

# **SEMESTER II**

**Program:** B.Tech  
**Semester:** Second  
**Course:** Chemistry I  
**Course Code:** BSC103

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### Course Learning Objective:

**CLO 1:** To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.

**CLO 2:** The knowledge gained on spectroscopy, stereochemistry will provide a strong platform to understand the concepts on these subjects for further learning

**CLO 3:** To acquire knowledge of the basic 3D structure in organic chemistry including stereochemistry, aromaticity and reaction mechanism.

**CLO 5:** To develop knowledge on the physical state and electrochemistry of molecules and significance of corrosion.

### Course Outcome:

On the completion of the Course, the students will be able to:

**CO 1:** Learn about the bonding in a molecular structure of simple and complex molecule, magnetism and isomerism in complex molecule.

**CO 2:** Learn about limitations of classical mechanics and solution in terms of quantum mechanics for atomic/molecular systems. Gain insight into the basic principles of UV, IR and NMR spectroscopic techniques. Use spectroscopic techniques to determine structure and stereochemistry of known and unknown compounds.

**CO 3:** Learn about aromaticity of organic compound identify and differentiate prochirality and chirality at centres, axis and determine the absolute configuration. Evaluate the stability of various conformers of acyclic and cyclic systems

**CO 4:** Learn about the rate of reaction, order and molecularity of reaction, mechanism of a simple as well as catalytic reaction..

**CO 5:** Learn about the phases and the electrochemical behavior of the molecules, EMF of cell and its application.

### Course Content:

Topics	Hours
<b>Unit I:</b> : Chemical Bonding	9
Ionic bond: Radius ratio rule, . Metallic Bond: valence bond and band theories, defects in solids, Werner's Theory, Bonding in Transition metal complexes, Ligands, coordination complexes, Crystal Field Theory, Octahedral and Tetrahedral complexes, CFSE, Jahn Teller theorem, magnetism, and isomerization in coordination compounds..	

<b>Unit II: Spectroscopic techniques and applications</b>	
Principles of spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging.	<b>4</b>
<b>Unit III: Organic Structure and Stereochemistry</b>	
Covalent bond: Lewis structure, Valence Bond theory, Molecular orbital theory, Molecular orbital of diatomic and polyatomic system, hybridization, conjugated molecules, Huckel molecular orbital theory of conjugated systems. Isomerism, Geometrical isomerism: cis–trans and syn-anti isomerism; Optical isomerism & Chirality; Wedge, Fischer, Newmann and Sawhorse Projection formulae and interconversions; Conformational studies of ethane, n-butane, Cyclohexane	<b>9</b>
<b>Unit IV Kinetics and Catalysis:</b>	
Order & molecularity of reactions, kinetics of zero, first & second order reaction Characteristics of catalyst, types of catalysis, theories of catalysis; Acid base catalysis, Enzyme catalysis, Important catalysts in industrial processes; Hydrogenation using Wilkinson’s catalyst,	<b>9</b>
<b>Unit V: Phase and Chemical equilibrium</b>	
Phase Rule: Terms Involved, Phase diagram of one component (Water) their applications. Law of chemical equilibrium, equilibrium constants and their significance, Weak and strong electrolytes, Standard electrode potential and its application , EMF and its measurement and application, the Nernst equation , Chemical and Electrochemical corrosion, Factors affecting the rate of corrosion.	<b>9</b>

### Suggested Reading:

1. *University chemistry*, by B. H. Mahan
2. *Chemistry: Principles and Applications*, by M. J. Sienko and R. A. Plane
3. *Fundamentals of Molecular Spectroscopy*, by C. N. Banwell
4. *Engineering Chemistry (NPTEL Web-book)*, by B. L. Tembe, Kamaluddin and M. S. Krishnan
5. *Physical Chemistry*, by P. W. Atkins
6. *Organic Chemistry: Structure and Function* by K. P. C. Volhardt and N. E. Schore.
7. *Engineering Chemistry* by Jain & Jain.
8. *Engineering Chemistry* by O P Agarwal.
9. J. D. Lee Concise Inorganic Chemistry ELBS, 1991.
10. R. G. Mortimer Physical Chemistry 3rd Ed., Elsevier (2009).
11. William Kemp, Organic Spectroscopy, 3rd Ed., 2008 Macmillan.

