

# CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

## BIOTECHNOLOGY

### B. Tech I – Year

#### I - Semester

<b>THEORY</b>						
S.No	Code	Subject	L	T	P/D	Credits
1	EG 111	English - I	2	0	0	2
2	MT 112 BT 111	Engineering Mathematics – I for BiPC stream Basics of Biology – I for MPC stream	3	1	0	3
3	PY 113	Engineering Physics	3	0	0	3
4	CY 113	General Chemistry	3	0	0	3
5	CS 111	Programming and Problem Solving	3	1	0	3
6	BT 112	Fundamentals of Biotechnology	3	1	0	3
7	EE 111	Principles of Electrical Engineering	3	1	0	3
<b>PRACTICALS</b>						
8	EG 112	English Language Laboratory – I	0	0	2	1
9	PY 114/ CY 116	Engineering Physics Lab – I / Chemistry Lab – I	0	0	3	2
10	CS 114	Programming Lab - I	0	0	3	2
11	ME 115	Workshop Practice	0	0	3	2
<b>TOTAL</b>			<b>20</b>	<b>04</b>	<b>11</b>	<b>27</b>

#### II – Semester

<b>THEORY</b>						
S.No	Code	Subject	L	T	P/D	Credits
1	EG 121	English - II	2	0	0	2
2	MT 122 BT 121	Engineering Mathematics – II for BiPC stream Basics of Biology – II for MPC stream	3	1	0	3
3	PY 124	Biophysics	3	0	0	3
4	BT 122	Bio-organic Chemistry	3	0	0	3
5	CS 121	Object Oriented Programming through C++	3	1	0	3
6	CE 112	Environmental Studies	3	1	0	3
7	BT 123	Introduction to Anatomy and Physiology of Humans	3	1	0	3
<b>PRACTICALS</b>						
8	EG 122	English Language Laboratory – II	0	0	2	1
9	PY 126 BT 124	Biophysics Lab / Chemistry Lab – II	0	0	3	2
10	CS 122	Programming Lab - II	0	0	3	2
11	ME 122N	Engineering Drawing	0	0	3	2
<b>TOTAL</b>			<b>20</b>	<b>04</b>	<b>11</b>	<b>27</b>

**ENGLISH – I**  
**(common to all branches)**

Instruction	2L Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	2

**Course Objectives:**

**To enable the students to**

- To understand the role and importance of communication and to develop their basic communication skills in English.
- To enable the students to communicate through listening, speaking, reading and writing.
- To achieve a sound foundation and acquaint the students in the basics of grammar.
- To develop vocabulary and to use appropriate idiomatic expressions, one word substitutes etc.,
- To ensure students use learning materials prescribed, and to inculcate the habit of reading for pleasure.
- To enhance imaginative creative and critical thinking through literary texts.
- To enable students to write composition and draft different kinds of letters.

**UNIT-I**

Effective Communication: Role and importance of communication, process of communication, types of communication, barriers to communication, Verbal communication and non verbal communication, formal versus informal communication.

**UNIT-II**

Review of Grammar: 1. Tense and aspect 2. Articles 3. Prepositions 4. Voice 5. Concord 6. Direct and indirect speech

**Vocabulary Enhancement:** 1. Synonyms 2. Antonyms

**UNIT-III**

Reading comprehension and reading strategies.

Lessons Prescribed: 1. Barack Obama: A Trendsetter 2. Rendezvous with Indra Nooyi

Text based exercises

**Vocabulary Enhancement:** 1. Homonyms 2. Homophones 3. Homographs 4. Words often confused

**UNIT-IV**

**Writing Skills:** Paragraph writing, Essay writing, Letter of application, Resume writing, Complaint letter with response.

**Vocabulary Enhancement:** Idiomatic expressions and one word substitutes.

**UNIT-V**

Soft skills - Introduction to soft skills, soft versus hard skills, professional etiquette in formal and semi formal situations, telephonic etiquette, E-mail etiquette.

