# COURSE STRUCTURE AND SYLLABUS

## B.Tech CSE, EEE & IT 1st Year (R20) ( w. e. f A.Y. 2020-21)

### I YEAR I SEMESTER

| Code | Course | Category | Periods per Week | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 2010001 | ENGINEERING MATHEMATICS - I | BS | 3 | 1 | 0 | 4 |
| 2010008 | ENGINEERING CHEMISTRY | BS | 3 | 1 | 0 | 4 |
| 2010201 | BASIC ELECTRICAL ENGINEERING | ES | 3 | 0 | 0 | 3 |
| 2010372 | ENGINEERING WORKSHOP | HSMC | 1 | 0 | 3 | 2.5 |
| 2010009 | COMMUNICATION ENGLISH | BS | 2 | 0 | 0 | 2 |
| 2010073 | ENGINEERING CHEMISTRY LAB | HSMC | 0 | 0 | 3 | 1.5 |
| 2010074 | ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB | ES | 0 | 0 | 2 | 1 |
| 2010271 | BASIC ELECTRICAL ENGINEERING LAB | BS | 0 | 0 | 2 | 1 |
| 2010021 | ENVIRONMENTAL SCIENCE | MC-1 | 3 | 0 | 0 | 0 |
| TOTAL | | | 15 | 2 | 10 | 19 |

### I YEAR II SEMESTER

| Code | Course | Category | Periods per Week | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 2020002 | ENGINEERING MATHEMATICS - II | BS | 3 | 1 | 0 | 4 |
| 2020006 | APPLIED PHYSICS | BS | 3 | 1 | 0 | 4 |
| 2020501 | PROGRAMMING FOR PROBLEM SOLVING | ES | 3 | 1 | 0 | 4 |
| 2020371 | ENGINEERING DRAWING PRACTICE | BS | 1 | 0 | 4 | 3 |
| 2020071 | APPLIED PHYSICS LAB | ES | 0 | 0 | 3 | 1.5 |
| 2020571 | PROGRAMMING FOR PROBLEM SOLVING LAB | ES | 0 | 0 | 3 | 1.5 |
| TOTAL | | | 10 | 3 | 10 | 18 |

## 2010001: ENGINEERING MATHEMATICS- I

**B.Tech. I Year I Semester**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**Course Objectives: To learn**

- Types of matrices and their properties, Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form. Geometrical approach to the mean value theorems and their application to the mathematical problems.
- Partial differentiation, concept of total derivative, finding maxima and minima of function of two and three variables.
- The evaluation of Multiple integration and its applications

**Course Outcomes:**

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

**CO.1**: Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations

**CO.2:** Find the Eigen values, Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations.

**CO.3:** Solve the applications on the mean value theorems.

**CO.4:** Find the extreme values of functions of two variables with/ without constraints.

**CO.5:** Evaluate the multiple integrals and apply the concept to find areas, volumes for cubes, sphere and rectangular parallelepiped

**UNIT-I: Matrices**

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

**Learning outcomes:**

- Understand the matrix representation of a set of linear equations
- Explain the Normal form and Echelon form.
- Apply elementary operations to find the rank
- Analyse the solution of the system of Linear equations
- Evaluate the rank of the matrix.

**UNIT-II: Eigen values and Eigen vectors**

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

**Learning outcomes:**

- Understand how to find the eigen values and eigen vectors of a matrix.
- Explain the quadratic form to canonical form using orthogonal transformations.
- Apply Cayley Hamilton theorem to find inverse and powers of the matrix
- Analyse the nature of the quadratic form.
- Evaluate the powers of matrix.

**UNIT-III: Calculus of single variable.**

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's and Maclaurin theorems with remainders (without proof). Beta and Gamma functions and their applications.

Learning outcomes:

- Understand the concept of mean value theorem.
- Explain the nature of functions by using mean value theorems.
- Apply Taylor's or Maclaurin's series to find the series expansion for the functions.
- Analyse the geometrical interpretation of mean value theorem.
- Evaluation of the slopes at any point on the curve

**UNIT-IV: Multivariable Calculus.**

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

**Learning outcomes:**

- Understand the concept of partial differentiation.
- Explain the functional dependence using Jacobian.
- Apply Lagrange's method to find Maxima and minima.
- Analyse concept of Lagrange multipliers.
- Evaluate the maximum and minimum value of functions of two variables.