**Program:** B.Tech  
**Semester:** Second  
**Course:** Chemistry I Lab  
**Course Code:** BSC103P

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**List of Laboratory Experiments/Demonstrations:**

1. Determination of surface tension and viscosity
2. To draw the pH-titration curve of strong acid vs strong base.
3. Ion exchange column for removal of hardness of water
4. Determination of chloride content of water
5. Determination of the rate constant of a reaction
6. Determination of cell constant and conductance of solutions
7. Synthesis of a polymer/drug
8. Saponification/acid value of an oil
9. Chemical analysis of a salt
10. Models of potential energy surfaces
11. Preparation of N/10 solution
12. Estimation of strength HCl solution supplied by titrating it against N/10 NaOH solution.
13. Adsorption of acetic acid by charcoal

**Program:** B.Tech  
**Semester:** Second  
**Course:** Mathematics II  
**Course Code:** BSC104

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3	1	0	4

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**Course Learning Objective:**

**CLO 1:** The subject helps the students to develop the fundamentals and basic concepts of Differential Equation. Students will be able to solve problems related to engineering applications by using these techniques.

**CLO 2:** Apply the principles of Power series to solve a variety of practical problems in Engineering and Applied Science.

**CLO 3:** Apply the concept of Partial Differential Equation to solve various equations like wave equation, heat equation etc.

**CLO 4:** Apply the concept of line, surface and volume integral with various theorems to solve practical problems.

**Course Outcome:**

On the completion of the Course, the students will be able to:

**CO 1:** To introduce the basic concepts required to understand, construct, solve and interpret ordinary differential equations.

**CO 2:** To teach methods to solve differential equations of various types.

**CO 3:** To give an idea about Power series solutions; Legendre polynomials, Bessel functions.

**CO 4:** To give an ability to apply knowledge of Partial Differential equation on engineering problems.

**CO 5:** Formulate and solve problems related to vector calculus in the field of Industrial Organization Engineering.

**Course Content:**

Topics	Hours
<b>Unit I: First order ordinary differential equations</b>	<b>6</b>
Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.	
<b>Unit II: Ordinary differential equations of higher orders</b>	<b>6</b>
Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation.	
<b>Unit III: Power series</b>	<b>4</b>
Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.	
<b>Unit IV: Partial Differential Equations</b>	<b>10</b>
Definition of Partial Differential Equations, First order partial differential equations, solutions of first order linear PDEs; Solution to homogenous and non-homogenous linear partial differential equations of second order by complimentary function and particular integral method. Second-order linear equations and their classification, Initial and boundary conditions, D'Alembert's solution of the wave equation; Heat diffusion and vibration problems, Separation of variables method to simple problems in Cartesian coordinates.	
<b>Unit V: Vector calculus</b>	<b>6</b>
Gradient, curl and divergence ; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.	

**Suggested Readings:**

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. W. E. Boyce and R. C. DiPrima, *Elementary Differential Equations and Boundary Value Problems*, 9th Edn., Wiley India, 2009.
4. S. L. Ross, *Differential Equations*, 3rd Ed., Wiley India, 1984.
5. E. A. Coddington, *An Introduction to Ordinary Differential Equations*, Prentice Hall India, 1995.
6. E. L. Ince, *Ordinary Differential Equations*, Dover Publications, 1958.
7. J. W. Brown and R. V. Churchill, *Complex Variables and Applications*, 7th Ed., Mc- Graw Hill, 2004.
8. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, Reprint, 2008.
9. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 36th Edition, 2010.

**Program:** B.Tech

**Semester:** Second

**Course:** Programming for Problem Solving

**Course Code:** ESC103

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**Course Learning Objective:**

The objective of this course is to help the students

**CLO 1:** To impart basic knowledge about simple algorithms, fundamentals of Programming Skills particularly in C Programming Language.