**Text Books:**

1. "Essential English"- E Suresh Kumar et al. (Orient Black Swan PVT Ltd.)
2. "Communication Skills and Soft Skills: An Integrated Approach"- E Suresh Kumar et al. (Pearson Publications)

**Suggested Reading:**

1. "English Vocabulary in Use" - Michael McCarthy (Cambridge University Press)
2. "Developing Communication Skills" – Krishna Mohan & Meera Banerjee (Macmillan)
3. "Murphy's English grammar" (Cambridge University Press)
4. "English Phrasal Verbs in use" - Michael McCarthy (Cambridge University Press)
5. "Written Communication in English" – Sarah Freeman (Orient Longman)
6. "Model Business letters, E-Mails and Other Business Documents" - Shirley, Taylor (Pearson) "Effective Technical Communication" – M. Ashraf Rizvi (Tata- McGraw Hill)
7. "Business Correspondence and Report Writing – R.C Sharma and Krishna Mohan (Tata McGrawHill )
8. Soft Skills, Alex, Publishers S. Chand

**ENGINEERING MATHEMATICS – I**  
**(for BiPC Stream)**  
**(Bio-Tech)**

Instruction	3L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	2

**UNIT-I**

Trigonometry: Graphs and periodicity of trigonometric functions. Trigonometric ratios and compound angles, trigonometric ratios of multiple and sub multiple angles. Transformations-sum and product rules. Hyperbolic and Inverse Hyperbolic functions.

**UNIT-II**

Limits, Continuity: Intervals and neighborhoods, limits and concept of a limit. Standard limits and related problems. Continuity and applications.

**UNIT-III**

Differentiation: Derivatives of a function, Elementary properties. Derivatives of Trigonometric, Inverse Trigonometric, Hyperbolic and inverse Hyperbolic functions. Methods of differentiation, second and higher order derivatives.

**UNIT-IV**

Matrices: Types of matrices, multiplication of matrices, scalar multiplication. Inverse of matrix-determinant, singular, non-singular, minor, cofactors, adjoint, Rank-Echelon form, consistency, inconsistency Solutions of simultaneous linear equations.

**UNIT-V**

Curve Fitting: Residues, Principle of Least squares and Curve fitting by the method of least squares, Fitting of a straight line, parabola, Fitting of the curves of the form  $ab^x, ae^{bx}$

**Text Books:**

1. Text Book of Mathematics by N. Krishnamurthy, Chand series Volume-I & II
2. Numerical Methods for scientists and engineers by B.S.Grewal

**Suggested Readin**

1. Matrices by A.R.Vasistha
2. Differential calculus by P.N.Chatterji / A.R.Vasistha
3. Calculus by David C.R

**BASICS OF BIOLOGY-I**  
(for MPC Stream)  
(Bio-Tech)

Instruction	3L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

**UNIT-I: HISTORY OF LIFE AND EVOLUTION**

History of earth, evolutionary concepts of origin of life. Experimental verification of chemical origin of life - Miller's Experiment. Darwinism, Natural selection, Sexual selection, Artificial selection, Mendelism, Hugo de Vries mutation theory, neo-darwinism, synthetic theory. Concept of species and speciation – allopatric speciation and sympatric speciation. Microevolution.

**UNIT-II: PLANT SYSTEMATIC AND REPRODUCTION**

Plant kingdom, salient features of classification. Alternation of generation of the plants. Type studies of Algae (*Spirogyra*), Fungi (*Rhizopus*), Bryophytes (*Pteris*), Gymnosperms (*Cycas*) and general characteristics and life cycle of Angiosperms. Overview of modes of reproduction-Asexual: vegetative propagation, budding, sporulation, binary fission; Sexual reproduction: development of male & female gametophyte, pollination, fertilization, development of embryo, endosperm, fruit and seed formation. Apomixes, pathenocarpy, polyembryony type of reproduction.

**UNIT-III: CELL STRUCTURE AND INTERNAL ORGANIZATION OF PLANTS**

Cell as basic unit of life, overview of the plant cell, cell cycle, cell division, mitosis and meiosis. Concept of Growth, meristems (apical, intercalary and lateral) their functions. Simple tissue (parenchyma, collenchyma and sclerenchyma), complex tissues (xylem and phloem). Tissue systems (epidermal, ground and vascular). Anatomy of dicotyledonous and monocotyledons stem and root. Primary and secondary growth in dicot stem and root.

