		L	T	P	C
B.Tech. I Semester	**LINEAR ALGEBRA & CALCULUS (R231101)** (Common to All Branches of Engineering)	3	0	0	3

Pre-requisites: Basic knowledge in Mathematics

Course Objectives:

1. To familiarize the students with the theory of matrices and quadratic forms.
2. To explain the series expansions using mean value theorems.
3. To teach basic concepts of partial derivatives.
4. To demonstrate the evaluation and applications of double and triple integrals.

Course Outcomes: At the end of the course, the student will be able to

CO1:Apply matrix techniques to solve system of linear equations.
CO2:Compute various powers of a matrix and identify the nature of the quadratic form
CO3:Apply the concepts of mean value theorems.
CO4:Calculate total derivative, Jacobian and maxima/minima of function of two variables.
CO5:Find areas and volumes using double and triple integrals.

UNIT I: Matrices

Rank of a matrix by echelon form, normal form. Cauchy–Bi net 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, Jacobi and Gauss Seidel Iteration Methods.

UNIT II:Eigen values, Eigenvectors and Orthogonal Transformation

Eigen values, Eigen vectors 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.

UNIT III: Calculus

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT IV: Partial differentiation and Applications (Multivariable calculus)

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives,chain rule, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT V: Multiple Integrals (Multivariable Calculus)

Double integrals, triple integrals, change of order of integration, 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. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 2017, 44thEdition.
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley& Sons, 2018,10thEdition.

REFERENCES

1. Thomas Calculus, George Thomas, Maurice D. Weirand Joel Hass, Pearson Publishers,2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G.Zilland Warren S.Wright, Jones and Bartlett,2018.
3. Advanced Modern Engineering Mathematics, GlynJames, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, R.K. Jain and S.R.K. Iyengar, Alpha Science International Ltd., 20215thEdition (9th reprint).
5. Higher Engineering Mathematics, B.V. Ramana, McGraw HillEducation,2017

Web Links:

1. https://archive.nptel.ac.in/courses/111/104/111104137/
2. https://archive.nptel.ac.in/courses/111/107/111107108/

		L	T	P	C
B.Tech. I Semester	**ENGINEERING PHYSICS (R231102)** (Common to CE, EEE, ME, ECE & CSE)	3	0	0	3

Pre-requisites: Knowledge of theoretical and experimental Physics from +2 Level.

Course Objectives:

1. Impart knowledge of wave optics phenomena like interference, diffraction and polarization required to design instruments with higher resolution.
2. Study the crystal structures, properties and their relationship exhibited by solid state materials.
3. Explore the knowledge of magnetic and dielectric materials and their utility in appliances.
4. Impart the fundamental concepts of quantum mechanics and free electron theory.
5. Understandthe physics of semiconductorsand their working mechanism for their utility in Engineering applications.

Course Outcomes:

At the end of the course, the student will be able to

CO1: Analyze the intensity variation of light due to interference, diffraction and polarization.
CO2: Familiarize with the basics of crystal structures and structure determination techniques.
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4: Explain the basic concepts of Quantummechanics and the free electron theory of solids.
CO5: Understand the physics of semiconductors and the mechanisms of current flow in semiconductors.

UNIT – I Wave Optics **10hrs**

Interference: Principle of superposition –Interference of light – Interference in thin films (Reflection Geometry) & applications –Colours in thin films- Newton's Rings- Determination of wavelength and refractive index.

Diffraction: Introduction – Fresnel and Fraunhofer diffractions – Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Difraction Grating – Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction-Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT –II Crystallography and X-ray diffraction **8hrs**

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices –crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC – 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 10hrs

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.

Magnetic Materials: Introduction - Magnetic dipolemoment - 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.

UNIT–IV Quantum Mechanics and Free Electron Theory 10hrs

Quantum Mechanics: Dual nature of matter – 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.

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 - Fermi-Dirac distribution –Density of states -Fermi energy

UNIT –V Semiconductors 8hrs

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.

Textbooks:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - D.K. Bhattacharya and Poonam Tandon, Oxford press(2015)
3. Engineering Physics by V. Rajendran, Tata McGraw-Hill Education.

Reference Books:

1. Engineering Physics -B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics – Shatendra Sharma, Jyotsna Sharma, Pearson Education,2018.
3. Engineering Physics-Sanjay D.Jain, D. Sahasrabudhe and Girish, University Press, 2010.
4. Engineering Physics -M.R. Srinivasan, New Age international publishers (2009).
5. Fundamentals of Physics – Halliday, Resnick and Walker,10th edition, John Wiley & Sons, 2013.