**CLO 2:** To enable how to implement conditional branching, iteration and recursion.

**CLO 3:** To enable them to use functions, arrays, pointers, strings and structures in solving problems.

**CLO 4:** To understand how to solve problems related to matrices, searching, sorting, use files to perform read and write operations.

**Course Outcome:**

On the completion of the Course, the students will be able to:

**CO1:** Understand the fundamentals of computer and C programming language, along with flow chart and algorithm to solve given program.

**CO2:** Able to choose the loops and decision-making statements to solve the problem.

**CO3:** Gain the knowledge of function, array , pointer and structure.

**CO4:** Learn about implementation of file Operations in C programming for a given application.

**Course Content:**

Topics	Hours
<b>Unit 1: Introduction to Programming</b>	
Introduction to Programming (Flow chart/pseudocode, compilation etc.), Variables (including data types)	2
<b>Unit II: Arithmetic expressions</b>	
Arithmetic expressions and precedence	2
<b>Unit III: Conditional Branching and Loops</b>	
Writing and evaluation of conditionals and consequent branching, Iteration and loops.	8
<b>Unit IV: Arrays</b>	
Arrays (1-D, 2-D), Character arrays and Strings	6
<b>Unit V: Basic Algorithms</b>	
Searching, Basic Sorting Algorithms, Finding roots of equations, idea of time complexity	6
<b>Unit VI: Function and Recursion</b>	
Functions (including using built in libraries), Recursion with example programs such as Quick sort, Ackerman function etc.	8
<b>Unit VII: Structure and Pointers</b>	
Pointers, Structures (including self referential structures e.g., linked list, notional introduction)	6
<b>Unit VIII: File handling</b>	
File handling	2

**Suggested Reading:**

1. E. Balagurusamy – *Programming in ANSI C, 3rd Edn.*, TMH, New Delhi, 2004
2. *Programming with C*, B.S.Gottfried (TMH)
3. Y. Kanetkar – *Let us C, 4th Edition*, BPB Publication, New Delhi; 2002
4. *The C Programming Language*, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education
5. *C Programming with problem solving*, J.A. Jones & K. Harrow, Dreamtech Press
6. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language*, Prentice



**Program:** B.Tech

**Semester:** Second

**Course:** Programming for Problem Solving

**Course Code:** ESC103P

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**Tutorial and Lab:**

**Tutorial 1:** Problem solving using computers: Lab1: Familiarization with programming environment

**Tutorial 2:** Variable types and type conversions: Lab 2: Simple computational problems using arithmetic expressions

**Tutorial 3:** Branching and logical expressions: Lab 3: Problems involving if-then-else structures

**Tutorial 4:** Loops, while and for loops: Lab 4: Iterative problems e.g., sum of series

**Tutorial 5:** 1D Arrays: searching, sorting: Lab 5: 1D Array manipulation

**Tutorial 6:** 2D arrays and Strings, memory structure: Lab 6: Matrix problems, String operations

**Tutorial 7:** Functions, call by value: Lab 7: Simple functions

**Tutorial 8 & 9:** Numerical methods (Root finding, numerical differentiation, numerical integration): Lab 8 and 9: Numerical methods problems

**Tutorial 10:** Recursion, structure of recursive calls: Lab 10: Recursive functions

**Tutorial 11:** Pointers, structures and dynamic memory allocation Lab 11: Pointers and structures

**Tutorial 12:** File handling: Lab 12: File operations

**Program:** B.Tech  
**Semester:** Second  
**Course:** Workshop Practice  
**Course Code:** ESC104

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**Course Learning Objective:**

- CLO 1:** Students able to understand different tool & equipment for work shop practice.
- CLO 2:** Students acquire skills for the preparation of different Carpentry/fitting/welding models.
- CLO 3:** Students able to understand the safety precaution in the workshop
- CLO 4:** Student acquires skills of Application orientated tasks.

