

55

CHEMISTRY-1(BTCH101C)

Subject Code: BTCH101C

L T P C

Duration: 42 Hrs.

3 1 0 4

UNIT-I

1. Atomic and Molecular Structure (12 Hrs.)
Bohr Model and its limitations, Line spectrum of H-atom and its explanation, Dual nature of electron, De-Broglie equation, Aufbau principle, Pauli's Exclusion Principle, Hund's Rule of max. multiplicity, Molecular orbitals and energy level diagrams of homonuclear and heteronuclear diatomic molecules. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT-II

2. Spectroscopic Techniques and Applications (8 Hrs.)
Elementary idea of Principles, Instrumentation and applications of spectroscopy : Electronicspectroscopy and Fluorescence, Vibrational and rotational spectroscopy of diatomic Molecules, Nuclear magnetic resonance and magnetic resonance imaging.

3. Polymers and Composites (4 Hrs.)
Introduction; Functionality; Types of polymerization; Specific features of polymers; Structures - regularity and irregularity; Tacticity of polymers; Average molecular weights and size; Determination of molecular weight by number average method; Effect of molecular weight on the properties of polymers; Introduction to polymer reinforced composite.

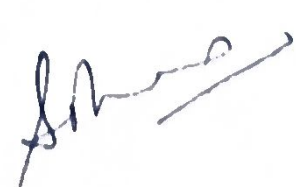
UNIT-III

4. Use of Free Energy in Chemical Equilibria (6Hrs.)

Introduction to Thermodynamic functions: energy, entropy and free energy. Simple Numerical problems based on of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Electrochemical Corrosion and its mechanism.

5. Periodic Properties (4 Hrs.)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity,



polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases.

UNIT-IV

6. Stereochemistry (4 Hrs.)

Representations of 3-dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of butane. Isomerism in transitional metal compounds.

7. Organic Reactions and Synthesis of a Drug Molecule (4 Hrs.)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of commonly used drug molecule – Paracetamol, Chloroquine, Aspirin and Metronidazole.

Recommended Text Books

1. B.H. Mahan, 'University Chemistry'.
2. M.J. Sienko and R.A. Plane 'Chemistry: Principles and Applications'.
3. C.N. Banwell, 'Fundamentals of Molecular Spectroscopy'.
4. B.L. Tembe, Kamaluddin and M.S. Krishnan, 'Engineering Chemistry (NPTEL Web-book)'.
5. P. W. Atkins, 'Physical Chemistry'.
6. K.P.C. Vollhardt and N.E. Schore 'Organic Chemistry: Structure and Function', 5th Edn., <http://bcs.whfreeman.com/vollhardtschore5e/default.asp>

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

1. Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Rationalize bulk properties and processes using thermodynamic considerations and knowledge about polymers and composites used in day to day life.
3. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
4. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
5. List major chemical reactions that are used in the synthesis of molecules.



CHEMISTRY-I LAB.

Subject Code: BTCH102C

L T P C

0 0 3 1.5

Objectives

1. To learn the preparation and standardization of solutions
2. To learn the estimation of various physical properties of given liquid samples
3. To estimate various crucial parameters for water sample
4. To learn the preparation of various molecules and detection of functional groups.

Choice of 10-12 experiments from the following:

1. Preparation of a standard solution
2. Determination of surface tension and viscosity
3. Thin layer chromatography
4. Determination of total Alkalinity/ Acidity of a water sample.
5. Determination of residual chlorine in water sample
6. Estimation of total, temporary and permanent hardness of water
7. Determination of the rate constant of a reaction
8. Determination of strength of an acid conductometrically
9. Potentiometry - determination of redox potentials and emfs
10. Synthesis of a polymer
11. Saponification /acid value of an oil
12. Detection and confirmation of organic functional groups.
13. Models of spatial orientation
14. To test the validity of Lambert Beer law/ Determination of $\lambda_{\max}$ / Determination of unknown concentration of a solution.
15. Determination of the partition coefficient of a substance between two immiscible liquids
16. Adsorption of acetic acid by charcoal
17. Synthesis of a drug – Acetaminophen, Aspirin

Laboratory Outcomes

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

1. Estimate rate constants of reactions from concentration of reactants/products as a function of time
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
3. Synthesize a small drug molecule and analyze a salt sample

5. P.W. Atkins, 'Physical Chemistry'.
6. K.P.C. Vollhardt and N.E. Schore 'Organic Chemistry: Structure and Function', 5th Edn., <http://bcs.whfreeman.com/vollhardtschore5e/default.asp>

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

1. Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Rationalize bulk properties and processes using thermodynamic considerations.
3. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
4. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
5. List major chemical reactions that are used in the synthesis of molecules.