**UNIT-IV: MICROBIOLOGY**

Introduction and importance of classification – five kingdoms. General account of prokaryotes, bacterial viruses - T4, plant viruses – TMV, animal viruses – HIV, Protista, Fungi, Plantae and Animalia. Reproduction in bacteria (asexual - binary fission and sexual - conjugation) and viruses (lytic and lysogenic). Economic importance of beneficial bacteria (agriculture, industry, medicine and biotechnology) and harmful bacteria (with respect to diseases caused in plants and animals).

**UNIT-V: PLANT PHYSIOLOGY AND CONCEPTS IN PLANT BIOTECHNOLOGY**

Absorption of water – soil water, water potential, diffusion, imbibitions, osmosis, plasmolysis, absorption of water, ascent of sap, transportation. Plant growth regulators. Crop improvement -Introduction, methodology, selection (mass, pure line, clonal), Heterosis and mutation breeding. Plant tissue culture techniques and their applications. Mushroom culture – morphology, types of mushrooms, food value and cultivation methods.

**Text books:**

1. Text book of Botany, I and II year, Telugu Akademi, Hyderabad 2012.
2. Text book of Zoology, I and II year, Telugu Akademi, Hyderabad 2012.
3. Biology. Raven, Johnson, Losos, Mason, Singer. Tata Mc Graw Hill Publishing Co. Pvt. Ltd 9<sup>th</sup> edition, 2010.

**Suggested Reading:**

1. Beginning Science: Biology. B.S. Beckett. Oxford University Press. 1<sup>st</sup> edition, 1983.
2. University Botany I: (Algae, Fungi, Bryophyta And Pteridophyta). S.M. Reddy. New age International (P) Ltd. Publishers, New Delhi. 1<sup>st</sup> edition, 1996
3. Botany for Degree students. A.C. Dutta, Oxford University Press. 6<sup>th</sup> Edition, 1998
4. Introduction to Applied biology and Biotechnology. K Vaidhyanath, K Pratap Reddy and K Sathya Prasad. BS Publications. India. 2004

**ENGINEERING PHYSICS**  
**(Bio-Tech)**

Instruction	3L Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

**UNIT – I**

**Waves and Oscillations:** Simple harmonic motion – Differential equation and its solution – Torsional pendulum – Superposition of two mutually perpendicular linear SHMs of same frequency – Lissajous figures – Damped vibrations – Differential equation and its solution – Logarithmic decrement - Relaxation time – Quality factor – Forced vibrations – Differential equation and its solution – Amplitude resonance.

**Ultrasonics:** Introduction – Production of ultrasonics by piezoelectric and magnetostriction methods – Detection of ultrasonics – Determination of ultrasonic velocity in liquids – Engineering applications.

**UNIT – II**

**Interference:** Introduction – Division of amplitude & division of wavefront – Interference in thin films (reflected light) – Newton's rings – Fresnel's biprism.

**Diffraction:** Introduction – Distinction between Fresnel and Fraunhofer diffraction – Diffraction at single slit & double slit – Diffraction grating (N Slits).

**UNIT – III**

**Polarization:** Introduction – Brewster's law – Malus's law – Double refraction – Nicol's prism – Quarter & Half wave plates – Optical activity – Laurent's half shade polarimeter.

**Lasers & Holography:** Introduction – Characteristics of lasers – Spontaneous & stimulated emission of radiation – Einstein's coefficients – Population inversion – Ruby laser – He-Ne laser – Semiconductor laser – Applications.

Basic principle of Holography – Recording & Reconstruction of hologram – Applications

**UNIT - IV**

**Elements of Statistical Mechanics:** Introduction – Ensembles – Phase space – Thermodynamical probability – Boltzmann theorem on entropy – Maxwell-Boltzmann, Bose-Einstein & Fermi-Dirac statistics – Photon gas – Planck's law of black body radiation – Wien's law and Rayleigh-Jean's law from Planck's law.