**Course Outcome:**

On the completion of the Course, the students will be able to:

- CO 1:** Understand the concepts of various manufacturing methods such as casting, forming machining.
- CO 2:** Understand the additive manufacturing with its implication in manufacturing.
- CO 3:** Ability to Produce Fitting jobs as per specified dimensions with the use of various fitting tools.
- CO 4:** Understand the basic concepts of electrical & electronics and understand the working principle of motors.
- CO 5:** Ability to understand the recyclable plastics & non-recyclable plastics and various manufacturing process & also understand the various additives & fillers used in plastics & its implications.
- CO 6:** Understand the various the types of welding such as Arc welding, TIG, MIG & various advanced welding & its practical implications in industrial arena.

**Course Content:**

Topics	Hours
<b>Unit 1:</b>	<b>3</b>
Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods	
<b>Unit II:</b>	<b>1</b>
CNC machining, Additive manufacturing	
<b>Unit III:</b>	<b>1</b>
Fitting operations & power tools	
<b>Unit IV:</b>	<b>1</b>
Electrical & Electronics	
<b>Unit V:</b>	<b>1</b>
Carpentry	
<b>Unit VI:</b>	<b>1</b>
Plastic moulding, glass cutting	
<b>Unit VII:</b>	<b>1</b>
Metal casting	
<b>Unit VIII:</b>	<b>1</b>
Welding (arc welding & gas welding), brazing	

**Suggested Reading:**

1. *Workshop technology by Hajara Chaudhary*
2. *Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.*
3. *Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology",*
4. *4<sup>th</sup> edition, Pearson Education India Edition, 2002.*
5. *(iii)Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008.*
6. *Roy A. Lindberg, "Processes and Materials of Manufacture", 4<sup>th</sup> edition, Prentice Hall India, 1998.*
7. *Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.*

**Program:** B.Tech

**Semester:** Second

**Course:** Workshop Practice Lab

**Course Code:** ESC104P

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**Workshop Practice: (60 hours)**

1. Machine shop- 10 hours
2. Fitting shop - 8 hours
3. Carpentry - 6 hours
4. Electrical & Electronics - 8 hours
5. Welding shop - 8 hours (Arc welding 4 hrs + gas welding 4 hrs)
6. Casting - 8 hours
7. Smithy- 6 hours
8. Plastic moulding & Glass Cutting - 6 hours

**Program:** B.Tech

**Semester:** Second

**Course:** Environmental Science

**Course Code:** MC101

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**Course Learning Objective:**

**CLO 1: Knowledge:** to help students, gain a variety of experiences and acquire a basic understanding of the environment and its associated problems.

**CLO 2: Awareness:** to help students acquire an awareness of and sensitivity to the total environment and its allied problems.

**CLO 3: Attitudes:** to help students to acquire a set of values and promote a feeling of concern for the environment and provide motivation for actively participating in environmental improvement and protection.

**CLO 4: Participation:** to provide students with an opportunity to be actively involved at all levels, working towards the resolution of environmental problems.

**CLO 5: Skills:** to help students to acquires the skills for identifying and solving environmental problems

**CLO 6: Evaluation Ability:** to evaluate environmental measures and education programs in terms of ecological, economic, social and aesthetic factors.

**Course Outcome:**

On the completion of the Course, the students will be able to:

**CO 1:** Articulate the interconnected and interdisciplinary nature of environmental studies; an integrative approach to environmental issues with a focus on sustainability

**CO 2:** Predict the consequences of human actions on the web of life, global economy and quality of human life, develop critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and sustainable development

**CO 3:** Acquire values and attitudes towards understanding complex environmental-economic social challenges, and participating actively in solving current environmental problems and preventing the future ones

**CO 4:** Reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world, adopt sustainability as a practice in life, society and industry.

