Chhattisgarh Swami Vivekanand Technical University B.E./B.Tech EE Sem 1 syllabus

Mathematics-I

Mathematics - I

Credits: 4

UNIT I: Calculus
Evaluation of definite and improper integrals, reduction formulae, Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.
UNIT II : Calculus
Rolle’s Theorem, Mean value theorems, Taylor’s and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and minima.

UNIT III : Sequences and series:
Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval’s theorem.

UNIT IV : Multivariable Calculus (Differentiation)
Limit, continuity and partial derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence directional derivatives.

UNIT V : Matrices
Rank of a matrix by elementary transformation, normal form of a matrix, System of linear equations; Symmetric, skewsymmetric and

orthogonal matrices; Eigen values and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem and Orthogonal transformation.

Text/Reference Books

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
8. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra,Affiliated East–West press, Reprint 2005.

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Programming for Problem Solving

Programming for Problem Solving

Credits: 3

Unit I: Introduction
Introduction to Programming, Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.), Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart, Pseudo code and Source

code with examples.

Unit II: Programming Concepts
Variables, data types, memory locations, Syntax and Logical Errors in compilation, object and executable code, Arithmetic expressions and precedence, Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching, Iteration and loops.

Unit III: Arrays
Introduction to Arrays (1-D, 2-D), Character arrays and Strings, Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required).

Unit IV: Function
Definition, prototyping, built in libraries, Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference, Recursion: Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Unit V: Structure
Defining structures and Array of Structures, Pointers: Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation), bit-fields. File handling: concept of a file, text files and binary files, Formatted I/O, file I/O operations, example programs

Text Books:
1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
Reference Books:
1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

English

English

Credits: 2

UNIT – I
Vocabulary Building
1.1 Root words from foreign languages and their use in English
1.2 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
1.3 Synonyms, antonyms, Homonyms and Homophones.
1.4 One Word Substitution
1.5 Basics of Phonetics: Definitions, Phonetic Symbols, Transcription of one and two syllable words
1.6 Communication: Definition, Cycle, Elements, 7Cs & Barriers

UNIT – II
Basic Writing Skills
2.1 Types of Sentences and Tenses, Voices and narration
2.2 Use of phrases and clauses in sentences
2.3 Importance of proper punctuation
2.4 Creating coherence
2.5 Techniques for writing precisely

UNIT – III
Identifying Common Errors in Writing
3.1 Parts of speech, Subject-verb agreement
3.2 Noun-pronoun agreement
3.3 Misplaced modifiers
3.4 Articles
3.5 Prepositions
3.6 Redundancies
3.7 Clichés
3.8 Errors in Spelling/ Misspelled words

UNIT – IV
Writing Practices
4.1 Comprehension
4.2 Précis Writing
4.3 Essay Writing
4.4 Business Letters & Job Application
4.5 Formal Reports: Components & Characteristics
4.6 Writing e-mails

UNIT – V
Listening
5.1 Listening: Definition, purposes, types, and strategies to improve

listening.
5.2 Characteristics of effective listening.
5.3 Barriers to Listening and measures to overcome barriers
5.4 Note making: types and conversion of notes into texts.

UNIT – VI
Oral Communication (This unit involves interactive practice sessions in Language Lab)
6.1 Listening Comprehension
6.2 Pronunciation, Intonation, Stress and Rhythm
6.3 Common Everyday Situations: Conversations and Dialogues
6.4 Communication at Workplace
6.5 Interviews
6.6 Formal Presentations

Suggested Books:
1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
7. English and Communication Skills for Students of Science and Engineering. S.P. Dhanavel. Orient Blackswan Ltd.2009.
8. Scientific English: A Guide for Scientists and Other Professionals. R A Day. Universities Press. 2000.
9. Word Power Made Easy. Norman Lewis. W R Goyal Publishers and Distributors. Publishers. 2009
10. Textbook of English Phonetics for Indian Students. T Balasubramaniam. Macmillan Publishers.2012
11. Technical Communication: Principles and Practice. Meenakshi Raman and Sangeeta Sharma. Oxford University Press. 2015.

Basic Civil Engineering and Mechanics

Basic Civil Engineering & Mechanics

Credits: 3

UNIT - I

Building Material

Qualities of good brick, Water absorption and Compressive Strength test for bricks. Types of Cement, Ingredients of Portland cement and their functions, Fineness, Setting Times and Compressive Strength of Cement, Functions of Sand in mortar, Mortar Mix proportions for various uses.

UNIT – II

Building Construction

Ingredients of Cement Concrete, Grades of Concrete, proportions for Nominal mix concrete, Workability & Compressive Strength of Concrete, Curing of Concrete. Necessity of foundations, Definitions of Safe bearing capacity, Ultimate bearing capacity and factor of safety, Difference between Load Bearing & Framed Construction.

UNIT - III

Surveying & Levelling

Principles of Surveying, Technical terms, Calculation of reduced level by Height of instrument and Rise & Fall method, Simple problems in levelling.

UNIT – IV

General System of Forces

Equations of equilibrium for a system of concurrent forces in a plane.Constraint, Action and Reaction.Types of support and support reactions. Free Body Diagram – Body subjected to two forces & Body subjected to three forces. Moment of a force. Theorem of Varignon, Equations of Equilibrium.

UNIT –V

Analysis of Plane Trusses

Engineering Structures, Rigid or perfect Truss, Determination of Axial forces in the members of truss, Method of Joints, Method of Sections.