**UNIT – V**

**Elements of Quantum Mechanics:** Introduction – Dual nature of light – de Broglie's hypothesis – Expression for de Broglie's wavelength – Heisenberg's uncertainty principle and its illustration (diffraction of a beam of electron at a slit) – Schrödinger time independent and time dependent wave equations – Interpretation of wave function – Infinite square well potential (particle in a box) – Potential step – Potential barrier (qualitative) – Tunneling effect.

**Text Books:**

1. M.N. Avadhanulu and P.G. Kshirsagar, *A Text Book Engineering Physics*, S. Chand Publications, 2014
2. S.L. Gupta and Sanjeev Gupta, *Modern Engineering Physics*, Dhanpat Rai Publications, 2011
3. V. Rajendran, *Engineering Physics*, McGahill Education Publications, 2013

**Suggested Reading:**

1. R. Murugesan and Kiruthiga Sivaprasath, *Modern Physics*, S. Chand Publications S. Chand Publications, 2005
2. M. Arumugam, *Materials Science*, Anuradha Publications, 2002.
3. Satyaprakash and Agarwal, *Statistical mechanics*, Kedannath Publications
4. P.K. Palanisamy, *Engineering Physics*, Scitech Publications, 2012
5. Hitendra K Malik and A.K. Singh, *Engineering Physics*, Tata McGahill Education Publications, 2011

**GENERAL CHEMISTRY**  
**(Bio-Tech)**

Instruction	3L Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

**UNIT – I**

**Introduction to Organic Chemistry:** History of organic Chemistry; Uniqueness of Carbon atom, General characteristics of organic compounds. Nomenclature of organic compounds, Hybridization; Functional Group properties- Carbonyl, carboxylic acid, Ester, Hydroxyl and Amine Functional Groups.

**UNIT-II**

**Structure Reactivity Correlations of Organic Molecules:** Electron displacements in a molecule-Inductive and mesomeric effect, resonance, hyper conjugation and electromeric effects; rules and effects of Organic reactions –Hoffman Rule, Saytzeff Rule and Markonikoff Rule, KharashEffect, Orientation Effect and Functional Group Effect, stearic effect.

**UNIT-III**

**Types of Organic Reactions and Some Name Reactions:** Types of Organic reactions- Nucleophilic, Electrophilic, free radical Substitution and Addition reactions, Elimination and Rearrangement (Oxime -rearrangement) reactions. Concepts of Aromaticity, Properties of aromatic compounds-Huckel's Rule. Name Reactions –Diels –Alder Reaction; Aldol Condensation, Hoffman Degradation, Perkin reaction.

**UNIT –IV**

**Inorganic Chemistry-Chemical Bonding:** Types of Bonds- Ionic bond, covalent bond-Characteristics. Bond length, Bond energy, polar and non-polar covalent bond. Dipole moment. Coordinate bond, Hydrogen bonding, vanderwal's forces. Molecular orbital theory-Molecular Orbital Energy Level Diagram (MOED) for O<sub>2</sub>-and N<sub>2</sub>-molecules.

**UNIT-V**

**Physical Chemistry:** Thermodynamics- First law of Thermodynamics, enthalpy, Hess's- law for a reaction. Bio-energetics. Electrochemistry-Electrode potentials, electrochemical series.

Solutions- Ionic product of water(Properties of water), pH and Buffer solutions. Colloidal solutions, suspension, emulsions.

**Text Books:**

1. Organic chemistry 6<sup>th</sup>ed -. Morison & Boyd, PHI (Prentice-Hall India)-Delhi.
2. Text Book of Inorganic Chemistry-Vol-I,IL Finar,Longman Group.
3. Text Book of Organic Chemistry-B.S.Bahl & Arun Bahl-S.Chand & Co. Delhi.
4. 4. Text Book of Organic Chemistry-B.S.Bahl & Arun Bahl-S.Chand & Co. Delhi.
5. Puri & Sharma, "Principles of Physical Chemistry

**Suggested Reading:**

1. Physical chemistry by P.W.Atkin (ELBS OXFORD PRESS)
2. Physical chemistry by W.J.Moore (Orient Longman)
3. Physical Chemistry by Glasstone

**PROGRAMMING AND PROBLEM SOLVING**  
(common to CSE, IT, ECE, EEE & Bio-Tech)

Instruction	3L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

**UNIT-I**

**Introduction to computers:** Hardware Components, Functional block diagram, Operating Systems, Program Development Environments.

**Programming languages:** System Programming, Application Programming, Low-level, High-level, Classification of Programming languages.

**Translators:** Compiler, Interpreter, Loader and Linker.

**Number Systems:** Representation of Binary, Octal and Hexadecimal Numbers, Conversions, Negative Binary Numbers, Fractional Numbers.

**UNIT-II**

**Problem solving: Algorithm:** Key Features of an Algorithm, Strategy for designing an Algorithm. Tracing an Algorithm to depict logic. Specification for converting algorithms to programs, Flow chart and Pseudo codes.

**Introduction to C Programming:** Standardizations, Developing Programs In C, Parts and structure of C Program, character set, Variable, Data types, Statement, Declaration, Token, Operators and Expressions.

**UNIT-III**

**Control Structures:** Test Condition for Selection and Iteration, Conditional Execution and Selection, Iteration and Repetitive Execution, Break, Continue and go to statement, Nested Loops.

**Functions:** Concept of Functions, Types of functions, Parameter passing techniques, Scope and Extent, Storage Classes, Recursion.

**Case Studies on Control structures and Functions (Tutorial Purpose only).**

**UNIT-IV**

**Arrays:** Declaration, Initialization, Accessing Array Elements, Internal Representation and Variable Length Arrays of One-dimensional Array and Multidimensional Arrays, Passing Arrays to Functions, Searching and Sorting.

**Pointers:** Address Operator (&), Declaring and Initializing Pointers, Indirection Operator and Dereferencing, Pointer Arithmetic, Pointers to Pointers, Array of Pointers, Pointers to Functions, Dynamic Memory Allocation, Command Line Arguments.

**Case Studies on Arrays and Pointers (Tutorial Purpose only).**

**UNIT-V**

**User-defined Data Types and Variables:** Structures, Declaring Structures and Structure Variables, Accessing the members of a Structure, Initialization, Nesting of Structures, Arrays of Structures, Structures and Pointers, Structures and Functions, Union, Enumeration Types.

**File Processing:** Working with Text and Binary Files, Sequential and Random Access File, Files of Records.

**A Case Study on Files (Tutorial Purpose only).**

**Text Books:**

1. Pradip Dey and Manas Ghosh "Programming in C 2/e" Oxford University Press, 2<sup>nd</sup> Edition 2011.
2. B. W. Kernighan & D.M. Ritchie, "The 'C' Programming Language" Prentice Hall India, 2<sup>nd</sup> Edition. 1990.
3. R S Bichkar "Programming with C" University Press, 2012.

**Suggested Reading:**

1. Rajaraman V. "The Fundamentals of Computers" 4<sup>th</sup> Edition, Prentice Hall of India, 2006.
2. Behrouz A. Forouzan, Richard F. Gilberg "Computer Science : A Structured Programming Approach using C" Cengage Publishers, 2006.

**FUNDAMENTALS OF BIOTECHNOLOGY**  
(Bio-Tech)

Instruction	3L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

**UNIT-I: Introduction to Biotechnology**

Definitions: Historical perspectives, scope and importance; an inter disciplinary challenge, Classical vs Modern concepts. Conventional practice of brewing, domestic fermented foods and milk. Introduction to prokaryotic cell and eukaryotic cell and its differences, origin of microbiology, types and importance of microorganisms. Developmental biology in evolution.

**UNIT -II: Introduction to Biomolecules and Bioinformatics**

Structure and functions of nucleic acids, lipids, carbohydrates, amino acids in brief. Introduction to Bioinformatics, role of bioinformatics in biotechnology, biological databases and their applications example - Human Genome project (PDB, Gene Data Bank).

**UNIT –III: Molecular Basis of Biotechnology**

Basic laws of inheritance; Mendalian ratios, Identification of genetic material, classical experiments, extra nuclear inheritance, structure of chromosome and it's functions, sex linked disorders. Central dogma of molecular biology, higher order chromatin organization. Basic concepts in plant tissue culture.