**Course Content:**

Topics	Hours
<p><b>Unit 1: Multidisciplinary nature of environmental studies, Natural Resources</b></p> <p>Definition, scope and importance need for public awareness. Renewable and non-renewable resources: Natural resources and associated problems.</p> <p>a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.</p> <p>b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems</p> <p>c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.</p> <p>d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.</p> <p>e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.</p> <p>f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</p> <ul style="list-style-type: none"> <li>• Role of an individual in conservation of natural resources.</li> <li>• Equitable use of resources for sustainable lifestyles.</li> </ul>	8
<p><b>Unit II: Ecosystems, Biodiversity and its conservation</b></p> <p>Concept of an ecosystem.</p> <ul style="list-style-type: none"> <li>• Structure and function of an ecosystem.</li> <li>• Producers, consumers and decomposers.</li> <li>• Energy flow in the ecosystem.</li> <li>• Ecological succession.</li> <li>• Food chains, food webs and ecological pyramids.</li> <li>• Introduction, types, characteristic features, structure and function of the following ecosystem:-</li> </ul> <p>a. Forest ecosystem</p> <p>b. Grassland ecosystem</p> <p>c. Desert ecosystem</p> <p>d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)</p> <ul style="list-style-type: none"> <li>• Introduction – Definition: genetic, species and ecosystem diversity.</li> <li>• Bio geographical classification of India</li> <li>• Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values</li> <li>• Biodiversity at global, National and local levels.</li> <li>• India as a mega-diversity nation</li> </ul>	10

<ul style="list-style-type: none"> <li>• Hot-sports of biodiversity.</li> <li>• Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.</li> <li>• Endangered and endemic species of India</li> <li>• Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.</li> </ul>	
<b>Unit III: Environmental Pollution, Social Issues and the Environment</b>	
<p>Definition, Cause, effects and control measures of:-</p> <ol style="list-style-type: none"> <li>a. Air pollution</li> <li>b. Water pollution</li> <li>c. Soil pollution</li> <li>d. Marine pollution</li> <li>e. Noise pollution</li> <li>f. Thermal pollution</li> <li>g. Nuclear hazards</li> </ol> <ul style="list-style-type: none"> <li>• Solid waste Management: Causes, effects and control measures of urban and industrial wastes.</li> <li>• Role of an individual in prevention of pollution.</li> <li>• Pollution case studies.</li> <li>• Disaster management: floods, earthquake, cyclone and landslides.</li> <li>• From Unsustainable to Sustainable development</li> <li>• Urban problems related to energy</li> <li>• Water conservation, rain water harvesting, watershed management</li> <li>• Resettlement and rehabilitation of people; its problems and concerns. Case Studies</li> <li>• Environmental ethics: Issues and possible solutions.</li> <li>• Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust Case Studies.</li> <li>• Wasteland reclamation.</li> <li>• Consumerism and waste products.</li> <li>• Environment Protection Act.</li> <li>• Air (Prevention and Control of Pollution) Act.</li> <li>• Water (Prevention and control of Pollution) Act</li> <li>• Wildlife Protection Act</li> <li>• Forest Conservation Act</li> <li>• Issues involved in enforcement of environmental legislation.</li> <li>• Public awareness.</li> </ul>	<b>10</b>
<b>Unit IV: Human Population and the Environment, Field work</b>	
<p>Population growth, variation among nations.</p> <ul style="list-style-type: none"> <li>• Population explosion – Family Welfare Programme.</li> </ul>	<b>8</b>

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| <ul style="list-style-type: none"> <li>• Environment and human health.</li> <li>• Human Rights.</li> <li>• Value Education.</li> <li>• HIV/AIDS.</li> <li>• Women and Child Welfare.</li> <li>• Role of Information Technology in Environment and human health.</li> <li>• Case Studies.</li> <li>• Visit to a local area to document environmental assets-<br/>river/forest/grassland/hill/mountain</li> <li>• Visit to a local polluted site-Urban/Rural/Industrial/Agricultural</li> <li>• Study of common plants, insects, birds.</li> <li>• Study of simple ecosystems-pond, river, hill slopes, etc.</li> </ul> |  |
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**Suggested Reading:**

1. *G. Kiely – Environmental Engineering Irwin/ McGraw Hill International Edition, 1997*
2. *M. L. Davis and S. J. Masen, Principles of Environmental Engineering and Science, McGraw Hill International Edition, 2004*
3. *E. Bharucha, Environmental Studies, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environment and Research, Pune*



**Program:** B.Tech

**Semester:** Second

**Course:** Life Skills

**Course Code:** HSMC102

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**Course Learning Objective:**

**CLO 1:** To familiarize students with basic aspect of Life Skills and its conceptual treatment, theoretical perspectives and practical strategies.