Web Resources

1. https://www.loc.gov/rr/scitech/selected-internet/physics.html
2. NPTEL: https://www.youtube.com/watch?v=s57qWFlt_fw
3. NPTEL: https://www.youtube.com/watch?v=3RZZQvEVrEA
4. NPTEL: http://youtu.be/OTDVov_kw6A
5. NPTEL: https://slideplayer.com / slide / 3866455 / 64 / video / CHAPTER + 3%3A +CRYSTAL+STRUCTURES+%26 amp%3B+PROPERTIES.mp4
6. NPTEL: https://youtu.be/na6mYwzIuhM
7. NPTEL: https://youtu.be/DocyilQj8yE
8. https://nptel.ac.in/courses/113106032/15%20-%20Magnetic%20Properties.pdf
9. http://www.nptelvideos.in/2012/11/quantum-mechanics-and-applications.html
10. https://nptel.ac.in/courses/122/106/122106034/
11. https://nptel.ac.in/courses/108/108/108108122/
12. NPTEL: https://www.youtube.com/watch?v=WiIdfUWjXog

I Semester	**(R231103)** (Common to CE, EEE, ME, ECE, IT, CSM, CSD & CAD)	2	0	0	2

Pre-requisites: Basic knowledge in English

Course Objectives:

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:

After the completion of the course, the student will be able to

CO1: hone human and ethical values and develop language proficiency.

CO2: improve word power and rudiments of grammar along with verbal techniques.

CO3: narrate the biographies of eminent personalities and their contributions to society.

CO4: apply grammatical structures and develop confidence levels through inspirational stories.

CO5**:** develop language competence with a special emphasis on intrapersonal skills.

UNITI

Lesson: HUMANVALUES: Gift of Magi **(Short Story)**

Listening: Identifying the topic, he context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing one self and others.

Reading: Skimming together main idea of a text; scanning to look for specific pieces of information.

Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.

Grammar: Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNITII

Lesson: NATURE: The Brook by Alfred Tennyson(Poem)

Listening:

Answeringaseriesofquestionsaboutmainideasandsupportingideasafterlisteningto audio texts.

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.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices linkers, use of articles and zero article; prepositions.

Vocabulary: Homonyms, Homophones, Homographs.

UNITIII

Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussingspecifictopicsinpairsorsmallgroupsandreportingwhatisdiscussed

Reading: Reading a text in detail by making basic inferences recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Note-making, paraphrasing
Grammar: Verbs- tenses; subject- verb agreement; Compound words, Collocations
Vocabulary: Compound words, Collocations

UNITIV
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
Grammar: Reporting verbs, Direct &Indirect speech, Active &Passive Voice
Vocabulary: Words of ten confused, Jargons

UNITV
Lesson: MOTIVATION: The Power of Intra personal 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
Reading: Reading comprehension.
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 Jargons

TEXTBOOKS:
1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units1,2 & 3)
2. Empowering with Language by Cengage Publications, 2023(Units4 &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.WordPowerMadeEasy-TheCompleteHandbookforBuildingaSuperiorVocabulary. Anchor, 2014.

WEB RESOURCES:

GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

I Semester	(R231104) (Common to CE, EEE, ME, ECE &CSE)	3	0	0	3

PART-A: BASIC CIVIL ENGINEERING

Course Objectives:

- To get familiarized with the scope and importance of Civil Engineering sub-divisions.
- To understand the preliminary concepts of surveying.
- To Acquire preliminary knowledge on Transportation and its importance in nation'seconomy.
- To get familiarized with the importance of quality, conveyance, and storage of water.
- To get the knowledge on basic civil engineering materials and construction techniques.

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Understand various sub-divisions of Civil Engineering as well as to attain knowledge on construction materials and prefabricated technology.

CO2: Know the concepts of surveying and to understand the measurement of distances, angles, and levels through surveying.

CO3: Understand the importance of Transportation and water resources engineering to promote environmental sustainability.

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 concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT II

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements. Introduction to Bearings Levelling instruments used for levelling - Simple problems on levelling and bearings-Contour mapping.

UNIT III

Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - 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–Rainwater Harvesting- Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

TEXTBOOKS:

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, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. FifthEdition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, KhannaPublishers, Delhi. 2016

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives:

- To get familiarized with the scope and importance of Mechanical Engineering in differentsectors and industries.

- To know the different engineering materials and different manufacturing processes.
- To provide an overview of different thermal and mechanical transmission systems andintroduce basics of robotics and its applications.

Course Outcomes:

After completion of the course, the student will be able to

CO1: Understand the different types of engineering materials.

CO2: Explain the different types of manufacturing processes, basics of thermal engineering and its applications.

CO3: Describe the working of different mechanical power transmission systems, power plants and the basics of robotics & its applications.

UNIT I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting**,** Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – working principle of Steam, Diesel, Hydro, Nuclear power plants.

Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives, and their applications.

Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(**Note**: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

TEXTBOOKS:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India)Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications,(India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengagelearning India Pvt. Ltd.

Reference Books:

1. AppuuKuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I.
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak MPandey, Springer publications.
3. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt.Ltd.
4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, TataMcGraw Hill publications (India) Pvt. Ltd.

		L	T	P	C
B.Tech. I Semester	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (R231105)** (Common to CE, EEE, ME, ECE, CSE)	3	0	0	3

PART A: BASIC ELECTRICAL ENGINEERING

Course Objectives

- 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:

After the completion of the course students will be able to

CO1: Understand the elements of electrical DC & ACnetworks.

CO2: Understand the Performance of DC machines, AC machines and Measuring Instruments.

CO3**:** Apply mathematical tools to electricity bill calculations and fundamental concepts of safety measures in electrical power systems.

