circuits by David A. Bell, Oxford publications
5. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications.
6. Circuit Theory (Analysis and Synthesis) by A. Chakrabarthi, Dhanpat Rai & Co.

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
0	0	2	1

(A0073232) COMMUNICATIVE ENGLISH LAB

Course Composition	**Basic Science (BS)**
Course Category	**Skill Development**
Developmental Needs	**Global**
Course Enrichment Relevance as per NEP-2020	**Human Values**

COURSE OBJECTIVES:

1. The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning students will get trained in the basic communication skills and also make them ready to face job interviews

COURSE OUTCOMES:

1. Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit professionalism in participating in debates and group discussions
5. Create effective resonate and prepare themselves to face interviews in future.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1						1		1	2	2		1			
CO2								1	1	3		1			
CO3						1			1	2		2			
CO4						1			2	2		1			
CO5								1	1	2		1			

1. Introduction to Phonetics, Vowels & Consonants - CALL
2. Neutralization/Accent Rules - EPD - CALL
3. Self-Introduction, Communication Skills & JAM - ICS
4. Role Play or Conversational Practice - ICS
5. E-mail Writing and Email Etiquettes - ICS
6. Resume Writing, Cover letter, SOP - CALL
7. Group Discussions - methods & practice - ICS

8. Debates - Methods & Practice - ICS
9. PPT Presentations/ Poster Presentation/ Describing Object - ICS
10. Interview Skills & MOCK Interviews - ICS

TEXT BOOKS:

REFERENCE BOOKS:

1. Meenakshi Raman, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Grant Taylor: English Conversation Practice, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. T. Balasubramanyam, A Textbook of English Phonetics for Indian Students,(3rd Ed) Trinity Press.
5. E.Suresh Kumar, P.Srihari, A Hand Book for English Language Laboratories, Cambridge University Press India Pvt. Ltd., 2009.

e-Resources and Digital Material:

1. http://www.letstalkpodcast.com/
2. https://www.youtube.com/c/mmmEnglish_Emma/featured
3. https://www.youtube.com/c/ArnelsEverydayEnglish/featured

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
0	0	2	1

(A0074232) CHEMISTRY LAB

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. Verify the fundamental concepts with experiments.

COURSE OUTCOMES:

1. Determine the cell constant and conductance of solutions.
2. Prepare advanced polymer Bakelite materials.
3. Measure the strength of an acid present in secondary batteries.
4. Analyse the IR spectra of some organic compounds.
5. Calculate strength of acid in Pb-Acid battery.

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	1		1					2			1			
CO2	1	1	2		2	1	1	1			1				
CO3	2	1			1		2		`11			1			
CO4	1	3	2	1	2		1			1		1			
CO5	2	2	1		2	1			2	1		1			

1. Conductometric titration of strong acid vs. strong base
2. Conductometric titration of weak acid vs. strong base
3. Determination of cell constant and conductance of solutions
4. Potentiometry - determination of redox potentials and emfs
5. Determination of Strength of an acid in Pb-Acid battery
6. Preparation of a Bakelite
7. Verify Lambert-Beer's law
8. Wavelength measurement of sample through UV-Visible Spectroscopy
9. Identification of simple organic compounds by IR
10. Preparation of nanomaterials by precipitation method
11. Estimation of Ferrous Iron by Dichrometry
12. Measurement of 10Dq by spectrophotometric method

13. **Estimation of Copper by using Standard EDTA solution**
14. **Estimation of Magnesium by using Standard EDTA solution**

TEXT BOOKS:

REFERENCE BOOKS:

1. 1) ''Vogel's Quantitative Chemical Analysis" 6th Edition, Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasanka

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
0	0	3	1.5

(A0371232) ENGINEERING WORKSHOP

Course Composition	**Engineering Science (ES)**
Course Category	**Skill Development**
Developmental Needs	**Global**

COURSE OBJECTIVES:

1. To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills

COURSE OUTCOMES:

1. Identify workshop tools and their operational capabilities.
2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
3. Apply fitting operations in various applications
4. Apply basic electrical engineering knowledge for House Wiring Practice

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3
CO1		1	2	2	1				2				1		
CO2					2	1			2				2		
CO3					2	1			2				2		
CO4					2	1			2				2		

1) Demonstration: Safety practices and precautions to be observed in workshop.
2) Wood Working: Familiarity with different types of woods and tools used in wood working and make following joints.
a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3) Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
4) Fitting: Familiarity with different types of tools used in fitting and do the following fitting exercises.
a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-wheeler tyre
5) Electrical Wiring: Familiarity with different types of basic electrical circuits and make the following connections.
a) Parallel and series b) Two-way switch c) Godown lighting d) Tube light
e) Three phase motor f) Soldering of wires
6) Foundry Trade: Demonstration and practice on Moulding tools and processes,