**UNIT –IV: Medical Biotechnology**

Basic concepts in Animal tissue culture. Elements of Immunology - Types of immunity (Acquired and Innate), structure and functions of antigen, types of antibodies, Hybridoma technology. Etiology of cancer. Production of rDNA products, example - Insulin and recombinant vaccine (Hepatitis B).

**UNIT –V: Process Biotechnology**

Upstream process - basic structure of fermenter, types of fermentation processes, aerobic and anaerobic process, construction of fermenter, Batch and Continuous fermentation. Downstream process - overview of downstream process in biotechnology. Case Studies - process flowchart for the production of  $\beta$ -lactam antibiotic, bioethanol production and biofertilizer production, bioremediation. Stoichiometry and carbon recovery in product formation, example - ethanol, citric acid and lactic acid.

**Text Books:**

1. Cell Biology. C.B. Powar. Himalaya publication. 2<sup>nd</sup> edition, 1981.
2. Principles of Genetics. John Gardner, Simmons and Snustad. John wiley and sons. 8<sup>th</sup> edition, 2006.
3. Principles of Genetics. P.K. Gupta. Rastogi Publication, Meerut, 2000.
4. Principles of Genetics. Simmons, Snustad and Jenkins. John wiley and sons. 8<sup>th</sup> Edition, 1997.
5. Bioinformatics: Methods and Applications. SC Rastogi, N Mendiratta & P Rastogi. PHI, New Delhi. 4<sup>th</sup> edition, 2005.
6. Bioseparations: Downstream processing for biotechnology. Paul A.Belter, E. L. Cussler and Wei-Shou Hu. Wiley, 1988
7. Kuby Immunology. Richard A. Goldsby, Thomas J. Kindt, Barbara A. Osborne. WH freeman company. 6<sup>th</sup> edition, 2006.
8. Introduction to the cellular and molecular biology of cancer. Edited by L.M. Franks, N.M. Teich. Oxford university press. 4<sup>th</sup> edition, 2005

**Suggested Reading:**

1. The Cell: A Molecular approach. Geoffrey M Cooper and Robert E. Hausman. Sinauer associates incorporated. 5<sup>th</sup> ed, 2009.
2. Principles of fermentation technology. Peter F. Stanbury, Allan Whitaker & Stephen J. Hall. Butterworth-Heinemann Limited, 1995
3. Industrial Microbiology. L.E. Casida. New age international, 2000.
4. Bioseparations: principles and techniques. B.Sivasankar: PHI learning Pvt Ltd, 2010.
5. Cell and Molecular biology eighth edition, Derobertis & Derobertis Lippincott Williams and Willins (2010)
6. Biotechnology: A text books of industrial microbiology. Wulf Crueger and Anneliese Crueger. Editor of English edition Thomas D. Brock. Sinauer Associates, 1990
7. Riott's essential immunology. Peter J. Delves, Seamus J. Martin, Dennis R. Burton and Ivan M. Riott. Wiley - Blackwell. 12<sup>th</sup> edition, 2011.
8. The Biology of Cancer. Robert A. Weinberg. Garland Science. 2<sup>nd</sup> edition, 2013.

**PRINCIPLES OF ELECTRICAL ENGINEERING**  
(common to CSE, IT & Bio-Tech)

Instruction	3L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

**UNIT – I**

**D.C. Circuits and network theorems:** Electric Circuit parameters( $R, L, C$ ), Voltage, Current, Power, Kirchoff's laws, mesh current and node voltage analysis, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem.

**UNIT – II**

**Electromagnetic Induction:** Electromagnetic induction, Faraday's laws of electromagnetic induction, static and dynamically induced EMF

**A.C. Circuits:** Generation of alternating voltage and current, equation of alternating voltage and current, average and rms values of sinusoidal quantities, form and peak factors, phasor representation of sinusoidal quantities, ac through pure resistance pure Inductance, pure capacitance, AC series RL, RC, RLC circuits.

**UNIT- III**

**D.C Generators:** working principle, construction, types of armature winding, emf equation, types of excitation, characteristics of series, shunt and compound generators, losses and efficiency.