UNIT I: DC & AC Circuits

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, 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) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

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.

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.

TEXTBOOKS:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

WEB RESOURCES:

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives:

- To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

Course Outcomes:

At the end of the course, the student will be able to

CO 1: Understand the Characteristics of Electronic Devices.
CO 2: Analyze various Electronic Circuits.
CO 3: Analyze different Logic gates & combinational circuits

UNIT I: SEMICONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - 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 CE Amplifier.

UNIT II: BASIC ELECTRONIC CIRCUITS AND INSTRUMENTATION

Rectifiers and power supplies: Block diagram description of a dc power supply, 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. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III: DIGITAL ELECTRONICS

Overview of Number Systems, 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. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Textbooks:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

		L	T	P	C
B.Tech. I Semester	**ENGINEERING PHYSICS LAB (R231106L)** (Common to CE, EEE, ME, ECE & CSE)	0	0	2	1

Pre-requisites: Knowledge of intermediate experimental Physics from +2 Level.

Course Objectives:

1. To gain practical knowledge by applying the experimental methods to correlate with the theoretical studies.
2. To learn the usage of electrical and optical systems for various measurements.
3. Apply the analytical techniques and graphical analysis to the experimental data.
4. To achieve perfectness in experimental skills and the study of practical applications.
5. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

Course Outcomes:

At the end of the course, the student will be able to:

CO1:compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.

CO2: build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.

CO3:determine the optical parameters based on interference and diffraction.

CO4: find the mechanical, electrical and magnetic properties of materials.

List of Experiments

(Any of the TEN experiments are required to be conducted)
(8 from physical Lab & 2 from virtual Lab)

Physical Lab Experiments

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Determination of wavelength of Laser light using diffraction grating.
4. Determination of energy gap of a semiconductor using p-n junction diode.
5. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
6. Determination of temperature coefficients of a thermistor.
7. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
8. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
9. Sonometer: Verification of laws of stretched string.
10. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.
11. Verification of Brewster's law
12. Determination of dielectric constant using charging and discharging method.
13. Determination of magnetic susceptibility by Kundt's tube method.

Virtual Lab Experiments

14. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
15. Estimation of Planck's constant using photoelectric effect.
16. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
17. Determination of young's modulus for the given material of wooden scale by non-uniform bending (or double cantilever) method.
18. Determination of the resistivity of semiconductors by four probe methods.
19. Study various crystal structures.

References:

1. A Text book of Practical Physics- S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.
2. College customized Engineering Physics Lab Manual.

WEB RESOURCES:

1. www.vlab.co.in
2. https://vlab.amrita.edu
3. https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

B.Tech. I Semester	COMMUNICATIVE ENGLISH LAB (R231107L) (Common to CE, EEE, ME, ECE, IT, CSM, CSD& CAD)	L	T	P	C
		0	0	2	1

Pre-requisites: Basic English Knowledge

Course Objectives:

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. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes:
After the completion of the course, the student will be able to

CO1: compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the laboratory.
CO2: build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
CO3: use accentual patterns effectively in an accurate manner and develop language proficiency by practicing LSRW skills.
CO4:apply the techniques of group discussion and debating methods, make presentations effectively with confidence and face the interviews dexterously.

List of Topics:
1. Vowels & Consonants
2. Neutralization/ Accent Rules
3. Communication Skills &JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions- methods &practice
8. Debates-Methods &Practice
9. PPT Presentations/Poster Presentation
10. Interviews Skills

Suggested Software:
- Walden InfoTech
- Young India Films

Reference Books:
1. Raman Meenakshi, Sangeeta-Sharma. TechnicalCommunication.OxfordPress.2018.
2. TaylorGrant:EnglishConversationPractice,TataMcGraw-HillEducationIndia,2016.
3. Hewing's, Martin. Cambridge Academic English(B2). CUP,2012.
4. J. Sethi &P.V. Dhamija. A Course in Phonetics and Spoken English, (2nd Ed), Kindle, 2013.

WEB RESOURCES:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice &Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA
5. http://www.real-english.com/

B.Tech. I Semester	ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP (R231108L) (Common to CE, EEE, ME, ECE, CSE)	L	T	P	C
		0	0	3	1.5

Activities:
Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
Provide some exercises so that hardware tools and instruments are learned to be used by the students.
Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
Provide some exercises so that measuring instruments are learned to be used by the students.

Components:
Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.

PART A: ELECTRICAL ENGINEERING LAB

Course Objectives:
To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Course Outcomes:
CO1: Compile the data organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.
CO2: Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
CO3:Analyze various characteristics of electrical circuits, electrical machines and measuring instruments.

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

Reference Books:
1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:

- To impart knowledge on the fundamentals of electron devices and digital circuits.

Course Outcomes:

At the end of the course, the student will be able to

CO1: Compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.

CO2: Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.

CO3: Identify & testing of various electronic components

CO4: Demonstrate the functionality of electronic devices and digital circuits.