Signature

Signature

Objectives:

The objective of this course is to familiarize the prospective engineers with techniques in Calculus, multivariate analysis and linear algebra to tackle any mathematical challenge that occurs during their engineering problems.

Calculus: (6 lectures)

Evaluation of definite and improper integrals, Beta and Gamma functions and their properties. Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Calculus: (6 lectures)

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders. indeterminate forms and L'Hospital's rule, Maxima and minima.

Sequences and series: (10 lectures)

Convergence of sequence and series, tests for convergence, Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

Multivariable Calculus (Differentiation): (8 lectures)

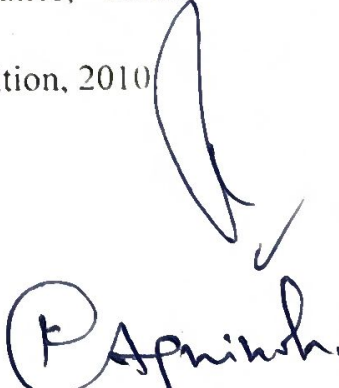
Limits, continuity and partial derivatives, directional derivatives, total derivative, Tangent plane and normal line, Maxima, minima and saddle points, Method of Lagrange multipliers.

Matrices (10 lectures)

Inverse and rank of a matrix, System of linear equations, Symmetric, skew-symmetric and orthogonal matrices, Determinants, Eigenvalues and Eigenvectors, Diagonalization of matrices, Cayley-Hamilton Theorem and Orthogonal transformation.

Suggested Text/Reference Books:

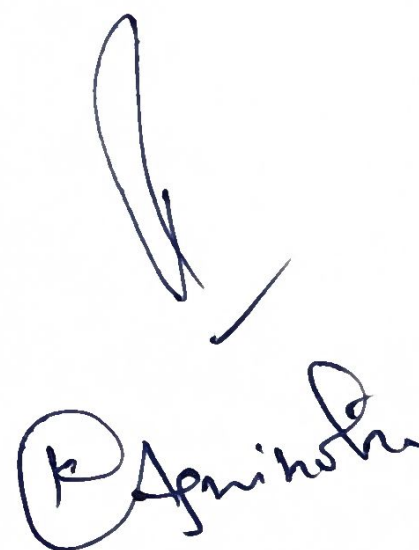
1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson. Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons. 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi. 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, second Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A textbook of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010



Course Outcomes:

On successful completion of the course, students would learn:

- To apply differential concept in practical problems of engineering.
- To apply Rolle's Theorem for analysis and application to Engineering problems.
- To apply tool of sequence and series for learning convergence of infinite series.
- To learn the uses of multivariable functions that are essential in most branches of engineering.
- The essential tool of matrices and linear algebra in a comprehensive manner.



P. Anish

Annexure-I**BTEE-101D Basics of Electrical and Electronics Engineering**

Mid Sem	End Sem	T	LTPC
40	60	100	3104

Course Outcomes:

- To understand and analyze basic electric circuits.
- To study the fundamental concepts of electromagnetic induction.
- To study and analyze the construction & working of transformers and DC machines.
- To acquire basic understanding of transducers and semiconductor devices.
- To understand the basic concepts of digital electronics.

Module 1: Direct Current (DC) Circuits

(8 hours)

Circuit elements and connected terminology, Kirchhoff's Laws- Statement and Illustrations, Method of solving circuits by Kirchhoff's laws, Ohm's Law and its limitations, Analysis of D.C circuits.

Module 2: Alternating Current (AC) Circuits

(8 hours)

Representation of sinusoidal waveforms, Peak, Root Mean Square and Average value of alternating current, Phasor representation, real power, active power, reactive power, power factor, Introduction of Resistive, Inductive & Capacitive circuits and their series and parallel combinations. Concept of resonance in series and parallel circuits.

Module 3: Electromagnetic Induction

(6 hours)

Concept of Magnetic field, Magnetic flux, Reluctance, Magneto motive Force, Self and Mutual Induction, Laws of Electromagnetic Induction, Magnetic Materials, BH Characteristics, Losses in Magnetic Circuits.