**D.C Motors:** working principle, back emf, types of excitation, torque equation, characteristics of series, shunt and compound motors, speed control of shunt and series motors.

**UNIT - IV**

**Single phase transformer:** Constructional details, working principle, Ideal transformer, emf equation, equivalent circuit, voltage regulation, losses and efficiency, condition for maximum efficiency, open circuit and short circuit test.

**UNIT -V**

**Three phase Induction Motors:** Construction, production of rotating magnetic field, working principle, types, slip, torque equation, starting torque, maximum torque, torque slip characteristics.

**Text books:**

1. Edward Hughes, Electrical Technology, 6th Edition, ELBS, 2001
2. V.K. Mehta, Principles of Electrical engineering, S.Chand & Co.

**Suggested Reading:**

1. B.L. Theraja & A.K. Theraja, Electrical Technology, Vol.I, S.Chand & Co.
2. P.V.Prasad & S. Siva Nagraju, Electrical Engineering: Concepts & Applications, Cengage Learning.

**ENGLISH LANGUAGE LABORATORY – I**  
(common to all branches)

Instruction	2 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	1

**Comuter Assisted Language Learning Lab (CALL)**

**Introduction:**

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 and contexts.

The following are the **objectives** of the course:

1. To make students recognize the sounds of English through audio – visual aids and computer software.
2. To help them overcome their inhibitions and self consciousness while speaking in English and to build their confidence. The focus shall be on fluency rather than accuracy.
3. To enable them to speak English correctly with focus on stress and intonation.
4. To expose the students to a variety of self instructional, learner friendly modes of communication.

**Syllabus:**

1. Introduction to English Phonetics: Introduction to auditory, acoustic and articulatory phonetics, organs of speech: the respiratory, articulatory and phonatory systems.
2. Sound system of English: Phonetic sounds and phonemic sounds, introduction to international phonetic alphabet, classification and description of English phonemic sounds, minimal pairs. The syllable : types of syllables, consonant clusters.
3. Aspects of connected speech: Strong forms, weak forms, contracted forms, elision.

**Interactive Communication Skills Lab (ICS LAB)**

**Introduction:**

The objective of the course is to enrich interpretation skills, problem solving skills, interpersonal skills, analytical skills and leadership skills of the students, the most essential requirement of communication skills for Engineering students. The course lays emphasis on the language integrated skills in simple and comprehensive manner.

The following are the **objectives** of the course:

1. To expose the students to a team environment and how best one works with teams while adapting themselves to a corporate environment and to make business presentations.
2. Use proper body language expressions in presentation and speeches.
3. Depict situations in the dialogue that are relevant and useful to the learner, retain the truth value in the dialogue.
4. Public speaking is to be shown in action by incorporating narrative examples and extracts from speeches relating directly to students actual life experiences.

**Syllabus:**

1. Situational dialogues & role plays.
2. Group discussions: Objectives of a GD, types of GD's, initiating, continuing and concluding of GD.
3. Public speaking: Advantages of public speaking, essentials of an effective speech, rehearsal techniques, planning and delivering speeches.

**Suggested Reading:**

1. E Suresh Kumar et al. **English for Success**(with CD), Cambridge University Press India Pvt Ltd. 2010.
2. T Balasubramanian. **A Textbook of English Phonetics for Indian Students**, Macmillan, 2008.
3. Kavita Tyagi and Padma Misra. **Professional Communication**, PHI Learning Pvt Ltd, 2011
4. J Sethi et al. **A Practical Course in English Pronunciation** (with CD), Prentice Hall India, 2005.
5. Meenakshi Raman and Sangeeta Sharma. **Technical Communication**, Oxford University Press 2009.