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. Verification of Truth Tables of Half adder and full adder circuits.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

References:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

B.Tech. I Semester	ENGINEERING WORKSHOP (R231109L) (Common to CE, EEE, ME, ECE & CSE)	L	T	P	C
		0	0	3	1.5

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

Course Outcomes: At the end of the course, the student will be able to

CO1: Compile the data, organize, and analyze it for discussion and report the findings and observations from experiential learning activities in the laboratory.

CO2: Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.

CO3: Identify workshop tools and practice on manufacturing of components using workshop trades including fitting, carpentry, Tin smithy, foundry, and welding.

CO4: Apply fitting operations in various applications and apply basic electrical engineering knowledge for House Wiring Practice.

List of Experiments:

1. **Demonstration**: Safety practices and precautions to be observed in workshop.
2. **Wood Working:** Familiarity with different types of woods and tools used in woodworking 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 metalworking, 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.

Textbooks:

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.

B.Tech. I Semester	HEALTH AND WELLNESS, YOGA AND SPORTS (R231110L) (Common to All branches of Engineering)	L	T	P	C
		-	-	1	0.5

Pre-requisites: Basic knowledge about physical and mental health.

CourseObjectives:
Themainobjectiveofintroducingthiscourseistomakethestudentsmaintaintheirmentaland physical wellness by balancing emotions in their life.It mainly enhances the essential traitsrequiredfor thedevelopment ofthe personality.

CourseOutcomes:
After completionofthecourse, thestudentwill be able to
CO1:Understandtheimportanceofyogaandsportsfor Physicalfitnessandsoundhealth.
CO2: Demonstrate an understanding of health-related fitness components.
CO3: Compareandcontrastvariousactivitiesthathelpenhancetheirhealth.
CO4: Assess current personal fitness levels.
CO5: DevelopPositivePersonality

UNITI
ConceptofhealthandfitnessNutritionandBalanceddiet,basicconceptofimmunityRelatio nshipbetweendietandfitness,Globalizationanditsimpactonhealth,BodyMassIndex(BMI) of all agegroups.
Activities:
i) Organizinghealthawarenessprogrammesincommunity
ii) Preparationofhealthprofile
iii) Preparationof chart forbalancedietforall agegroups

UNITII
Conceptofyoga,needforandimportanceofyoga,originandhistoryofyogainIndiancontext,cl assification of yoga, Physiological effects of Asanas- Pranayama and meditation, stressmanagementand yoga,Mental health and yogapractice.
Activities:
Yogapractices–Asana,Kriya,Mudra,Bandha,Dhyana,SuryaNamaskar

UNITIII
Concept of Sports and fitness, importance, fitness components, history of sports, Ancient andModernOlympics, Asiangames and Commonwealth games.
Activities:
i) Participation in one major game and one individual sport viz., Athletics, Volleyball,Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricketetc.
ii) Practicing general and specific warm up, aerobics
iii) Practicingcardiorespiratoryfitness,treadmill,runtest,9minwalk,skippingandrunning .

ReferenceBooks:
1. GordonEdlin,EricGolanty.HealthandWellness,14thEdn.Jones&BartlettLearning,202 2
2. T.K.V.Desikachar.The HeartofYoga:DevelopingaPersonalPractice
3. ArchieJ.Bahm. YogaSutras ofPatanjali, JainPublishing Company,1993
4. Wiseman,JohnLofty,SASSurvivalHandbook:TheUltimateGuidetoSurvivingAnywher eThird Edition, William Morrow Paperbacks, 2014

5. TheSportsRulesBook/HumanKineticswithThomasHanlon.--

B.Tech. II Semester	DIFFERENTIAL EQUATIONS& VECTOR CALCULUS (R231201) (Common to All Branches of Engineering)	L	T	P	C
		3	0	0	3

Pre-requisites: Basic knowledge in Mathematics

Course Objectives:

1. To familiarize the student in the concepts of linear differential equations.
2. To demonstrate the concepts of partial differential equations.
3. To explain the concepts of vector differentiation and integration.

Course Outcomes:

At the end of the course, the student will be able to

CO1: Identify whether the given differential equation of first order is linear, exact or not.
CO2: Solve linear ordinary differential equations of higher order and its applications.
CO3: Find a solution of linear and non-linear PDEs
CO4: Calculate gradient of a scalar function, divergence and curl of a vector function.
CO5: Apply Green's, Stokes and Gauss divergence theorem in evaluation of line, surface and volume integrals.

UNIT I Differential equations of first order and first degree

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.

UNIT II Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, 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 and 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.

UNIT IV Vector differentiation

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT V Vector integration

Line integral-circulation-work done, surface integral-flux,Green's theorem in the plane (without proof),Stoke's theorem (without proof) volume integral, Divergence theorem (without proof) and related problems.

TEXT BOOKS

1. Higher Engineering Mathematics, B.S. Grewal , Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley&Sons, 2018,10th Edition.

References

1. ThomasCalculus,GeorgeB.Thomas,MauriceD.Weirand JoelHass,PearsonPublishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics,Dennis G.Zilland WarrenS.Wright, JonesandBartlett, 2018.
3. AdvancedModernEngineeringMathematics,GlynJames,Pearsonpublishers,2018, 5th Edition.
4. AdvancedEngineeringMathematics,R.K.JainandS.R.K.Iyengar,AlphaScienceInternationalLtd. , 2021, 5thEdition (9th reprint).
5. Higher Engineering Mathematics, B.V.Ramana, McGraw HillEducation,2017.