**CLO 2:** To equip students with the social and interpersonal skills that enables them to cope with the demands of everyday life.

**CLO 3:** To build self-confidence, encourage critical thinking, foster independence and help people to communicate more effectively.

**CLO 4:** To enhance one's ability to meet the challenges of everyday life.

**CLO 5:** To develop psychosocial competency.

**Course Outcome:**

On the completion of the Course, the students will be able to:

**CO 1:** To develop Personal, Social and Professional Competency.

**CO 2:** Gain Intellectual Competency.

**CO 3:** Develop effective communication skills and practice effective written and oral communication

**CO 4:** Develop life and career path.

**CO 5:** Understand and develop professionalism and self responsibility.

**Course Content:**

<b>Topics</b>	<b>Hours</b>
<b>Unit I: Know Thyself / Discovering Self</b>	
- Introduction of the Subject, Learning Objective, Learning Outcome, Importance/ Benefit of the subject - Know Thyself/ Discovering Self, Snap shot of yourself - Assess your Personal Traits - Strength and Weaknesses - Hobbies and Interest - Etiquettes and Manners {Personal Etiquette, Professional Etiquette, Social Etiquette , Tour & Travel}	<b>4</b>
<b>Unit II: Grammar</b>	
- The Sentence, Kinds of Sentences - Parts Of Speech - Article - Verb, Kinds Of Verb, Modal Auxiliaries' - Tense - Voice {Active and Passive} - Narration (Direct and Indirect Speech) & Common Errors	<b>4</b>
<b>Unit III: Vocabulary</b>	
- Homophones, - Word Formation {Prefix, Suffix} - Word Power {Antonym, Synonym} - Word Exercise - Degree of Comparison - Idioms and Phrases	<b>4</b>
<b>Unit IV: Letter Writing</b>	
- Letter Writing, The Forms of Letter, - Classification of Letters - Social Letters - Letter of Application - Official Letters/Business Letters - Editorial Letter	<b>6</b>
<b>Unit V: Phonetics &amp; Phonology</b>	
<b>BASICS OF PHONETICS</b> Introduction Speech Mechanism Phonetics Symbols Classification of Sounds Consonants, Vowels & Diphthongs Stress Pattern, <b>USAGE OF PHONETICS</b> Syllable, Syllable Division, Word Syllable, Tone/ Accent/Pitch, Manner of, Articulation, Voice Modulation	<b>6</b>

### **Suggested Readings:**

1. *Monippally, Matthukutty. M. 2001. Business Communication Strategies. 11<sup>th</sup> Reprint. Tata McGraw-Hill. New Delhi*
2. *Swets, Paul. W. 1983. The Art of Talking So That People Will Listen: Getting Through to Family, Friends and Business Associates. Prentice Hall Press. New York*
3. *Lewis, Norman. 1991. Word Power Made Easy. Pocket Books*
4. *Sen , Leena .Communication Skills ; Eastern Economy Edition*
5. *Ghanekar , Dr. Anjali . Essentials of Business Communication Skills ; Everest Publishing House*
6. *David Green . Contemporary English Grammar, Structure & Composition ; MacMillan*
7. *Dictionary; Oxford*
8. *Dictionary ; Longman*

### **Websites:**

- [www.tatamcgrawhill.com/digital\\_solutions/monippally](http://www.tatamcgrawhill.com/digital_solutions/monippally)
- [www.dictionary.cambridge.org](http://www.dictionary.cambridge.org)
- [www.wordsmith.org](http://www.wordsmith.org)
- [www.edufind.com](http://www.edufind.com)
- [www.english\\_the\\_easy\\_eay.com](http://www.english_the_easy_eay.com)
- [www.englishclub.com](http://www.englishclub.com)
- [www.english\\_grammar\\_lessons.com](http://www.english_grammar_lessons.com)