**ENGINEERING PHYSICS LAB - I**  
**(common to all branches except Chemical Engg)**

Instruction	3 Periods per alternate week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

1. Error Analysis – Estimation of errors in the determination of time period of a torsional pendulum
2. Newton’s Rings – Determination of wavelength of given monochromatic source
3. Single Slit Diffraction – Determination of wavelength of given monochromatic source
4. Diffraction Grating – Determination of wavelengths of two yellow lines of mercury light
5. Malus’s Law – Verification of Malus’s law
6. Double Refraction – Determination of refractive indices of O-ray and E-ray of given calcite crystal
7. Polarimeter – Determination of specific rotation of glucose
8. Laser – Determination of wavelength of given semiconductor red laser
9. Fibre Optics – Determination of NA and power losses of given optical fibre
10. Recording & Reconstruction of Hologram

**CHEMISTRY LAB – I**  
**(Bio-Tech)**

Instruction	3 Periods per alternate week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

**I. Qualitative semi-micro analysis**

1. Analysis of unknown salt mixture-I
2. Analysis of unknown salt mixture-II
3. Analysis of unknown salt mixture-III
4. Analysis of unknown salt mixture-IV

**II. Volumetric Analysis**

1. Estimation of amount of ferrous ion using  $K_2Cr_2O_7$  solution
2. Estimation of temporary, permanent and total hardness of water

**Text Book:**

1. Vogel's text book of quantitative chemical analysis. J. Mendham, R.C. Denney, J.D. Barnes and M. J. K. Thomas. Pearson education Pvt. Ltd., New Delhi, 6<sup>th</sup> edition, 2002.
2. Senior practical physical chemistry. B. D. Khosla, V. C. Garg and Adarsh Khosla. R. Chand and Co., New Delhi

**PROGRAMMING LAB- I**  
**(common to all branches except Chemical Engg)**

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

1. Identify the hardware components, assembling of computers.
2. Basic of OS commands, Installation of OS (Linux, DOS and XP).
3. Familiarization of Editors.
4. Sin x and Cos x values using Series expansion.
5. Demonstration of switch case (menu driven).
6. Demonstration of Parameter passing in Functions.
7. Demonstration of Functions using Recursion.
7. Program to count No of lines, characters, blanks, tab and special characters.
8. Demonstration of arrays
  - i) Search-Linear
  - ii) Sorting-Bubble, Selection
  - iii) Operations on Matrix
9. Generation of address labels using structures.
10. Implementation of string manipulation operations with and without library function.
11. Sequential file operations.
12. Random Access File Operations.

**WORKSHOP PRACTICE**  
(common to Chemical Engg & Bio-Tech)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

**Trades for Practice**

<b>1.Carpentry</b>	<b>2.Plumbing</b>	<b>3.House Wiring</b>	<b>4.Welding and demonstration of lathe operations</b>
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**Exercises in Carpentry**

1. To plane the given wooden piece to required size
2. To make a cross lap joint on the given wooden piece according to the given dimensions.
3. To make a Tee lap joint on the given wooden piece according to the given dimensions.
4. To make a dove tail-joint on the given wooden piece according to the given dimensions.
5. To make a bridle joint on the given wooden piece according to the given dimensions.

**Exercises in Plumbing**

1. To make external threads for GI pipes using dies.
2. To connect the GI pipes as per the given diagram using taps, couplings & bends.
3. To connect the GI pipes as per the given diagram using, couplings, unions, reducer & bends.
4. To connect the GI pipes as per the given diagram using shower, tap & valves
5. Demonstration of above exercise by giving water connection.

**Exercises in House Wiring**

1. Wiring of one light point controlled by one single pole switch, a three pin socket controlled by a single pole switch, and wiring of one buzzer controlled by a bell push.
2. Wiring of two light points connected in series and controlled by single pole switch. Verify the above circuit with different bulbs.
3. Wiring of two light points connected in parallel from two single pole switches and a three pin socket
4. Stair case wiring-wiring of one light point controlled from two different places independently using two 2-way switches.
5. Go-down wiring.

**Exercises in Welding**

1. To make a butt joint using arc welding on the given MS work pieces
2. To make a lap joint using arc welding on the given MS work pieces
3. To make a T-fillet joint using arc welding on the given MS work pieces.
4. To make a corner joint using arc welding on the given MS work pieces.
5. To join two thin sheets of GI material using Electric Resistance welding.

**Demonstration of operations on lathe**

**Facing, turning, taper turning, grooving, knurling and boring operations over a cylindrical mild steel bar**

**Note:** A minimum of 12 exercises from the above need to be done