Preparation of Green Sand Moulds for given Patterns.
7) Welding Shop: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8) Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

TEXT BOOKS:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published, 2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

REFERENCE BOOKS:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
0	0	3	1.5

(A0272232) ELECTRICAL CIRCUITS LAB

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**

COURSE OBJECTIVES:

1. The objective of laboratory is to impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics. It also gives practical exposure to the usage of different circuits with different condition.

COURSE OUTCOMES:

1. Determine self, mutual inductance and coefficient of coupling values, parameters of choke coil.
2. Draw locus diagrams of RL, RC series circuits and examine series and parallel resonance.
3. Apply Thevenin's, Norton's, Thevenin's, superposition theorem, maximum power transfer, compensation, reciprocity and Millman's Theorems to compare practical results obtained with theoretical calculations.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	2	3	3	2					2	2	2	3	3	2	
CO2	3	2	2	2					3	2	2	2	3	2	
CO3	3	2	3	2					2	3	2	3	3	2	

List of Experiments:

(Any 10 of the following experiments are to be conducted)

1. Verification of Kirchhoff's circuit laws.
2. Verification of node and mesh analysis.
3. Verification of network reduction techniques.
4. Determination of cold and hot resistance of an electric lamp
5. Determination of Parameters of a choke coil.
6. Determination of self, mutual inductances, and coefficient of coupling
7. Series and parallel resonance
8. Locus diagrams of R-L (L Variable) and R-C (C Variable) series circuits
9. Verification of Superposition theorem

10. Verification of Thevenin's and Norton's Theorems
11. Verification of Maximum power transfer theorem
12. Verification of Compensation theorem
13. Verification of Reciprocity and Millman's Theorems
14. **Verification of Star-Delta and Delta –Star Transformation**
15. **Verification of formfactor, average value of various signals.**

TEXT BOOKS:

REFERENCE BOOKS:

1. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerley, Mc GrawHill Company,6th edition.
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem. L T P C

(A0075232) HEALTH AND WELLNESS, YOGA AND SPORTS

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3

List of Experiments:

(Any 10 of the following experiments are to be conducted)

1. Verification of Kirchhoff's circuit laws.
2. Verification of node and mesh analysis.
3. Verification of network reduction techniques.
4. Determination of cold and hot resistance of an electric lamp
5. Determination of Parameters of a choke coil.
6. Determination of self, mutual inductances, and coefficient of coupling
7. Series and parallel resonance
8. Locus diagrams of R-L (L Variable) and R-C (C Variable) series circuits
9. Verification of Superposition theorem
10. Verification of Thevenin’s and Norton’s Theorems
11. Verification of Maximum power transfer theorem
12. Verification of Compensation theorem
13. Verification of Reciprocity and Millman’s Theorems
14. **Verification of Star-Delta and Delta –Star Transformation**
15. **Verification of formfactor, average value of various signals.**

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I B.Tech. II Sem.

L	T	P	C
0	0	3	1.5

(A0271232) ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**

COURSE OBJECTIVES:

1. To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.
2. To impart knowledge on the principles of digital electronics and fundamentals of electron devices.

COURSE OUTCOMES:

1. Get an exposure to common electrical & electronic components and their ratings.
2. Understand the usage of common electrical & electronic measuring instruments.
3. Understand the basic characteristics of electrical machines and perform energy calculations.
4. Plot and discuss the characteristics of various electron devices.
5. Explain the operation of a digital circuit.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	-	2	-	2	-	2	-	-	2	3	2	-
CO2	3	-	3	-	-	2	3	-	-	-	2	-	3	2	-
CO3	2	2	-	-	-	-	3	-	-	-	-	-	3	2	-
CO4	3	3	-	-	-	-	2	-	-	-	-	-	3	2	-
CO5	2	3	2	-	-	2	3	-	-	-	-	-	3	2	-

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises
8. **Verification of Resistors in series and parallel.**
9. **Resistor color coding.**

Note: Minimum Six Experiments to be performed.

PART B: BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.
9. **Study of C.R.O.**
10. **Verification of Truth Tables of T- flip flops using respective ICs.**

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.
Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

TEXT BOOKS:

REFERENCE BOOKS:

1. Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.
4. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
5. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
6. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

e-Resources and Digital Material: