21BS1111: MATHEMATICS-I (Linear Algebra and Differential calculus)

(Common to all branches)

L	T	P	C
3	1	-	4

Course Objectives: To learn

1. Types of matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form
4. To estimate the value for the given data using interpolation
5. Geometrical approach to the mean value theorems and their application to themathematical problems
6. Partial differentiation, concept of total derivative
7. Finding maxima and minima of function of two and three variables.

Course Outcomes: After learning the contents of this paper the student must be able to

1. Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
2. Find the Eigen values and Eigenvectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Estimate the value for the given data using interpolation.
5. Solve the applications on the mean value theorems.
6. Find the extreme values of functions of two variables with/ without constraints.

UNIT-I: Matrices

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation

UNIT-III: Numerical Techniques

Solution of Algebraic and Transcendental Equations: Bisection method; Regular-False method; Iteration Method; Newton-Raphson method.

Interpolation: Finite differences, other operators, Newton's forward and backward difference interpolation formulae. Lagrange's method of interpolation formulae.

UNIT-IV: Differential Calculus& Special functions

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's mean value Theorem. Taylor's Series for one variable (without proof). Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates) for known curves.

Special Functions: Definition of Improper Integral; Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

Definitions of Limit and continuity. Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence and independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

TEXTBOOKS:

[1] B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition,2014

[2] N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

[3] Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

REFERENCES:

[1] Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.

[2] G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint,2002.

[3] Paras Ram, Engineering Mathematics, 2nd Edition, CBSPublishes

[4] Rajinder Kumar Jain, S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, Newedition

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B. Tech I Year Syllabus **VBIT- R21**

21BS1112/1212-APPLIED PHYSICS (Common to CSE, CSM,CSC,CSD,CSB, ECE, EEE & IT)

L	T	P	C
3	1	-	4

Course Objectives:

1. To enlighten the necessity of Quantum Mechanics and to provide fundamentals of de 'Broglie waves, quantum mechanical wave equation and its applications.
2. To explain the basic concepts and transport phenomenon of charge carriers in semiconductors and applications of diodes.
3. To understand the basic concepts of Electromagnetic theory.
4. To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
5. To understand the mechanisms of emission of light, the use of lasers as light sources for technical applications, study of propagation of light wave through optical fibers along with applications in communications.

Course Outcomes: After completion of this course the student is able to

1. Explain the concept of dual nature of matter and understand the significance of wave function.
2. Estimate the concentration of charge carriers in semiconductors and will be able
3. To determine the type of semiconductors.
4. Learn the basic laws of Electro magnetism.
5. Learn various dielectric properties and their usage in various engineering applications.
6. Learn principle, working of various laser systems and light propagation through optical fibers.

UNIT –I:

INTRODUCTION TO QUANTUM PHYSICS:

Introduction to quantum physics, Black body radiation, Planck's law (Qualitative treatment only), Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Physical significance of the wave function ψ, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT –II:

SEMICONDUCTOR PHYSICS:

Intrinsic and Extrinsic semiconductors, Position of fermi energy level in intrinsic and extrinsic semiconductors, calculation of carrier concentration of Intrinsic semiconductor, Hall Effect, formation of PN junction, forward and reverse bias (V-I Characteristics), energy diagram of PN junction, Direct and indirect band gap semiconductors, LED: Device structure, Materials and Characteristics, Solar cell working principle and Characteristics, PIN and Avalanche photodiode.

UNIT – III:

ELECTROMAGNETISM:

Scalar and Vector fields, Significance of Gradient , divergence and Curl, GaussDivergence Theorem and Stokes Theorem(Qualitativetreatment),Coulomb's law, Gauss law of electrostatics, Electric current and continuity equation, Amperes law, Modified Ampere's law and Faraday's laws, Maxwell's Equations in Integral and Differential form, Derivation of Maxwell's Equations from Integral form to Differential form.

UNIT – IV:

ENGINEERING MATERIALS:

DIELECTRICS: Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, types of polarizations: electronic and ionic polarizations (quantitative treatment), internal field, Clausius-Mossotti relation, ferroelectricity, Piezo and Pyro electricity.

MAGNETIC MATERIALS: Magnetization, Permeability, magnetic field intensity, magnetic field induction, magnetic susceptibility, Bohr magneton, classification of magnetic materials, domain theory, and hysteresis curve, soft and hard magnetic materials,Introduction to Superconductivity.

UNIT –V

LASERS AND OPTICAL FIBERS:

Lasers: Characteristics of lasers, absorption, spontaneous and stimulated emission of radiation, population inversion,Einstein coefficients, Basic components of laser, pumping mechanisms, Types of lasers: Ruby laser, Helium – Neon laser, semiconductor laser, applications of lasers.

Fiber Optics: Principle of optical fiber (TIR), construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: single mode, multimode, step index and graded index fibers, attenuation in optical fibers, applications of optical fibers with special focus on communications.

TEXT BOOKS:

1. Solid State Physics, A. J. Dekker, Macmillan publishers Ind. Ltd.,
2. Solid State Physics, Charles Kittel, Wiley student edition.
3. Engineering Physics, B.K. Pandey, S. Chaturvedi – Cengage Learning.
4. Halliday and Resnick, Physics – Wiley.
5. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar – S. Chand Publications.
6. Introduction to Electrodynamics - David Griffiths, 4th edition, Pearson Education of India.

REFERENCES:

1. Engineering Physics S.O.Pillai, New Age International publications.
2. Engineering Physics P.K. Palanisamy, SciTech Publications.

3. Modern Engineering Physics A.S. Vasudeva S.Chand publications
4. Engineering Physics H.K.Malik and A.K.Singh, McGraw Hill Publications.
5. Engineering Physics R.K.Gaur and S.L.Gupta, Dhanpat Ray Publications.
6. Electro Magnetic Theory and Electrodynamics – Satya Prakash- Edition-2019, Kedar Nath Ram Nath Publications.

21BS1113/21BS1213: Engineering Chemistry
(Common to CSE, CSC, CSD, IT, EEE, ECE, CSB & CSM)

L	T	P	C
3	0	0	3

Course Objectives:

1. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the students to understand the technology based onthem.
2. To acquire knowledge of Nanomaterials and their engineeringapplications.
3. To acquire knowledge of Electrochemistry and Corrosion, which are essential for the engineersin their respective fields.
4. To acquire required knowledge of polymers.
5. To acquire the skills pertaining to spectroscopy and apply them for various materialstudies.

Course Outcomes:

1. They gain the knowledge of atomic, molecular and electronic changes, Band theory related to conductivity ofmaterials.
2. They can prepare the Nanomaterials and apply their properties for engineering use.
3. They can be able to construct the batteries and also the methods forcontrolling corrosion.
4. They can prepare and apply the various polymeric materials.
5. They gain the required skills of spectroscopic methods and their application for engineeringmaterials.

UNIT-I

Molecular structure and Theories of Bonding: Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and F_2 molecules. π molecular orbitals of Butadiene and Benzene. Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and Square Planar geometries. Band structure of solids and effect of doping on conductance.

UNIT-II

Nanomaterials: Definition of Nanomaterials, Classification of Nanomaterials based upon Dimension and Chemical composition. Preparation-High energy ball milling, Chemical Vapour Deposition, Wet Chemical Synthesis, Gas condensation Processing, Chemical Vapour Condensation, laser ablation. Carbon Nanomaterials: Graphene, Nano Graphite, Fullerenes, carbon Nanotubes, Nanowires, Nanocones. Properties of Nanomaterials. Applications in Medicine, Catalysis, Environment and Textiles, Biomimicry-Water proofing paints (Lotus leaf) and Gecko tapes.

UNIT-III

Electrochemistry and Corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation, Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium-ion battery). Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

UNIT-IV

Polymers: Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples.

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, compounding, compression and injection molding. Preparation, Properties and engineering applications of PVC and Bakelite.

Fibers: Characteristics of fibers – preparation, properties and applications of Nylon-6, 6 and Dacron. Fiber reinforced plastics (FRP) – Applications.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages – Polylactic acid and poly vinyl alcohol and their applications.

UNIT-V

Spectroscopic techniques and applications: Electronic Spectroscopy-Principle, Beer-Lambert's law, Electronic transitions, Terms-Chromophore, Auxochrome, Bathochromic shift, Hypsochromic shift, Hyperchromic shift and Hypochromic shift, Selection rules and Applications. IR Spectroscopy-Principle, Vibrational modes, Selection rules and Applications. NMR Spectroscopy- Principle, chemical shift-Shielding effect, Deshielding effect with Ethanol as an example, Reference (TMS), Selection rules and Applications, Introduction to Magnetic resonance Imaging (MRI).

TEXT BOOKS:

1. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning; 1st edition (2019).

2. Engineering Chemistry by Jain & Jain, Dhanpat Rai & Co. (P) Limited; 16th edition (2017).

3. Fundamentals of Molecular Spectroscopy by C.N.Banwell, McGraw Hill Education; 4th edition (2017).

4. Engineering Chemistry by SS Dara and SS Umare, S Chand Publications; 12th edition (2004).

REFERENCES:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, 2nd edition (2015).
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. 2nd edition (2017).
3. Materials Science and Engineering: An Introduction by William D. Callister and David G. Rethwisch, Wiley Publication; 9th edition (2013).
4. Understanding Nanomaterials by Malkiat S. Johal,CRC Press; 1st Edition (2018).
5. Applications of Nanomaterials in Human Health by Firdos Alam Khan, Springer Publication;1st edition (2021).
6. Organic Spectroscopy by William Kemp, Macmillan; 2nd edition (2019).

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21BS1115: ENGINEERING PHYSICS
(Common to CE& ME)

L	T	P	C
3	1	0	4

Course Objectives:

1. To understand periodic arrangement of atoms in crystal structures and correlate the properties of new materials using X- ray diffraction methods.
2. To understand the significance of optical phenomenon such as interference, diffraction related to its technical applications.
3. Familiarize the concepts of theoretical acoustics for their practical utility in engineering acoustics. Explanation for the significance of ultrasound and its application in NDT application.
4. The primary knowledge of waves and oscillations provides insights into a diverse complex phenomenon in engineering applications.
5. Exposure to nanomaterials is essential to learn multidisciplinary and interdisciplinary applications related to nano technology.

Course Outcomes:
After completion of this course the student is able to

1. Interpret various crystal systems, identify the crystal planes using miller indices, and analyses the structure of crystals by Laue and Powder diffraction methods.
2. Explain the need of coherent sources, identify the engineering applications of interference and diffraction.
3. Explain sound waves and its propagation/absorption of construction material used in design of buildings and identify the use of ultrasonics in diversified fields of engineering.
4. Recognize various types harmonic oscillations and their importance in resolving challenges in technical applications.
5. Identify different synthesis methods and explain the engineering applications of nano materials and CNT.

UNIT –I

CRYSTALLOGRAPHY:

Space lattice, unit cell and lattice parameters, basis, crystal systems, Bravais crystal systems, co-ordination number and packing factor of SC, BCC, FCC. Miller indices, crystal planes and directions, inter planar spacing, structure of NaCl.

X-RAY DIFFRACTION:

Introduction to X-rays, Bragg's law, XRD methods: Laue and powder methods

UNIT –II

WAVE OPTICS:

Huygens Principle, Superposition of waves and interference of light by wavefront splitting and Amplitude Splitting, Young's double slit Experiment, Newton's Rings, Fraunhofer diffraction from a single slit and N-slits, diffraction Grating-Resolving Power.

UNIT –III

Acoustics and Ultrasonics:
Acoustics: Introduction – requirements of acoustically good hall– Reverberation – Reverberation time– Sabine's formula (Derivation using growth and decay method) - Absorption coefficient and its determination – Factors affecting acoustics of buildings and their remedial measures.

Ultrasonics: Introduction - Properties - Production by magnetostriction and piezoelectric methods – Detection - Acoustic grating - Non Destructive Testing – pulse echo system through transmission and reflection modes - Applications

UNIT –IV
WAVES AND OSCILLATIONS: Longitudinal, Transverse and standing waves,the simple oscillator, characteristics of SHM, energy of a Simple harmonic Oscillator, frequency of vibrating spring, damped harmonic oscillator, energy and power dissipation in damped harmonic oscillator,logarithmic decrement, relaxation time and quality factor,Forced Vibrations, resonance and electrical analogy for a simple oscillator.

UNIT –V
ADVANCED NANOMATERIALS: Introduction and properties – synthesis – chemical vapour deposition – ball milling – applications. Carbon nanotubes: structure and properties – synthesis– arc method – Pulsed laser deposition- applications.

TEXT BOOKS:

1. Engineering Mechanics, 2nd ed.- MK Harbola, Cengage Learning.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar – S. Chand Publications.
3. Solid State Physics, CharlesKittel, Wiley's student edition.
4. Introduction to Nano technology-by Charles P. Poole & F. J. OwensWiley's interscience-2003 Edition.

REFERENCES:

1. Engineering Physics S.O.Pillai, New Age International publications.
2. Engineering Physics P.K. Palanisamy, SciTech Publications.
3. Modern Engineering Physics A.S. Vasudeva, S.Chand publications
4. Engineering Physics H.K.Malik and A.K.Singh, McGraw Hill Publications.
5. Engineering Physics R.K.Gaur and S.L.Gupta, Dhanpat Ray Publications.

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B. Tech I Year Syllabus **VBIT - R21**

21HS1111/21HS1211: ENGLISH
(Common to ALL)

INTRODUCTION

L	T	P	C
2	0	0	2

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Course Objectives: The course will help to

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

Course Outcomes: Students should be able to

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SYLLABUS:

UNIT –I

- **Text**: 'Why the Indian Family is a Great Institution' by Mr.Venkaiah Naidu, the Vice-President of India, Published May 14 2018
- **Source**: https://www.thehindubusinessline.com/opinion/why-the-indian-family-is-a-great-institution-ep/article23884420.ece
- **Poem**: A Snowflake Falls by Ruth Adams, Published: Feb 2006
- **Source**: https://www.familyfriendpoems.com/poem//a-snowflake-falls
- Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes. Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives
- Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
- Reading: Reading and Its Importance- Techniques for Effective Reading.
- Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II

'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

- Vocabulary: Synonyms and Antonyms- Words from Foreign Languages and their Use in English.
- Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
- Reading: Improving Comprehension Skills – Techniques for Good Comprehension
- Writing: Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents- Format of a Formal Letter-Writing Formal Letters eg., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III

The Man Who Carved a Road through the Mountain byJosceline Anne Mascarenhas. January 16, 2015 (Source: Internet)

- Vocabulary: - Collocations – One-word Substitutes

- Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.
- Reading: Sub Skills of reading - Skimming, Scanning
- Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence

UNIT –IV

'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

- Vocabulary: Standard Abbreviations in English - Phrasal verbs
- Grammar: Redundancies and Clichés in Oral and Written Communication.
- Reading: Comprehension- Intensive Reading and Extensive Reading
- Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT –V

Text-I: 'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Text-II: The Myth of the Shy Gene

Source: Sayre, K. (2001). The Myth of the Shy Gene. In Unstoppable Confidence: Unleash your Natural Confidence Within. Essay, Unstoppable Books.

- Vocabulary: Technical Vocabulary and their usage – Idiomatic Expressions
- Grammar: Common Errors in English
- Reading: Reading Comprehension-Exercises for Practice
- Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Prescribed Textbook:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers.Cambridge University Press.

References:

1. Swan, M. (2016). Practical English Usage.Oxford University Press.

2. Kumar, S and Lata, P.(2018). Communication Skills.Oxford University Press.

3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.

4. Zinsser, William. (2001). On Writing Well.Harper Resource Book.

5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.

6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press

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B. Tech I Year Syllabus **VBIT - R21**

21CS1111: PROGRAMMING FOR PROBLEM SOLVING
(Common to ALL)

L	T	P	C
3	-	-	3

Course Objectives:
1. To learn the fundamentals of computers and understand the structure of a C Program.
2. To learn how to develop a program using control structures.
3. To learn how to use arrays and pointers to solve problems
4. To learn heterogeneous types i.e. Structures and unions.
5. To learn how to use files in various applications.

Course Outcomes:
1. Able to understand the basics components of computer and languages and able to apply Control structures in program development.
2. Able to apply modular programming concept to solve problems.
3. Able to apply arrays and pointers to solve various problems.
4. Able to develop programs using structures and unions.
5. Able to develop applications using files.

UNIT I

INTRODUCTION TO C PROGRAMING:

Computer Systems: Computer Languages, Creating and running programs, Program Development. Flow chart, Algorithm, Pseudo code.

Overview of C Language: Background, C Program structure, C Tokens(Identifiers, key words, constants, symbols), Data Types, Variables, Input/output functions.

Operators: Arithmetic, relational, logical, bitwise, conditional, increment/decrement, assignment operators etc., C program examples. Expressions, Operator Precedence and Associativity, Expression Evaluation, Type conversions.

UNIT II

Control statements: Selection Statements (decision making) – if and switch statements Repetitive/Iterative statements (loops) - while, do-while, for with C Program examples.
break, continue, goto, return etc with C program examples

Arrays: Concept of array in C, one dimensional arrays, Accessing and manipulating elements of arrays, Two – dimensional arrays, multidimensional arrays, C program examples

UNIT III

Functions-Designing Structured Programs, user defined functions- categories, parameter passing mechanisms, inter function communication, Standard functions, Storage classes-auto, register, static, extern, scope rules,C program examples.

Recursion- recursive functions.

Pointers – Definition, Introduction (Basic Concepts), Pointers for inter function communication (call by value and call by reference), pointers to pointers, compatibility, passing an array to a function, Pointer Applications - Arrays and Pointers, Pointer Arithmetic **,** Pointer to functions.

UNIT IV

STRINGS – Concepts, C Strings, String Input / Output functions, array of strings, string manipulation functions, C program examples.

STRUCTURES AND UNIONS: Structures – Declaration, initialization, accessing structure members, C program examples. Structures and functions, unions, bit fields, C programming examples, the type definition (typedef), Enumerated types.

UNIT V

FILE HANDLING AND PREPROCESSOR COMMANDS: Concept of file- text files and binary files, Opening and Closing files, file opening modes, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions.. fseek() , rewind() and ftell() . C program examples.

Preprocessor commands- Macro substitution, File inclusion, C program examples.

TEXT BOOKS:

1. A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
3. Programming in C. P. Dey and M Ghosh , Oxford University Press.
4. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

REFERENCE BOOKS:

1. C for All, S. ThamaraiSelvi, R.Murugesan, Anuradha Publications.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
3. Programming in C, Ajay Mittal, Pearson.
4. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
5. Problem solving with C, M.T.Somasekhara, PHI
6. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.

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21ME1111: ENGINEERING MECHANICS
(Common to ME & CE)

L	T	P	C
3	1	-	4

Course Objectives: The objectives of this course are to

1. Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium
2. Comprehend the effect of friction on general plane motion.
3. Locate the centroid and center of gravity of a body.
4. Compute the area moment of inertia and mass moment of inertia of standard and composite sections.
5. Explain kinematics and kinetics of particles, rectilinear, curvilinear motion of bodies. Also make clear the concepts of work-energy and Impulse momentum method and its applications.

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

1. Compute the resultant of system of forces in plane and space acting on bodies and analyze equilibrium of a body subjected to a system of forces.
2. Analyze and solve equilibrium problems with friction and bodies subjected to friction.
3. Calculate the location of centroid and center of gravity of various composite sections.
4. Solve area and mass moment of inertia of composite sections.
5. Analyze dynamics of a body undergoing different motions.

UNIT-I

INTRODUCTION TO MECHANICS: Introduction to Mechanics, Basic Concepts, Various System of Forces Coplanar Concurrent Collinear Forces – Resultant Force - Triangle and Parallelogram law of Forces, Components in Space Resultant -Moment of Force – Principle of Moments and its Application - Couples and Resultant of Force Systems.

EQUILIBRIUM OF SYSTEM OF FORCES: Concept Equilibrium, Free body diagrams, Equations of Equilibrium of Coplanar Systems, Lami' s theorem and its applications in force analysis and Spatial Systems.

UNIT-II

FRICTION: Introduction, Types of Friction -Limiting Friction -Laws of Friction – Coefficient of Friction - Static and Dynamic Frictions - Motion of Bodies by General Friction Analysis and Problem Solving.

CONCEPT OF INCLINED PLANES IN FRICTION: Wedge Friction - Ladder Friction and Screw jack – Applications.

UNIT-III

CENTROIDS: Introduction to Centroid, definition - Centroid of Simple Planes from Basic Principle – Centroid of different Composite Planes.

CENTER OF GRAVITY: Introduction, Centre of Gravity of various bodies – Center of gravity of composite bodies.

UNIT-IV

AREA MOMENTS OF INERTIA: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration. Transfer Theorem for moment of inertia - Moments of Inertia of Composite Figures.

MASS MOMENT OF INERTIA: Introduction – Radius of gyration - Transfer Formula for Mass Moments of Inertia - Moment of Inertia of various mass bodies - Mass moment of inertia of composite bodies.

UNIT-V

INTRODUCTION TO DYNAMICS: Kinematics of Particles: Rectilinear motion, curvilinear motion. Kinetics of Particle: Motion of bodies in Rectilinear coordinates and motion of connected bodies, D-Alembert's principle, Other methods to solve kinetic problems: Work-Energy and Impulse momentum.

TEXT BOOKS:

1. Engineering Mechanics - A.K. Tayal/Umesh Publications.
2. Engineering Mechanics – N.H. Dubey/TMH
3. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP
4. Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall

REFERENCES:

1. Engineering Mechanics -S.Timoshenko and D.H. Young/TMH.
2. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP

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21EE1111 / 21EE1211: Basic Electrical Engineering
(Common for CSE, CSM, CSC, CSBS, ECE, EEE, IT, CSD)

L	T	P	C
3	0	0	3

Pre-Requisites: Mathematics, applied physics

Course Objectives:

1. To introduce the concepts of electrical circuits and itscomponents
2. To understand DC circuits and AC single phase circuits
3. To study and understand the different types of DC/AC machines andTransformers.
4. To understand the basic concept of Measuring Instruments.

Course Outcomes

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric circuits
3. To study the working principles of Electrical Machines
4. To introduce components measuring instruments

UNIT I: D.C. CIRCUITS

Ohm's law, Types of elements, sources, independent, dependent sources, source transformation, V-I Relation for Passive elements, KVL, KCL, Network reduction techniques-series-parallel-series parallel – star delta transformation, mesh and nodal analysis.

UNIT II: NETWORK THEOREMS&A.C. CIRCUITS

Network Theorems: Superposition-Thevenin's, and Norton's theorems for DC excitation

A.C. Circuits: Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series and parallel R- L-C circuits, calculation of q-factor and band width.

UNIT III: D.C.MACHINES

D.C.Genertors: Principle of operation of D.C Generator -types-E.m.f. Equation-Numerical problems.

D.C.Motors: Principleof operation of D.C. Motor-types -losses and efficiency -torque Equation.

Unit IV: A.C.Machines

Transformers: Principle of operation-constructional details**, Ideal** and practical transformer, equivalent circuit, losses in transformers, open circuit and short circuit tests-numerical problems, regulation and efficiency.

Three-phaseInduction motor: Principle of operation-Production of R.M.F -slip – rotor frequency -torque-slip &Torque characteristics. Synchronous Generators

Unit V: Measuring Instruments

Introduction-classification of instruments-operating principles-essential features of measuring instruments-permanent magnet moving coil (PMMC) instruments-moving iron type ammeters and voltmeters.

Textbooks :

1. Basic electrical engineering ,M.S Naidu &Kamakshaiah, Tata McGraw-Hill Education,
2. Basic Electrical Engineering , P.S.Subramanyam, BS publications ,second edition
3. Ghosh, Fundamentals of Electrical & Electronics S Engineering, 2nd Ed., PHI, 2010
4. V. K. Mehta and Rohit Mehta, Basic Electrical Engineering, S Chand and company Ltd, New Delhi, India, Revised Edition, 2012.
5. D. P. Kothari and I. J. Nagrath, Theory and Problems of Basic Electrical Engineering, 4th Ed., PHI Learning Private limited, 2013.
6. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
7. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010

References:

1. J. B. Gupta, Basic Electrical and Electronics Engineering, 3rd Ed., S. K. Kataria& Sons, 2009
2. B. L. Theraja, Fundamentals of Electrical Engineering and Electronics, 5th Ed., S. Chand & Company Ltd, 2013
3. Principles of Electrical machines, V.K Mehta&Rohith Mehta, S.ChandPubliactions.

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21BS1152/21BS1252:APPLIED PHYSICS LAB
(Common to ECE, CSM, CSB, CSC, CSD, EEE CSE & IT)

L	T	P	C
-	-	3	1.5

List of Experiments:

1. **Energy gap of P-N junction diode**:
   To determine the energy gap of a semiconductor diode.

,

2. **Solar Cell:**
   To study the V-I Characteristics of solar cell.

3. **Light Emitting Diode:**
   To study the V-I characteristics of light emitting diode

4. **Stewart – Gee's experiment:**
   Determination of magnetic field along the axis of a current carrying coil.

5. **Hall effect**
   To determine the Hall coefficient of a given semiconductor diode.

6. **Optical fibre:**
   To determine the Numerical aperture and bending losses of a given fibre.

7. **Laser Diode:**
   To determine V-I characteristics of laser diode

8. **Photoelectric Effect:**
   To determine stopping potential of different filters and Planck's constant

9. **LCR series:**
   To determine the resonant frequency and quality factor of LCR circuit.

10. **R-C circuit:**
    To determine the time constant of R-C circuit.

Note: Any 8 experiments are to be performed

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21BS1155: ENGINEERING PHYSICS LAB
(Common to Civil & Mechanical Engineering)

L	T	P	C
-	-	3	1.5

List of Experiments:

1. **MELDE'S EXPERIMENT:**
   To determine the frequency of a vibrating bar or turning fork using Melde's apparatus.

2. **TORSIONAL PENDULUM:**
   To determine the rigidity modulus of the material of the given wire using Torsional pendulum.

3. **NEWTON'S RINGS:**
   To determine the radius of curvature of the lens by forming Newton's rings.

4. **DIFFRACTION GRATING:**
   To determine the wavelength of the given source using grating.

5. **DISPERSIVE POWER OF PRISM:**
   To determine the dispersive power of prism by using spectrometer.

6. **LCR SERIES:**
   To determine the resonant frequency and quality factor of LCR series circuit.

7. **RC CIRCUIT:**
   To determine the time constant of R-C circuit.

8. **COUPLED OSCILLATOR:**
   To determine the spring constant by single coupled oscillator.

9. **YOUNGS MODULUS:**
   Young's modulus of given material by Strain gauge method.

10. **SONOMETER:**
    Sonometer: Verification of laws of string.

Note: Any 8 experiments are to be performed.

21HS1152/21HS1252:English Language Communication Skills Lab
(Common to ALL)

L	T	P	C
-	-	2	1

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

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

Learning Outcomes:

Students will be able to attain -

1. Better understanding of nuances of English language through audio- visual experienceand group activities
2. Neutralization of accent for intelligibility
3. Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus

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

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

Listening Skills

Objectives

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

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

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

Speaking Skills

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

Exercises:

- Oral practice: Just A Minute (JAM) Sessions
- Describing objects/situations/people
- Role play – Individual/Group activities

The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English.

As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)

Exercise – I
CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants- Consonant clusters

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.

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

Exercise – II
CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context-

Minimal pairs-

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making

Requests and Seeking Permissions - Telephone Etiquette- Giving Directions

Exercise - III

CALL Lab: Understand: Past tense and Plural markers - Intonation- Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American

Pronunciation- Listening to foreign speakers

ICS Lab:

Understand: Descriptions and Narrations- Fictional Writing- Developing a Story through hints- Story telling through Translation

Practice: Describing Objects/Places/Persons/Situations- Story telling- Narrating incidents

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests- Speech/Audio and Video Recording for Self-Analysis

ICS Lab:

Understand: Oral Presentation skills- Public speaking-

Practice: Making a Short Speech – Extempore

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests- Critical Analysis on Video and Audio Lessons/Speeches

ICS Lab:

Understand: Sensitization towards Interviews

Practice: Self-Introduction.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

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

System Requirement (Hardware component):

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

i) Computers with Suitable Configuration

ii) High Fidelity Headphones

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

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

B. Tech I Year Syllabus **VBIT - R21**

21CS1153: PROGRAMMING FOR PROBLEM SOLVING LAB
(Common to ALL)

L	T	P	C
-	-	3	1.5

Course Objectives:

1. To learn C-language Programs using the data types, input/ output statements and control statements.
2. Describe the importance of modular programing and arrays using C-Language Program.
3. Understand the concept and use of pointers for memory management techniques, structure, union, and enumerated types.
4. Understand the basic characteristics of text, binary files and C implementation of file I/O using streams.

Course Outcomes:

1. Ability to design and test programs to solve mathematical and scientific problems.
2. Ability to write structured programs using control structures and functions.
3. Able to Implement C programs using arrays & pointers.
4. Able to Use the type definition, enumerated types, define and use structures, unions in programs using C language.
5. Able to execute programs that read and write text, binary files using the formatting and character I/O functions.

EXPERIMENTS

1. a) Write a C program to find area of rectangle.
   b) Write a C program to find simple interest and compound interest.
   c) Write a C program to evaluate the expression $y= 3x^2+4x+5$.

2. a) Write a C Program to swap two numbers.
   b) Write a C program to convert Celsius to Fahrenheit.
   c) Write a C program to perform all arithmetic operations (+, -, *, / , %).
   d) Write a C program to check whether the given number is even or odd using Conditional Operator.

3. a) Write a C program to find the Largest of two numbers.
   b) Write a C program to Check the given year is leap year or not.
   c) Write a C program to print ascending order of three given integers.

4. a) Write a C program to Find the grade of a student using the following data. (use else if ladder and switch)s

SNO	MARKS	GRADE
I	Greater than or equal to 90 %	O grade
Ii	80 and less than 90%	A+ grade

iii	70 and Less than 80%	A grade
iv	60 and less than 70%	B+ grade
V	50 and less than 60%	B grade
vi	40 and less than 50 %	C grade
vii	Below 40 %	Fail

b) Write a C program to find the roots of quadratic equation.

c) Write a C Program to implement arithmetic calculator using switch case.

5. a) Write a C program to find sum of individual digits of the given integer.

b) Write a C program to find factorial of a given number.

c) Write a C program to check whether the given number is palindrome or not.

6. a) Write a C program to display the prime numbers from 1 to n(where n value is Given by user)

b) Write a C program to print Fibonacci series.

c) Write a C program to find GCD and LCM of two given numbers using functions.

7. a) Write a C program find $\mathbf{x^y}$.

b) Write a C program find $^{\mathbf{n}}\mathbf{c_r}$.

c) Write a C program to construct a pyramid of following numbers.

1

1 2

1 2 3

d) Write a C program to construct the pascal triangle

8. a) Write a C program to find largest and smallest numbers in a list of array elements .

b) Write a C program to find mean, variance, standard deviation for a given list ofelements.

9. a) Write a C program to transpose a matrix.

b) Write a C program to perform the Addition of Two Matrices.

c) Write a C program to perform the Multiplication of Two Matrices.

10. a) Write a C program to find GCD using functions.

b) Write a C program to find the factorial of a given number using recursive function.

c) Write a C program to generate the Fibonacci series using recursive function.

11. a) Write a C program to swap two integers using following methods.

i. call by value ii. call by reference

b) Write a program for reading elements using pointer into array and display the values using array.

12. a) Write a C program to perform the following operations on strings:

i. to insert a sub-string into a given main string from a given position.

ii. to delete n characters from a given position in a given string.

b) Write a C program to arrange given strings n alphabetical order.

13. a) Write a C program to find total and average marks for five subjects of three students using structures.
b) Write a C program to demonstrate nested structures.

14. a) Write a C program to display the contents of a file to standard output device.
b) Write a C program which copies one file to another into another file.
c) Write a C program to merge two files into a third file
(i.e., the contents of the first file followed by those of the second are put in the third file)

15. a) Write a C program to reverse the contents of a file.
b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

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21ME1153 / 21ME1154/21ME1254: ENGINEERING GRAPHICS
(Common to ME, CE,ECE,EEE,IT,CSD, CSE, CSM, CSC, CSB)

L	T	P	C
1	0	4	3

Course objectives:

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

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

1. Preparing working drawings to communicate the ideas and information.
2. Read, understand and interpret engineering drawings.

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics – Various Drawing instruments – conventions in Drawing, Lettering practice – BIS Conventions.

Curves: Conic Sections - Ellipse, parabola and Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid.

Scales: Plain and Diagonal scales.

UNIT – II

ORTHOGRAPHIC PROJECTIONS: Principles of Orthographic Projections – Conventions, Projection of Points and Lines, Projection of Planes: regular geometric figures.

UNIT – III

PROJECTION OF SOLIDS: Projection of regular solids, Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone.

UNIT – IV

DEVELOPMENT OF SURFACES: Development of surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone.

Intersection of Solids: Intersection of Prism vs Prism, Cylinder vs Cylinder.

UNIT – V

ISOMETRIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Plane Figures, Simple and Compound Solids –. Isometric Projection of parts with Spherical.

Transformation of Projections: Conversion of Isometric Views to Orthographic Views and vice versa.

Introduction to CAD (For internal Evaluation weightage only): Introduction to CAD, coordinate system and reference planes, commands – 2D drawings.

TEXT BOOKS:

1. Engineering Drawing - N.D. Bhatt / Charotar.
2. Engineering Drawing - Basant Agrawal /TMH

REFERENCES:

1. Engineering Drawing – P.J. Shah/S.Chand Publishers.
2. Engineering Drawing - M.B. Shah AND B.C. Rana / Pearson.
3. Engineering Drawing - N.S. Parthasarathy and Vela Murali/ Oxford
4. Engineering Drawing – K.Venugopal and V.Prabu Raja/New age publications.
5. Engineering Graphics – P I Varghese/TMH.

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21BS1153/21BS1253: CHEMISTRY LAB
(Common to all Branches)

L	T	P	C
-	-	3	1.5

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness and chloride content in water to check its suitability for drinking and Industrial purpose.
2. To determine the rate constant of reactions from concentration as a function oftime.
3. To determine the physical properties like adsorption, viscosity and surface tension.
4. To prepare the drug molecules and check the purity of organic molecules by thin layer chromatography (TLC).

Course Outcomes: Students should be able to:

1. Determine the parameters like hardness and chloride content inwater.
2. Estimate the rate constant of a reaction from concentration – timerelationships.
3. Determine the physical properties like adsorption, surface tension andviscosity.
4. Calculate the Rf values of some organic molecules by thin layer chromatography (TLC).

(Any TEN experiments compulsory)

1. Determination of total hardness of water by complexometric method usingEDTA.
2. Determination of chloride content in water byArgentometry.
3. Estimation of amount of HCl using standard NaOH by Conductometry.
4. Estimation of amount of Acetic acid using standard NaOH by Conductometry.
5. Estimation of amount of HCl using standard NaOH by Potentiometry.
6. Estimation of amount of Ferrous ion usingKMnO4 by Potentiometry.
7. Determination of rate constant of acid catalyzed hydrolysis of methylacetate.
8. Thin layer chromatography: calculation of Rf values, ex: Mixture of ortho and para nitrophenols.
9. Determination of acid value of coconutoil.
10. Verification of Freundlich adsorption isotherm-adsorption of acetic acid oncharcoal.
11. Determination of viscosity of given liquids using Ostwald's viscometer.
12. Determination of distribution coefficient of acetic acid between n-butanol and water.
13. Determination of surface tension of given liquids usingstalagmometer.
14. Verification of Beer's law and estimation of given KMnO4solution.
15. Estimation of iron incement by Colorimetry.
16. Preparation of Aspirin andParacetamol.

REFERENCES:

1. Senior practical physical chemistry by B.D. Khosla, A. Gulati and V. Garg, R. Chand &Co; 18th edition (2018).
2. Vogel's text book of practical organic chemistry, Pearson Education; 5thedition (2003).
3. Text book on Experiments and calculations in Engineering Chemistry by S.S.Dara, S Chand & Company; 9th edition (2015).
4. Physical Chemistry-A molecular Approachby Donald A. McQuarrie and John D. Simon, Viva Books; Student edition (2019).
5. Engineering Chemistry Laboratory Manual by Shirish Kumar Kodadi, Kindle Publications; 1st edition (2020).

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21EE1152 / 21EE1252: BASIC ELECTRICAL ENGINEERING LAB

(Common for CSE, CSM, CSC, CSBS, ECE, EEE,IT and CSD)

L	T	P	C
0	0	3	1.5

Course Objectives:

1. To analyze a given network by applying various electrical laws and network theorems
2. To know the response of electrical circuits for different excitations
3. To calculate, measure and know the relation between basic electrical parameters.
4. To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters
4. Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Verification of superposition theorem
4. Verification of Thevenin's and Norton's Theorem
5. Resonance in series RLC circuit
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
7. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
8. Measurement of Active and Reactive Power in a balanced Three-phase circuit
9. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
10. Performance Characteristics of a Three-phase Induction Motor
11. No-Load Characteristics of a Three-phase Alternator

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21ME1155/ 21ME1255: ENGINEERING WORKSHOP PRACTICE
(Common to CSE,CSM,CSC,CSB, ECE,EEE,IT,CSD)

L	T	P	C
1	-	3	2.5

Course objectives:

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

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

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including fitting, carpentry, and foundry, house wiring and welding.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry (T-Lap Joint, Dovetail Joint, Mortise and Tenon Joint)
2. Fitting (V-Fit, Square Fit) **[Demonstration]**
3. Tin-Smithy (SquareTin, Retangulat Tray and Conical Funnel)
4. Foundry (Preparation of green sand mould using single piece and split pattern) **[Demonstration]**
5. Welding Practice – (Arc welding and Gas welding) **[Demonstration]**
6. House-wiring (Parallel and series, Two-way switch and Tube light)

7. Black Smithy (Round to square, Fan hook and S-hook) **[Demonstration]**

Text Books:

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

Reference Books:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP

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B. Tech I Year Syllabus **VBIT - R21**

21BS1211: MATHEMATICS-II

(Ordinary Differential Equations and Vector Calculus)

(Common to ALL)

L	T	P	C
3	1	0	4

Course Objectives: Develop ability to

1. Solve first order differential equations and its applications, namely, Newton's law of cooling, Natural growth and decay.
2. Solve higher order differential equations of various types.
3. Evaluate multiple integrals and apply the same to solve engineering problems.
4. Explain properties of vector operators. To determine solenoidal, irrotational vectors and directional derivatives of vectors.
5. Determine the length of a curve, area between the surfaces and volumes of solids using vector integration.

Course Outcomes: After learning the contents of this paper the student would be able to

1. Identify whether the given differential equation of first order is exact or not.
2. Solve higher differential equation and apply the concept of differential equation to real world problems.
3. Evaluate the multiple integrals and apply the concept to find areas, volumes, cubes, sphere and rectangular parallelepiped.
4. Calculate scalar potential for a vector and directional derivative of a scalar point function.
5. Make use of vector integral theorems to evaluate area, surface area and volumes.

UNIT-I: First Order ODE

Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law ofnatural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II: Ordinary Differential Equations of Higher Order

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type $e^{ax}, \sin ax / \cos ax, x^k, e^{ax}V(x), x^kV(x)$; Method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III: Integral Calculus

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables-Cartesian to polar for double and Cartesian to Spherical and Cylindrical polar coordinates for triple integrals. **Applications:** Areas by double integrals for known curves and volumes by double integrals and triple integrals for known curves.

UNIT-IV: Vector Differentiation

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXTBOOKS:

[1] B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2014

[2] N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

[3] Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

REFERENCES:

[1] Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

[2] Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes

[3] S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

[4] Rajinder Kumar Jain, S. R. K. Iyengar, Advanced Engineering Mathematics,Narosa Publications, New Edition.

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21BS1214: Applied Chemistry
(Common to Mechanical & Civil Engineering)

L	T	P	C
3	0	0	3

Course Objectives:

1. To understand the various treatment methods and to use the treated water for industrial purposes.
2. To understand the phase equilibria in heterogeneoussystems.
3. To acquire the knowledge of Thermodynamiclaws.
4. To equip required knowledge about engineering materials like cement, refractories and composites.
5. To acquire the skills pertaining to spectroscopy and apply them for various materialstudies.

Course Outcomes:

1. They can be able to use treated water for industries.
2. They can apply the phase equilibria in heterogeneoussystems.
3. They can comprehend the role of thermodynamicproperties-internal energy, enthalpy, entropy, temperature, pressureand specific volume.
4. They can apply the properties of engineeringmaterials in appropriate conditions.
5. They gain the required skills of spectroscopic methods and can apply for interpreting the engineeringmaterials.

UNIT-I

Water and its treatment: Introduction – Hardness of water – Causes of hardness – Types of hardness: Temporary and Permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water – Disinfection of potable water by Chlorination and Ozonization. Defluoridation – Nalgonda technique – Determination of F^- ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales, Caustic Embrittlement and Boiler corrosion. Internal treatment of Boiler feed water – Calgon conditioning – Phosphate conditioning – Colloidal conditioning – Softening of water by Ion- Exchange process. Desalination of water – Reverse Osmosis. Numerical problems – Sewage water – Steps involved in treatment of sewage.

UNIT-II

Phase Rule and its Applications: Terms involved in Phase equilibria – Phase, Component, Degrees of Freedom- explanation with suitable examples, True/metastable equilibrium, Eutectic mixture/ point, Triple point, Thermodynamic derivation of phase rule, applications and limitations of Phase rule, Phase diagrams of one component system-Water system and two component system -Pb/Ag systems.

Eutectic mixtures – desilverisation. Heat treatment of steel. Iron allotropy, micro constituents of Iron and Steel, Iron-Carbon equilibrium diagram.

UNIT-III

Chemical thermodynamics:

I Law: First law of thermodynamics-Statement,System and surroundings, state and path variables, Extensive and Intensive properties, Concept of Thermodynamics, reversibility, Isothermal and Adiabatic process, Relation between work done, heat and internal energy. Enthalpy and molar heat capacities-Numerical problems, Kirchhoff's equation, Limitations of I law.

II Law: Second law of thermodynamics-Statements, Definition-reversible, irreversible process, cyclic processes, Carnot cycle, efficiency of reversible heat engine in terms of entropy. Entropy changes in the reversible and irreversible processes, physical significance of entropy and Numerical problems. Gibbs-Helmholtz equation, Concept of spontaneity, Functions and significance-Numericalproblems.

UNIT-IV

Engineering materials:

Cements: Composition, Properties and Applications of Portland cement, White cement, Water proof cement, High alumina cement and Acid resistant cement.

Refractories: Classification, characteristics of good refractories, Refractoriness, refractoriness under load, porosity and chemical inertness – applications of refractories.

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants – mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and firepoint.

Composites: Introduction, Classification, Constituents and Applications of Composites.

Rubbers: Natural rubber –vulcanization, Compounding. Synthesis and uses of Buna S, Thiokol rubber.

UNIT-V

Spectroscopic techniques and applications: Electronic Spectroscopy-Principle, Beer-Lambert's law, Electronic transitions, Terms-Chromophore, Auxochrome, Bathochromic shift, Hypsochromic shift, Hyperchromic shift and Hypochromic shift, Selection rules and Applications. IR Spectroscopy- Principle, Vibrational modes, Selection rules and Applications. NMR Spectroscopy- Principle, chemical shift-Shielding effect, Deshielding effect with Ethanol as an example, Reference (TMS), Selection rules and Applications, Introduction to Magnetic resonance Imaging (MRI).