**UNIT-V: Multiple integrals& applications**:

Evaluation of Double integrals (Cartesian and polar coordinates); Change of order of integration (Cartesian form); Evaluation of Triple integrals; Change of variables (Cartesian to polar) for double and (cartesian to spherical and cylindrical polar coordinates) for triple integrals.

Applications: finding the area of a region using double integration and volume of a region using double and triple integration.

**Learning outcomes:**

- Understand the concept of double integrals.
- Explain the polar form of double integral and triple integral.
- Apply double integration techniques in evaluating areas bounded by region.
- Analyse the centre of mass of a Lamina
- Evaluation of double integrals interns of volumes

**TEXTBOOKS:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.

**REFERENCES**:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

## 2010008: ENGINEERING CHEMISTRY

**B.Tech. I Year I Semester**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**Course Objectives:**

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

**Course Outcomes:** The basic concepts included in this course will help the student to gain:

- The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
- The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
- The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

**Unit - I:**

**Molecular structure and Theories of Bonding:** Atomic and Molecular orbitals / Introduction of VBT. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of $N_2$, $O_2$ and CO molecules. $\pi$ molecular orbitals of 1,3-butadiene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d-orbitals in tetrahedral, octahedral and square planar geometries. Applications of CFT. Band structure of solids and effect of doping on conductance.

**Learning Outcomes:** At the end of this unit, the students will be able to

- Understand the Schrodinger wave equation to hydrogen and particle in a box.
- Explain the molecular orbital energy level diagram of different molecular species.
- Apply the band theory of solids for conductors, semiconductors and insulators.
- Analyze discuss the magnetic behavior and colour of complexes.
- Evaluate the Crystal Field theory and Splitting of d- orbital's

**Unit - II:**

**Water and its treatment:** Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method, Numerical Problems on hardness of water. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization.Boiler troubels-scale and sludge,

caustic embrittlement, priming and foaming. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis.

**Learning outcomes:** The student will be able to

- Understand the differences between temporary and permanent hardness of water.
- Explain the principles of reverse osmosis and Ion-Exchange processes.
- Apply the drinking water with BIS and WHO standards.
- Analyze problems associated with hard water - scale and sludge.
- Evaluate the Internal and external treatment of water.

**Unit - III:**

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Proper Design, Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroplating and electroless plating of Nickel.

**Learning outcomes: The student will be able to**

- Understand the Nernst equation for calculating electrode and cell potentials.
- Explain the corrosion prevention methods and factors affecting corrosion.
- Apply the Pilling Bedworth rule for corrosion and corrosion prevention.
- Analyze the Dry and Wet corrosion and its Mechanism.
- Evaluate the Corrosion control methods

**Unit - IV:**

**Stereochemistry, Reaction Mechanism and synthesis of drug molecules:** Introduction to representation of 3-dimensional structures, Structural and stereoisomers, symmetry and chirality. Enantiomers, diastereomers, optical activity and configurational nomenclatures (D,L and R,S configurations) Conformational analysis of n- butane.
Substitution reactions: Nucleophilic substitution reactions: Mechanism of $S_N1$, $S_N2$ reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$.Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$.Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

Learning Outcomes: At the end of this unit, the students will be able to

- Understand the 3 dimension structures of organic chemistry
- Explain the symmetry , chirality of the organic molecule
- Apply the Markownikoff and anti Markownikoff's additions; Grignard additions conformations of n-butane
- Analyze the reaction mechanism of different compounds.
- Evaluate the synthesis of aspirin, paracetamol

**Unit - V:**

Spectroscopic techniques and applications: Principles of spectroscopy, selection rules and applications of electronic spectroscopy and IR Spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift, spin-spin splitting Introduction to Magnetic resonance imaging.

**Learning Outcomes:** At the end of this unit, the students will be able to

- Understand the. Principles of .spectroscopy and its selection rules
- Explain the concepts of nuclear magnetic resonance spectroscopy
- Apply the chemical shift values for the different compounds
- Analyze the different structures of organic compound
- Evaluate the vibrational and rotational spectroscopy

**Text Books:**


1. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Text Book of Engineering chemistry by Jaya Shree Anireddy: Wiley Publications.
3. Text Book of Engineering Chemistry by Prasanth Rath,B.Rama Devi and Ch.Venkata Ramana Reddy : Cengage Publication 2019.