WEB LINKS:

1. https://archive.nptel.ac.in/courses/111/106/111106100/
2. https://archive.nptel.ac.in/courses/111/105/111105122/

B.Tech. II Semester	Introduction to Programming (R231204) (Common to All Branches of Engineering)	L	T	P	C
		3	0	0	3

Course Objectives:

To introduce students to the fundamentals of computer programming.

- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as datatypes, control structures, functions, and arrays.
- To encourage collaborative learning and team work in coding projects.

Course Outcomes: A student after completion of the course will be able to

CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2:Analyze a problem and develop an algorithm to solve it.
CO3: Implement various algorithms using the C programming language.
CO4:Understand more advanced features of C language.
CO5:Develop problem-solving skills and the ability to debug and optimize the code.

UNIT I Introduction to Programming and Problem Solving

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program algorithms,flowcharts(UsingDiaTool),pseudocode.IntroductiontoCompilation and Execution, Primitive Data Types, Variables and Constants, Basic Input and Output, Operations,Type Conversion, and Casting.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT II Control Structures

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT III Arrays and Strings

Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT IV Pointers & User Defined Data types

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined datatypes-Structures and Unions.

UNIT V Functions & File Handling

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Life time of Variables, Basics of File Handling

Textbooks:

1. "TheCProgrammingLanguage",BrianW.KernighanandDennisM.Ritchie,Prentice-Hall,1988
2. Schaum'sOutlineofProgrammingwithC,ByronSGottfried,McGraw-HillEducation,1996

ReferenceBooks:

1. ComputingfundamentalsandCProgramming,Balagurusamy,E.,McGraw-HillEducation,2008.
2. ProgramminginC,RemaTheraja, Oxford,2016,2nd edition
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad,CENGAGE,3rdedition

B.Tech. II Semester	ENGINEERING GRAPHICS (R231205) (Common to CE, EEE, ME, ECE & CSE)	L	T	P	C
		1	0	4	3

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines, and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:

At the end of the course, the student will be able to

CO1: Understand the principles of engineering drawing and construct the polygons, engineering curves, scales.
CO2: Draw and interpret orthographic projections of points, lines and planes in front, top and side views.
CO3: Understand and draw projection of solids in various positions in first quadrant.
CO4: Draw the sectional views and explain principles behind development of surfaces.
CO5: Convert the isometric views into orthographic views & vice versa and create 2D, 3D objects using Auto CAD.

UNIT-I:

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and vernier scales.

UNIT-II:

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes
Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT III

Projections of Solids: Types of solids: Polyhedral and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramidand cone.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings ofobjects including PCB and Transformations using Auto CAD (*Not for end examination*).

TEXTBOOK:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana, and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M. B. Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

B.Tech. II Semester	CHEMISTRY (R231211) (Common to ECE & CSE)	L	T	P	C
		3	0	0	3

Pre-requisites: Intermediate Chemistry

Course Objectives:
- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electrochemistry and polymers.
- To introduce instrumental methods.

Course Outcomes:
At the end of the course, the student will be able to
CO1: apply the concepts of quantum mechanics and chemical bonding to understand the behavior of electrons and molecular orbital diagrams.
CO2: comprehend engineering applications of semiconductors, super conductors, graphene and nano-materials
CO3: apply the concepts of electrochemistry to conductometric, potentiometric titrations and electrochemical sensors.
CO4: enumerate the uses of polymeric materials.
CO5: explain principles andapplicationsof UV-Visible, IR spectroscopy and chromatographic techniques.

UNIT I: STRUCTURE AND BONDING MODELS
Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory– bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II: MODERN ENGINEERING MATERIALS
Semiconductors – Introduction, basic concept, application Superconductors-Introduction basic concept, applications.
Supercapacitors: Introduction, BasicConcept-Classification–Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

UNIT III: ELECTROCHEMISTRY AND APPLICATIONS
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, with specific examples and mechanisms of polymer formation.
Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.
Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers–poly acetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers-Poly Glycolic Acid(PGA), Poly Lactic Acid(PLA).

UNIT V: INSTRUMENTAL METHODS AND APPLICATIONS

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification- HPLC: Principle, Instrumentation and Applications.

TEXT BOOKS

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

References

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

WEB RESOURCES

1.https://nptel.ac.in/courses/104101130
2. https://archive.nptel.ac.in/courses/122/101/122101001/

		L	T	P	C
B.Tech. II Semester	**NETWORK ANALYSIS (ECE & allied branches) (R231216)**	3	0	0	3

Course Objectives:

- To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits
- To impart knowledge on applying appropriate theorem for electrical circuit analysis
- To explain transient behavior of circuits in time and frequency domains
- To teach concepts of resonance
- To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

Course Outcomes:

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

CO1: Analyse basic electrical circuits with nodal, mesh analysis and network simplification theorems.
CO2: Analyse electrical networks in the Laplace domain and Find Transient response.
CO3: Find Steady state response of a network.
CO4: Analysis of Coupled Circuits
CO5: Compute the parameters of a two-port network.