TEXT BOOKS:

1. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning; 1st edition (2019).
2. Engineering Chemistry by Jain & Jain, Dhanpat Rai & Co. (P) Limited; 16th edition (2017).
3. Fundamentals of Molecular Spectroscopy by C.N.Banwell, McGraw Hill Education; 4th edition (2017).
4. Engineering Chemistry by SS Dara and SS Umare, S Chand Publications; 12th edition (2004).
5. Engineering Thermodynamics by **PK Nag,** McGraw Hill Education; 6th Edition (2017).
6. Unified Chemistry by **Dr. O.P. Agarwal**, Jai Prakash Nath Publications; vol-3 (2016).

REFERENCES:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press; 2nd edition (2019).
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd; 2nd edition (2017).
3. Materials Science and Engineering: An Introduction by William D. Callister and David G. Rethwisch, Wiley Publication; 9th edition (2013).
4. Modern Thermodynamics by by **Arieh ben-naim** and **Diego casadei**, World Scientific Publishing Co Pvt Ltd; 2nd Edition (2016).
5. Organic Spectroscopy by William Kemp**,** Macmillan; 2nd edition (2019).

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B. Tech I Year Syllabus **VBIT - R21**

21CS1211: PYTHON PROGRAMMING
(Common to ALL)

L	T	P	C
3	0	0	3

Prerequisites: A course on "Programming for Problem Solving using C".

Course Objectives:

1. Learn Syntax and Semantics and create Functions in Python.
2. Handle Strings and Files in Python.
3. Understand Lists, Dictionaries and Regular expressions in Python.
4. Implement Object Oriented Programming concepts in Python.

Course Outcomes:

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Able to Apply Modular Programming.
3. Able to Develop Programmes using Collection of Items.
4. Able to Implement File Handling.
5. Able to deploy Small Projects using Predefined Libraries.

UNIT - I

BASICS OF PYTHON PROGRAMMING: Features of Python, variables and identifiers, Built in and Standard data types in python, operators and expressions

CONTROL STATEMENTS: Selection/Conditional branching statements, basic loop, structures/ iterative Statements, nested loops, break, continue, and pass Statements.

UNIT – II

FUNCTIONS AND MODULES: function definition, function call, more on defining functions, recursive functions, modules, python packages. Python Global keyword, Introduction to Arrays.

STRINGS: Introduction, built-in string methods and functions, slice operation, String Module. Regular Expressions

UNIT - III

PYTHON COLLECTIONS

LISTS: Introduction, Creating, nested list, cloning lists, basic list operations, list methods.

TUPLES: Introduction, Creating, basic tuple operations, tuple assignment, tuples for returning multiple values, nested tuples, Built-in Tuple functions.

SET: Introduction, Creating, Python Set methods.

DICTIONARIES: Introduction, Creating, Basic operations, sorting items, looping over dictionary, nested dictionaries, built-in dictionary functions.

UNIT - IV

FILES: Introduction, modes of opening file with creating, reading and writing files, other file methods in python.

EXCEPTIONS: Assertion, Exception, handling exceptions – try, except, finally. Built-in exception types and user-defined exceptions.

UNIT – V:

PYTHON LIBRARIES:

Numpy: Introduction to numpy and uses, Arrays in Numpy, Numpy Functions: Trigonometoric functions, Exponential and Logarithmic functions, Arithmetic functions, Sample programs.

Pandas: Introduction to Pandas and uses, Pandas Series, Pandas DataFrames, sample programs.

TEXT BOOKS:

1. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning.

2. Think Python First Edition, by Allen B. Downey, Orielly publishing

3. Fluent Python: Clear, Concise, and Effective Programming, Luciano Ramalho, Orielly publishing

REFERENCE BOOKS:

1. Introduction to Computation and Programming Using Python. John V. Guttag, The MIT Press.

2. James Payne, Beginning Python using Python 2.6 and Python 3, Wrox publishing

3. Paul Gries, Practical Programming: An Introduction to Computer Science using Python 3,The Pragmatic Bookshelf, 2nd edition (4 Oct. 2013)

4. Charles Dierach, Introduction to Computer Science using Python

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21CS1253: PYTHON PROGRAMMING LAB
(Common to ALL)

L	T	P	C
-	-	3	1.5

Prerequisites:
Students should install Python on Linux platform.
Student should have basics of understanding a program

Course Objectives:

1. To be able to introduce core programming basics and program design with functions using Python programming language.
2. To understand a range of Object-Oriented Programming
3. To understand the programs designed to strengthen the practical expertise.

Course Outcomes:

1. Student should be able to code and debug the basic programming
2. Ability to explore the object oriented concepts, and the built in objects of Python.

1. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula : c/5 = f-32/9]
2. Python Program for factorial of a number
3. Python Program for simple interest using def
4. Python Program to Check if a Number is Odd or Even
5. Write a python program to find largest of three numbers.
6. Python program to print all Prime numbers in an Interval
7. Python Program to Find Factorial of Number Using Recursion
8. Python program to copy all elements of one array into another array
9. Python Program to Add Two Matrices
10. Python Program to reverse a string
11. Write a program to create, append, and remove lists in python.
12. Write a program to demonstrate working with tuples in python.
13. Write a program to demonstrate working with dictionaries in python
14. Python Program to create and sort a dictionary
15. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file
16. Write a simple program using numpy
17. Write a simple program using pandas

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21ME1256: ENGINEERING WORKSHOP
(Common to ME & CE)

L	T	P	C
1	-	4	3

Course objectives:

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

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

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

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry (T-Lap Joint, Dovetail Joint, Mortise and Tenon Joint)
2. Fitting (V-Fit, Square Fit)
3. Tin-Smithy (SquareTin, Retangulat Tray and Conical Funnel)
4. Foundry (Preparation of green sand mould using single piece and split pattern)
5. Welding Practice – (Arc welding and Gas welding)
6. House-wiring (Parallel and series, Two-way switch and Tube light)
7. Black Smithy (Round to square, Fan hook and S-hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)
4. Power tools in construction and wood working

Text Books:

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

Reference Books:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ Scitech

2. Workshop Manual / Venkat Reddy/ BSP

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