Module 4: Electrical Machines

(6 hours)

Single Phase Transformer: Construction and working principle, Voltage regulation. Construction and working principle of D.C. machines.

Module 5: Transducers

(6 hours)

Introduction, working and applications of Resistive Transducers (Strain Gauge), Capacitive Transducers (Parallel Plate) and Inductive Transducers (LVDT).

Module 6: Semiconductor Devices

(8 hours)

Principle of operation, characteristics and applications of PN Junction Diode; Rectifiers; Zener Diode. Principle of operation, characteristics and applications of Bipolar Junction Transistor; Regulated Power Supply.

Module 7: Digital Electronics

(6 hours)

Binary, Octal and Hexadecimal Number System & its arithmetic operations, Logic gates, Introduction of R-S, J-K, D and T Flip Flop & its truth table.

Suggested Readings/ Books

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill.
2. B.L Theraja & A.K Theraja, "A Textbook of Electrical Technology", S Chand publishers.
3. Edward Hughes, "Electrical Technology", Addison Wesley Longman Limited.
4. Samarjit Ghosh, "Fundamentals of Electrical and Electronics Engineering", PrenticeHall India.
5. D. P. Kothari and I. J. Nagrath, "Basic Electronics", Tata McGraw Hill.
6. A.K Sawhney, "A Course in electrical and electronic Measurements & Instrumentation", Dhanpat Rai & Co.

8/8/15

02.02.15

all

BTEE-102 D

BTEE----- Basics of Electrical and Electronics Engineering Lab

Mid Sem	End Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Laboratory Outcomes

1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the basic working of transducers and semiconductor devices.
4. Verify truth table of logic gates and flip flops.

List of Experiments to be performed

1. To verify Ohm's Law and its limitations.
2. To verify Kirchhoff's Laws.
3. To find voltage-current relationship in a R-L series circuit and to determine the power factor of the circuit.
4. To measure power and power factor in a single-phase AC circuit.
5. To verify series and parallel resonance in AC circuits.
6. To measure the minimum operating voltage, current drawn, power consumed, and the power factor of a fluorescent tube light.
7. To verify the working of a). Strain Gauge b). LVDT.
8. To study the use of digital multimeter.
9. To obtain the characteristics of a P-N junction diode.
10. To use a half wave rectifier and full-wave rectifier for rectification of AC supply and to determine the relationship between RMS and average values of the rectified voltage.
11. To study Zener diode as voltage regulator.
12. To obtain the characteristics of a transistor under common base (CB) and common emitter (CE) configuration.
13. To verify the truth table of logic gates.
14. To verify the truth table of flip flops.

Note: Atleast ten experiments should be performed in semester.

M
8/8/25
Z
08.8.25
all

Communication skills in English
(BTHU-101C)

Semester: I/II (Batch 2022 Onwards)

L T P3 0

0

Internal Marks: 40

External Marks: 60

Total Marks: 100

COURSE OUTCOMES : After studying this course, the students shall be able to:

- Understand the significance of effective communication in English at work place.
- Enhance vocabulary and acquire effective reading skills for academic and professional efficiency.
- Utilise suitable writing styles while expressing their thoughts and ideas in an organized way in written form.
- Produce effectively different forms of professional writing.
- Enhance grammatical competence in English language

Detailed contents

Unit 1

Importance of Communication in English Communication: Its meaning, Process, Types, Channels and Barriers to effective communication.

Language as a tool of communication, significance of communicating in English

Unit 2

Reading Skills & Vocabulary Building: Reading Process, Reading Strategies, Reading Comprehension.

Synonyms, Antonyms, and Standard abbreviations

Unit 3

Basic Writing Skills & Writing Styles: Sentence Structure; creating coherence; organizing principles of paragraphs in documents, Paragraph writing, Essay writing, Précis writing

Identifying Common errors in writing Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles and Prepositions

Pranveer Kumar

[Signature]

Unit 4

Writing Practices -Business letters,: Complaint letter, Collection Letter, Sales Letter, Inquiry Letter, Order Placement Letter; Job Applications and Resume/CV Writing, Business Emails, Memorandum and Report Writing.