**Reference Books:**


1. Organic reaction Mechanism by Morrison and Boyd.
2. Fundamentals of Molecular Spectroscopy by C.N.Banwell
3. Inorganic Chemistry by J.D.Lee

## 2010201: BASIC ELECTRICAL ENGINEERING

| **B.Tech. I Year I Semester** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| | **3** | **0** | **0** | **3** |

**Course Prerequisites:** Nil

**Course Objectives:**

- To analyse and solve electric circuits.
- To provide an understanding of basics in Electrical circuits.
- To identify the types of electrical machines for a given application.
- To explain the working principles of Electrical Machines and single phase transformers.

**UNIT-I**

**DC Circuits**: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenins and Norton's Theorems.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Explain the need of circuit elements. (L2)
- Analyse the resistive circuits with independent sources. (L4)
- Solve D.C. circuits by using KVL and KCL. (L3)
- Apply network theorems for solving D.C. circuit problems. (L3)

**Unit-II**

**AC Circuits**: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power and power factor. Analysis of single-phase ac circuits consisting of R, L, C, and RL, RC, RLC combinations (series only). Three phase balanced circuits, voltage and current relations in star and delta connections.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Develop an understanding of the fundamental laws and elements of A.C circuits. (L3)
- Learn the energy properties of electric elements and the techniques to measure voltage and current. (L2)
- Explain the concept of steady state. (L2)

**UNIT-III**

**Transformers**: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Demonstrate knowledge of construction and operating principles of single-phase transformers. (L3)
- Determine losses, efficiency, and voltage regulation of a transformer under specificoperating conditions. (L5)
- Identify the connections of a three phase transformer. (L3)
- Illustrate the performance characteristics of different induction motors. (L3)

**UNIT-IV:**

**Electrical Machines**: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dcmotor. Construction and working of synchronous generators.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Explain construction & working of induction motor - DC motor. (L2)
- Perform speed control of DC Motor. (L3)
- Explain principle and operation of DC Generator & Motor. (L2)

**UNIT-V**

**Electrical Installations**: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

**Learning Outcomes:**

At the end of this unit, the student will be able to

- Understand working principles of LT Switchgear components. (L2)
- Perform elementary calculations for energy consumption, power factor improvement and battery backup. (L3)

**Text Books:**

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshaiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.

**Reference Books:**

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin Pearson.

**Course Outcomes**

After completion of this course the student is able to

- Analyse Electrical circuits to compute and measure the parameters of Electrical Energy.
- Comprehend the working principles of Electrical DC Machines.
- Identify and test various electrical switchgear, single phase transformers and assess the ratings needed in given application.
- Comprehend the working principles of electrical AC machines.

## 2010372:ENGINEERING WORKSHOP

**B.Tech I Year I Semester**

| L | T | P | C |
|---|---|---|---|
| 1 | 0 | 3 | 2.5 |

**COURSE OBJECT :**

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, Equipment and machines

**UNIT – 1 CARPENTRY & FITTING HOURS :4**

**Carpentry** – Introduction, Carpentry tools, sequence of operations, Trade importance, advantages, disadvantages and applications

**Fitting** – Introduction, fitting tools, sequence of operations, Trade importance, advantages, disadvantages and applications

**LEARNING OUTCOME :**

Student should be able to

1. Understand the trade of carpentry and fitting. (L2)
2. Explain the tools involved in manufacturing operations. (L3)
3. Evaluate the applications of carpentry and fitting. (L4)

**UNIT – 2 TIN SMITHY AND BLACKSMITHY HOURS :**

**Tin-Smithy** – Introduction, Tin smithy tools, sequence of operations, Trade importance, advantages, disadvantages and applications

**Black smithy**- Introduction, Black smithy tools, sequence of operations, Trade importance, advantages, disadvantages and applications

**LEARNING OUTCOME :**

Student should be able to

1. Understand the oldest manufacturing methods. (L2)
2. Describe the sequence of operations involved. (L3)
3. Explain the safety precautions and tools usage. (L4)

**UNIT – 3 HOUSE WIRING AND WELDING HOURS :4**

**House-wiring** – Introduction, Electrical wiring tools, sequence of operations and applications (Parallel & Series, Two-way Switch and Tube Light)

**Welding Practice** – Introduction, electrode, welding tools, and sequence of operations, advantages and applications ( Arc Welding & Gas Welding)

**LEARNING OUTCOME :**

Student should be able to

1. Discuss the topic of Heat engines.(L3)
2. Identify types of Heat engines cycles.(L5)
3. Evaluate the Factors affecting routing procedure, Route Sheet.(L4)

**LIST OF EXPERIMENTS**:

1. Carpentry
2. Fitting
3. House Wiring
4. Tin smithy
5. Black smithy
6. welding
7.Foundry

**TRADES FOR DEMONSTRATION & EXPOSURE:**

1.Plumbing
2. Metal Cutting (Water Plasma), Power Tools In Construction And
3. Wood Working

**TEXT BOOK :**

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

**REFERENCE BOOK :**

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

**COURSE OUTCOMES :**

1. **Explain** the design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint. (L4)
2. **Demonstrate** the design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit. (L4)
3. **Understand** to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder. (L4)
4. **Demonstrate** the design and model various basic prototypes in the trade of Welding. (L4)
5. **Explain** to make various basic prototypes in the trade of Black smithy such as J shape, and S shape. (L4)
6. **Understand** to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring. (L4)

## 2010009:Communicative English

**B.Tech I Year I Semester** **L T P C**
2 0 0 2

**Learning Objectives:**

- Improve language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically.
- Analyze a variety of texts and interpret them to demonstrate in writing or speech.
- Write clearly and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.
- Develop language components to communicate effectively in formal and informal situations.

**Course Outcomes:**

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts in their profession.
- Acquire basic proficiency in English including LSRW skills.
- Use prewriting techniques to develop ideas and produce multiple drafts of different types of paragraphs.
- Recognize and incorporate basic grammar, mechanics, and sentence variety in writing.

**SYLLABUS**

**UNIT –I: 'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press**
**Vocabulary Building**: The Concept of Word Formation --The Use of Prefixes and Suffixes.
**Grammar:** Common Errors: Articles and Prepositions.
**Reading:** Reading and Its Importance- Techniques for Effective Reading.
**Basic Writing Skills:** Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.
**Learning Outcomes**

At the end of the module, the learners will be able to

- Understand the concept of word formation, root words and their usage in English.
- know the types of sentences and analyze the sentence structure
- use articles and prepositions appropriately
- use punctuation marks correctly in writing
- understand the techniques of effective reading
- write paragraphs effectively

**UNIT –II: Writing Skills.**

**Vocabulary:** Synonyms and Antonyms.

**Grammar:** Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

**Reading:** Improving Comprehension Skills – Techniques for Good Comprehension

**Writing:** Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, and Job Application with Resume.

**Learning Outcomes**

At the end of the module, the learners will be able to

- enrich their vocabulary using synonyms and antonyms
- noun, pronoun and subject verb agreement accurately
- understand the techniques of reading comprehension
- write formal letters in various context.

**UNIT –III : 'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press**

**Vocabulary**: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

**Grammar:** Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses. **Reading:** Sub-skills of Reading- Skimming and Scanning

**Writing**: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence

**Learning Outcomes**

At the end of the module, the learners will be able to

- use Prefixes and Suffixes from Foreign Languages in English
- understand the use misplaced modifiers and uses of tenses
- skim and scan the given text appropriately
- write definitions, descriptions and classifications

**UNIT –IV: 'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

**Vocabulary**: Standard Abbreviations in English

**Grammar:** Redundancies and Clichés in Oral and Written Communication.

**Reading**: Comprehension- Intensive Reading and Extensive Reading

**Writing: Writing Practices**--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

**Learning Outcomes**

At the end of the module, the learners will be able to

- understand the importance of food pyramid in your daily life.
- explain the Active and passive Voice Subject Verb Agreement (Concord)
- apply the One word Substitutes in your every day vocabulary.
- analyze the Intensive and Extensive reading skills.
- evaluate the importance of Technical Report Writing, and E-mail writing.