UNIT I

Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples.
Network Theorems: Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens - problem solving using dependent sources also.

UNIT II

Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots.
Laplace transform: introduction, Laplace transformation, basic theorems, problem solving using Laplace transform, partial fraction expansion, Heaviside's expansions, problem solving using Laplace transform.

UNIT III

Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L- C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving using Laplace transforms also.

UNIT IV

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies.

Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.

UNIT V

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also.

Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.

TEXTBOOKS:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.
3. Network lines and Fields by John. D. Ryder 2nd Edition, PHI

References:

1. D. Roy Choudhury, Networks and Systems, New Age International Publications, 2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017
3. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.

B.Tech. II Semester	Chemistry Lab (R231213L) (Common to ECE & CSE)	L	T	P	C
		0	0	2	1

Pre-requisites: **Intermediate Chemistry Lab**

Course Objective:
- Verify the fundamental concepts with experiments.

Course Outcomes:
At the end of the course, the students will be able to
CO1: Compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.
CO2: Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
CO3: Determine the strength of unknown solutions by using different types of volumetric titrations like acid base, redox and complexometric titrations.
CO4: Apply the acquired knowledge of electro chemistry and spectroscopy to conduct experiments like conductometric, potentiometric, colorimetry and PH metric titrations.

List of Experiments
(Any ten experiments from the following list)
1. Measurement of 10 Dqbyuv-visible spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Potentiometry- determination of redox potentials and emfs.
5. Determination of cell constant and conductance of solutions
6. Determination of Strength of an acid in Pb - Acid battery
7. Preparation of a Bakelite
8. Verify Lambert - Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nano materials by precipitation method
12. Estimation of Ferrous Ion by Dichrometry
13. Estimation of Sodium Hydroxide by using standard Hydrochloric acid.
14. Estimation of amount of Copper ion by using EDTA method.
15. Estimation of strength of acetic acid by using pH meter (pH metry method)

Reference:
- "Vogel's Quantitative Chemical Analysis 6th Edition "Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar.

WEB RESOUCES:
1. https://vlab.amrita.edu/index.php?sub=2&brch=190

B.Tech. II Semester	Computer Programming Lab (R231208L) (Common to All Branches of Engineering)	L	T	P	C
		0	0	3	1.5

Course Objectives:

The course aim is to give students hands–on experience and train the month concepts of the C-programming language.

Course Outcomes:

CO1: Read, understand, and trace the execution of programs written in C language.

CO2: Select the right control structure for solving the problem.

CO3:Develop C programs which utilize memory efficiently using programming constructs like pointers.

CO4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

UNIT-I

WEEK 1
Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:
Tutorial1: Problem-solving using Computers.

Lab1: Familiarization with programming environment
i) Basic Linux environment and its editors likeVi, Vim & Emacsetc.
ii) Exposure to Turbo C, Gcc
iii) Write simple programs using printf(),scanf()

WEEK 2
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments/Activities:
Tutorial2: Problem-solving using Algorithms and Flowcharts.
Lab1: Converting algorithms/flowcharts into C Source code.

Developing the algorithms/flowcharts for the following sample programs

i) Sum and average of 3numbers
ii) Conversion of Fahrenheit to Celsius and vice versa
iii) Simple interest calculation

WEEK 3

Objective: Learn how to define variables with the desired data-type ,initialize them with Appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:

Tutorial3: Variable types and type conversions:

Lab3: Simple computational problems using arithmetic expressions.

i) Finding the square root of a given number
ii) Finding compound interest
iii) Area of a triangle using heron's formulae
iv) Distance travelled by an object

UNIT II

WEEK 4

Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and associativity:

Lab4: Simple computational problems using the operator'precedence and associativity

i) Evaluat e the following expressions.
    a. A+B*C+(D*E)+F*G
    b. A/B*C-B+A*D/3
    c. A+++B---A
    d. J=(i++) +(++i)
ii) Find the maximum of three numbers using conditional operator
iii) Take marks of 5 subjects in integers, and find the total,average in float

WEEK 5

Objective: Explore the full scope of different variants of "if construct" namely if-else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can beusedandhowtousethem.Exploreallrelationalandlogicaloperatorswhilewritingconditionalsfor"if construct".

Suggested Experiments/Activities:

Tutorial5: Branching and logical expressions:

Lab5:Problemsinvolvingif-then-elsestructures.

i) Write a Cprogram to find the max and min of four numbers using if-else.
ii) Write a C program to generate electricity bill.
iii) Find the roots of the quadratic equation.
iv) Write a C program to simulate a calculator using switch case.
v) Write a C program to find the given year is a leap year or not.

WEEK 6

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and For loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial6: Loops,while and for loops

Lab6: Iterative problems e.g.,the sum of series

i) Find the factorial of given number using any loop.
ii) Find the given number is a prime or not.
iii) Compute sine and cosseries
iv) Checking a number palindrome
v) Construct a pyramid of numbers.

UNIT-III

WEEK 7:

Objective: Explore the full scope of Arrays construct namely defining and initializing 1-Dand 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-Darrays,explore search solution linear search.

Suggested Experiments/Activities:

Tutorial7:1DArrays searching.

Lab7:1D Array manipulation, linear search

i) Find the min and max of a 1-D integer array.
ii) Perform linear search on1D array.
iii) The reverse of a 1D integer array
iv) Find 2's complement of the given binary number.
v) Eliminate duplicate elements in an array.

WEEK 8:

Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:

Tutorial8:2D arrays, sorting and Strings.

Lab8: Matrix problems, String operations, Bubble sort

i) Addition of two matrices
ii) Multiplication two matrices
iii) Sort array elements using bubblesort
iv) Concatenate two strings without built-in functions
v) Reverse a string using built-in and without built-in string functions

UNIT-IV

WEEK 9:

Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & amp; value initialization, resizing changing and reordering the contents of an

array and memory de-allocation using malloc(), calloc(), realloc() and free() functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:

Tutorial9: Pointers, structures and dynamic memory allocation

Lab9: Pointers and structures,memory dereference.

i) Write a Cprogram to find thesum of a 1D array using malloc()
ii) Write a C program to find the total,average of n students using structures
iii) Enter n students data using calloc() and display failed students list
iv) Read student name and marks from the commandline and display the student details along with the total.
v) Write a Cprogram to implement realloc()

WEEK 10:

Objective :Experiment with C Structures, Unions, bitfields and self-referential structures(Singlylinked lists) and nested structures

Suggested Experiments/Activities:

Tutorial10: Bit fields ,Self-Referential Structures, Linked lists

Lab10: Bit fields,linked lists

Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit-fields

i) Create and display a single linked list using self-referential structure.
ii) Demonstrate the differences between structures and unions using a C program.
iii) Write a C program to shift/rotate using bit fields.
iv) Write a C program to copy one structure variable to another structure of the same type.

UNIT-V

WEEK 11:

Objective: Explore the Functions, sub-routines, scope and extent of variables ,doing some experiments by parameter passing using call by value.Basic methods of numerical integration

Suggested Experiments/Activities:

Tutorial11: Functions,call by value,scope and extent,

Lab11: Simple functions using call by value, solving differential equations using Eulers theorem.

i) Write a C function to calculate NCR value.
ii) Write a C function to find the length of a string.
iii) Write a C function to transpose of a matrix.
iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12:

Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:

Tutorial12: Recursion, the structure of recursive calls

Lab12: Recursive functions

i) Write a recursive function to generate Fibonacci series.
ii) Write a recursive function to find the lcm of two numbers.

iii) Write a recursive function to find the factorial of a number.
iv) Write a C Program to implement Ackermann function using recursion.
v) Write a recursive function to find the sum of series.

WEEK 13:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers

Suggested Experiments/Activities:
Tutorial13: Call by reference, dangling pointers

Lab13: Simple functions using Call by reference, Dangling pointers.
i) Write a C program to swap two numbers using call by reference.
ii) Demonstrate Dangling pointer problem using a Cprogram.
iii) Write a C program to copy one string into another using pointer.
iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK 14:
Objective: To understand datafiles and file handling with various file I/O functions. Explore the differences between text and binary files.

Suggested Experiments/Activities:
Tutorial14: File handling

Lab14: File operations

i) Write a C program to write and read text into a file.
ii) Write a C program to write and read text into a binary file using fread() and fwrite()
iii) Copy the contents of one file to another file.
iv) Write a C program to merge two files into the third file using command-line arguments.
v) Find no.of lines,words and characters in a file
vi) Write a C program to print last n characters of a given file.

Textbooks:
1. Ajay Mittal, Programming in C:A practical approach,Pearson.
2. Byron Gottfried,Schaum' sOutline of Programming with C,McGrawHill

Reference Books:
1. BrianW.KernighanandDennisM.Ritchie,TheCProgrammingLanguage,Prentice-HallofIndia
2. CProgramming,AProblem-SolvingApproach,Forouzan,Gilberg,Prasad,CENGAGE

B.Tech. II Semester	IT Workshop (R231209L) (Common to All Branches of Engineering)	L	T	P	C
		0	0	2	1

Course Objectives:

- To introduce the internal parts of a computer, peripherals, I/Oports, connecting cables
- To demonstrate configuring the system as Dualboot both Windows and other Operating SystemsViz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spreadsheets and Presentation tools.

Course Outcomes

CO1: Perform Hardware troubleshooting.

CO2: Understand Hardware components and their inter dependencies.

CO3: Safeguard computer systems from viruses/worms.

CO4: Document / Presentation preparation. Perform calculations using spreadsheets.

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMW are) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMW are) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and popup blockers. Also, plug-ins like Macromedia Flash and JRE for app lets should be configured.

Task3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

La TeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft(MS) office or equivalent(FOSS) tool word: Importance of La TeX and MS office or equivalent(FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeX and word Accessing, overview of tool bars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, News paper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Text boxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MSoffice or equivalent(FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel–Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel –average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWERPOINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slideslotter, notes etc) and Inserting –Background, textures, Design Templates, Hidden slides.