Unit 5

Speaking Skills and Listening Skills: Importance of Oral presentation, Outlining and Structuring of Presentation, Role of Visual Aids, Guidelines for Effective Presentation, Interview Skills
Importance of Listening in communication, Poor Listening Habits, Types of Listening, Qualities of a good Listener

Suggested Readings:

- (i) Fundamentals of Technical Communication ,Meenakshi Raman & Sangeeta Sharma,Oxford university Press.
- (ii) Effective business Communication,Asha Kaul, Prentice Hall of India.
- (iii) (Communication Skills For Engineers, Sunita Mishra & C. Mualikrishna, Pearson Education.
- (iv) Effective Technical Communication, M. Ashraf Rizvi, McGraw Hill
- (v) Remedial English Grammar. F.T. Wood. Macmillan.2007
- (vi) On Writing Well. William Zinsser. Harper Resource Book. 2001
- (vii) Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006
- (viii) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.

Kiranjeet Kaur

Tuly

**Communication skills Lab
Laboratory (BTHU-102C)
Semester: I/II
(Batch 2022 Onwards)**

L T P

0 0 2

Internal Marks: 30

External Marks: 20

Total Marks: 50

COURSE OUTCOMES :

After studying this course, the students shall be able to:

1. Receive and understand spoken material accurately besides developing ability to converse fluently.
2. Demonstrate fluency in speech in acceptable accent.
3. Acquire proficiency in skills involved in effective workplace communication.
4. Develop a knack for structured public talk.
5. Imbibe the skills required to perform satisfactorily in job interviews.

Detailed Contents

1. Interactive practice sessions in Language Lab on Oral Communication
2. Listening Comprehension: Listening to a recorded talk and participation in conversation.
3. English Sound System, Pronunciation and Stress Placement.
4. Communication at Workplace: Self-introduction, Discussion Skills, Meeting Skills and Telephonic Skills.
5. Oral Presentations: Power Point Presentation.
6. Interviews: Pre-interview Preparation, Question-answer Strategies, Projecting a positive image.

Suggested Readings/Books Practical English Usage.

1. Michael Swan. OUP. 1995.

Kiranjit Kaur

[Signature]

2. Handbook of Practical Communication. Chrissie Wright. Jaico Publishers.
3. Effective Technical Communication, M.Ashraf Rizvi Tata McGraw Hills.
4. Spoken English , R.K. Bansal & J.B. Harrison Orient Longman.
5. A Practical Course in English Pronunciation, J.Sethi, Kamlesh Sadanand & D. V. Jindal , Prentice Hall of India Pvt. Ltd. New Delhi.
6. A Text book Of English Phonetics for Indian Students T. Balasubramaniam, Macmillan English Pronouncing Dictionary ,Daniel Jones, Current Edition with CD Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

K. Anjitha Rao

[Signature]

Introduction to Shaheed Bhagat Singh and his co-patriots

Introduction to Bhagat Singh as a person through the eyes of his colleagues, family background and childhood, Education and participation in National Freedom Movement, his visits to Jallianwala Bag and Nankana Sahib.

2. His contribution to National Freedom Movement.

Building of Youth Movement, His contribution through his writings, National College Movement and his comrades, Durga Das Library and Lahore Science movement, List of books Shaheed Bhagat Singh read.

3. Shaheed Bhagat Singh's experiences at Kanpur

As journalist and joining Hindustan Republican Association

4. His return to Punjab

Joining Morcha, His first experience of underground life, Shaheed Bhagat Singh at Kirti Magazine, Establishment, Hindustan Socialist Republican Association

5. Shaheed Bhagat Singh's attacks on British rule

Saunders Case, Assembly bomb case, Hunger Strike for Jail Reforms, 'Cut Short Justice' system of the British.

6. Overall contributions and his vision of free India.

Reference books

1. Shaheed Bhagat Singh by Jatinder Nath Sanyal, National Book Trust, New Delhi
2. Bhagat Singh Enduring Legacy for Justice, Liberty and Equality, Published by Social Change Publishers, New Delhi
3. Shaheed Bhagat Singh and his comrades by Prof Jagmohan Singh Chetna Parkashan, Punjabi Bhawan, Ludhiana
4. Shaheed Bhagat Singh Edited by Bansi Des Chaturvedi Published by Atama Ram and Sons, Delhi
5. Shaheed Bhagat Singh By Shiv Verma Published by Lok Parkashan Greh, Delhi
6. Asha Shaheedon ke Sansamran by Raja Ram Shastri Published by Sadhna Sahitya Mander Parkashan, Jaipur
7. Bhagat Singh The Eternal Rebel by Malwinder ji Singh Waraich, Published by Unistar Book Pvt. Ltd.
8. www.shaheedbhagatsingh.org

Rajeev Kumar
20/12/22

2
3
5
12/12/22