Text books:

1. Comprehensive Basic Civil Engineering B.C. Punmia
2. Building construction by Ahuja and Birdi
3. Engineering Mechanics by A. K. Tayal

Reference books:

1. Basic Civil Engineering by Ramamurutham
2. Engineering Mechanics by R. K. Bansal

Chemistry-I

Chemistry I

Credits: 4

Unit – I
Atomic & molecular structure
MolecularorbitalTheory: Equationsfor atomic and molecular orbitals (LCAO), Energy level diagram of homo(H2,N2,O2,L i 2 , F2) & heteromolecules (CO,NO, HF), Concept of bond order. Pi-molecular orbitals of butadiene, benzene and aromaticity.CrystalFieldTheory:Splitting ofd-orbitalofoctahedralandtetrahedral complexes,Energy leveldiagram oftransitionmetal ion&magneticproperty, numerical based on Crystal field stabilization energy.

Unit – II
Spectroscopic techniques and applications
Principle of spectroscopy. Electromagnetic radiation, Spectrophotometer (line diagram) Electronic Spectroscopy (Ultraviolet–visible spectroscopy): Theory, Types of electronic transition, Chromophore, auxochromes ,Electronic excitation in conjugated dienes , Absorption Laws, applications on quantitative analysis , Simple numerical based on absorption laws and uses or application of Electronic Spectroscopy. Vibrational spectroscopy (Infrared spectroscopy): Molecular vibration, Selection rule, functional group region, fingerprint region and uses or application of Vibrational spectroscopy. Nuclear magnetic resonance spectroscopy: Introduction, number of signal, chemical shift, Spin-spin oupling and uses or application of Nuclear magnetic resonance spectroscopy.

Unit – III
Use of free energy in Chemical Equilibria
Thermodynamic Functions: Energy, Entropy, Free energy, Cell potential & related numericals,Estimations of entropyandfreeenergies, Nernst Equation & its application to voltaic cell,Relation of free energy with EMF. Corrosion: Electrochemical

theory of corrosion, galvanic series, Galvanic corrosion, Differential aeration corrosion, Pitting, and Water line corrosion, Caustic embrittlement,factors affecting corrosion ,Cathodic Protection.

Unit –IV

Periodic properties

Periodic table, atomic and ionic radii, ionisation energies, electron affinity, electronegativity. Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms. Polarizability,Oxidation states, coordination numbers and geometries, Hard, soft acids and bases (Classification,PearsonsHSABprinciple,itsapplications&limitations)Mole electronpairrepulsiontheorytoNH3,H3O+, SF4,CIF3, ICl2 and H2O), Numerical based on effective nuclear charge.

Unit -V

Organic reactions and synthesis of drug molecule

Introduction to reactions involving substitution (free radical-Chlorination of molecule, Gomberg reaction, Wurtz reaction, Electrophilic, Nucliophilic-SN1 SN2), Addition (Electrophilic–Morkownihoff rule,Nuclophilic)Elimination (α elimination , β elimination , unimolecular E1, biomolecular E2), oxidation (Baeyer villiger oxidation), reduction (Clemmensen reduction, Wolff-Kishner reduction) cyclization (Bergman Cyclization) and ring openings and rearrangement reaction (Beckamann, Reimer-Tiemann reaction, Canannizaro, crossed cannizzaro reaction) Synthesis of a commonly used drug molecule: General guidelines of drug making, synthesis of Aspirin, Ibuprofen, Paracetamol.

Unit -VI

Introduction to quantum theory

Schrodingerequation&itsimportance,Applicationstohydrogenatom, Wavemechanicalmodelfor manyelectronatoms-radialdistributioncurves.

Unit -VII

Chemical bonding in molecules:

MO theory, Structure, bonding and energy levels of bonding and shapes of many atom molecules, CoordinationChemistry,Electronicspectraandmagnetic properties of

complexes with relevance to bio- inorganic chemistry, organometallic chemistry.

Unit -VIII

Stereochemistry:

Introduction to Stereochemistry: Representations of 3 dimensional structures, Chirality, Optical activity. Isomerism- structural isomerism, stereoisomers, enantiomers, diastereomers, Configurations (D, L &R, S), Geometrical isomerism (cisandtrans&EandZ).Racemicmodification &theirresolution, Isomerismin transitional metalcompounds. Conformational analysis: Conformations of cyclic (cyclohexane) and acyclic compounds (ethane & butane).

Unit -IX

Reactivity of organic molecules:

Organic acids and bases: factors influencing acidity, basicity, and nucleophilicity of molecules, kinetic vs. thermodynamic control of reactions.

Unit -X

Strategies for synthesis of organic compounds:

Reactive intermediates substitution, elimination, rearrangement, kinetic and thermodynamic aspects, role of solvents.

Text Books:

1. A.TextBookofEngg.Chemistry,ShashiChawala,DhanpatRai&Co. (P)Ltd.
2. EngineeringChemistrybyP.C.Jain(DhanpatRaiPublishingCompany.
3. Engineering Chemistry,Concept in engineering Chemistry by Satyaprakash and Manisha Agrawal by Khanna Publication.

Books for Chemical Engineering:

1.AdvancedInorganicChemistryVol1&IIbyGurdeepRaj, GoelPublishingHouse.
2. OrganicReactionandTheirMechanism, P.S.Kalsi,NewAgeInternational Publishers.

Reference Books:

1. Universitychemistry,byB.H.Mahan
2. Chemistry:PrinciplesandApplications,byM.J.SienkoandA.Plane

3. FundamentalsofMolecularSpectroscopy,byC.N.Banwell
4. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe,Kamaluddin andM. S.Krishnan
5. PhysicalChemistry,byP.W.Atkins
6. OrganicChemistry:StructureandFunctionbyK.P.C.VolhardtandN.E. Schore, 5thEdition
7. EssentialsofPhysicalChemistry,Bahi&Tuli,S.ChandPublishing
8. IntroductiontoNanoscienceby S.M. Lindsay