AITOOLS – Chat GPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations or even providing in complete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

- Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:

2. Comdex Information Technology course toolkit, Vikas Gupta, WILEY Dreamtech,2003
3. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
4. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
5. PC Hardware- A Handbook, Kate J. Chase, PHI(Microsoft)
6. La TeX Companion, Leslie Lamport, PHI/Pearson.
7. IT Essentials PC Hardware and Software Companion Guide, David Anfinson and KenQuamme.– CISCO Press, Pearson Education,3rd edition
8. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education,3rdedition

B.Tech. II Semester	NETWORK ANALYSIS AND SIMULATION LAB (R231217L) (ECE & allied branches)	L	T	P	C
		0	0	3	1.5

Course Objectives:

- To gain hands-on experience in verifying Kirchoff's laws and network theorems
- To analyze transient behavior of circuits
- To determine 2-port network parameters

Course Outcomes:

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

CO1: Compile the data,organize and analyze it for discussion and report the findings and Observations from experimental learning activities in the laboratory.

CO2: Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.

CO3: Verify Kirchoff's laws and Network theorems.

CO4: Characterize and model the network in terms of all network parameters.

The experiments need to be simulated using software and the same need to be verified using the hardware.

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits
3. Verification of Superposition, Thevenin's& Norton theorems for AC circuits
4. Verification of maximum power transfer theorem for AC circuits
5. Verification of Tellegen's theorem for two networks of the same topology.
6. Study of DC transients in RL, RC and RLC circuits
7. To study frequency response of various 1st order RL & RC networks
8. To study the transient and steady state response of a 2nd order circuit by varying its various parameters and studying their effects on responses
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters
11. Determination of hybrid (H) and transmission (ABCD) parameters
12. To measure two port parameters of a twin-T network and study its frequency response.

Hardware Requirements:

Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components

Software requirements:

Multisim/Pspice/Equivalent simulation software tool, Computer Systems with required specifications

References:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.

B.Tech. II Semester	NSS/NCC/Scouts & Guides/Community Service (R231210L) (Common to all branches)	L	T	P	C
		-	-	1	0.5

Pre-requisites: Basic societal Knowledge

Course Objective:
- The objective of introducing this course is to impart discipline, character, fraternity, team work, social consciousness among the students and engaging them in selfless service.

Course Outcomes:
After completion of the course, the students will be able to
CO1: Understand the importance of discipline, character and service motto.
CO2:Solvesomesocietal issues by applying acquired knowledge, facts, and techniques.
CO3:Explorehuman relationshipsbyanalyzingsocialproblems.
CO4:Determinetoextendtheir helpforthefellowbeingsanddowntroddenpeople.
CO5:Developleadershipskillsandcivicresponsibilities.

UNITI: Orientation
GeneralOrientationonNSS/NCC/Scouts&Guides/CommunityServiceactivities,careerguidance.
Activities:
i) Conducting–icebreakingsessions-expectationsfromthecourse-knowingpersonaltalents andskills
ii) Conductingorientationsprogramsforthestudents–futureplans-activities-releasingroadmap etc.
iii) Displayingsuccessstories – motivationalbiopics- award winningmoviesonsocietalissuesetc.
iv) Conductingtalent show in singingpatriotic songs-paintings-any othercontribution.

UNITII: Nature & CareActivities:
i) Bestoutofwastecompetition.
ii) Posterandsignsmakingcompetitiontospreadenvironmentalawareness.
iii) Recyclingandenvironmentalpollutionarticlewritingcompetition.
iv) OrganisingZero-wasteday.
v) DigitalEnvironmentalawarenessactivityviavarioussocialmediaplatforms.
vi) Virtualdemonstrationof differenteco-friendlyapproachesforsustainableliving.
vii) Writeasummaryonanybookrelatedtoenvironmentalissues.

UNITIII: Community ServiceActivities:
i) ConductingOneDaySpecialCampinavillagecontactingvillage-arealeaders – Surveyin the village, identification of problems- helping them to solve via media-authorities-experts-etc.
ii) ConductingawarenessprogramsonHealth-relatedissuessuchasGeneralHealth,Mentalhealth, Spiritual Health, HIV/AIDS,
iii) ConductingconsumerAwareness.Explainingvariouslegalprovisionsetc.
iv) WomenEmpowermentProgrammes-SexualAbuse,AdolescentHealthandPopulationEducation.
v) Anyotherprogrammesincollaborationwithlocalcharities,NGOs etc.

ReferenceBooks:

1. NirmalyaKumarSinha&SurajitMajumder,ATextBookofNationalServiceScheme,Vol;.I, VidyaKutirPublication,2021(ISBN978-81-952368-8-6)
2. *RedBook* – NationalCadetCorps–StandingInstructionsVolI&II,DirectorateGeneralof NCC, Ministry ofDefence,NewDelhi
3. DavisM.L.andCornwellD.A.,"IntroductiontoEnvironmentalEngineering",McGraw Hill, New York4/e 2008
4. MastersG.M.,JosephK.andNagendranR."IntroductiontoEnvironmentalEngineeringan d Science",PearsonEducation, New Delhi. 2/e2007
5. RamAhuja.*SocialProblemsin India*,RawatPublications,NewDelhi.