**UNIT –V 'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

**Vocabulary**: Technical Vocabulary and their usage

**Grammar:** Common Errors in English

**Reading:** Reading Comprehension-Exercises for Practice

**Writing: Technical Reports**- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

**Learning Outcomes**

At the end of the module, the learners will be able to

- understand the Technical Vocabulary and their Usage.
- avoid common errors in English
- read any text using the sub skills of reading
- write technical reports using manual script format.

**Prescribed Textbooks:**

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

**2. Wren & Martin. (2017). High School English Grammar and Composition Book, S Chand Publishing**

**References:**

1. Murphy, R. (2015). Essential Grammar in Use. Cambridge University Press.
2. Current English Grammar and Usage with Composition by R. P Sinha
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Swan, M. (2016). Practical English Usage. Oxford University Press.
5. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

## 2010073: ENGINEERING CHEMISTRY LAB

**B.Tech - I Year I Semester**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1 |

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

The student will learn:

• Estimation of hardness and chloride content in water to check its suitability for drinking purpose.

• To determine the rate constant of reactions from concentrations as an function of time.

• The measurement of physical properties like adsorption and viscosity.

• To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

**Course Outcomes:** The experiments will make the student to:

- Understand various procedures for performing the experiments.
- Explain the different measuring devices and meters to record the data
- Apply the mathematical concepts and equations to obtain quality results.
- Analyze the analytical techniques and graphical analysis to the experimental data.
- Evaluate the various parameters for different experiments accurately.

**List of Experiments:**

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry

**Conductometric titrations**

3.Strong acid $_{vs}$ strong base

4.Weak acid $_{vs}$ strong base

**Potentiometric titrations**

5.Strong acid $_{vs}$ strong base

6. Redox titration:-$Fe^{2+}$ using KMnO4
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography- calculation of Rf values. eg: ortho and para nitro phenols
10.. Determination of acid value of coconut oil
11. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
12. Determination of surface tension of a give liquid using stalagnometer

**References**

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

## 2010074: Communicative English Language (CEL)Lab

**B.Tech. I Year I Semester** **L T P C**
**0 0 2 1**

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

**Course Objectives:**

- Facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
- Enhance English language skills, communication skills and to practice soft skills.
- Improve fluency and pronunciation intelligibility by providing an opportunity for practice in speaking.
- Train students in different interview and public speaking skills such as JAM, debate, role
- play, group discussion etc.
- Instill confidence and make them competent enough to express fluently and neutralize their mother tongue influence.

**Learning Outcomes:**

**By the end of the course students will be able to-**

- Better perception of nuances of English language through audio- visual experience.
- Neutralization of accent for intelligibility.
- Participate in group activities.
- Speaking skills with clarity and confidence which in turn enhances their employability.
- Apply effective communication skills in a variety of public and interpersonal settings

**Communicative English Language Lab (CELL) shall have two parts:**

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

**Listening Skills**

**Objectives**

a. Enable students develop their listening skills to appreciate its role in the LSRW skills approach to language and improve their pronunciation.
b. Equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

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

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

**Speaking Skills**

**Objectives**

a. Involve students in speaking activities in various contexts.

b. Enable students express themselves fluently and appropriately in social and professional contexts.

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

**Exercise – I**

**CALL Lab**: *Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

**ICS Lab**: *Understand:* Communication at Work Place- Spoken vs. Written language. *Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

**Exercise – II**

**CALL Lab**: *Understand:* Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

**ICS Lab**: *Understand:* Features of Good Conversation – Non-verbal Communication. *Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

**Exercise - III**

**CALL Lab:** *Understand:* Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

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

**ICS Lab**: *Understand:* How to make Formal Presentations. *Practice:* Formal Presentations.

**Exercise – IV**

**CALL Lab**: *Understand:* Listening for General Details. *Practice:* Listening Comprehension Tests.

**ICS Lab**: *Understand:* Public Speaking – Exposure to Structured Talks. *Practice:* Making a Short Speech – Extempore.

**Exercise – V**

**CALL Lab:** *Understand:* Listening for Specific Details. *Practice:* Listening Comprehension Tests.

**ICS Lab**: *Understand:* Interview Skills. *Practice:* Mock Interviews.

**Reference Books:**

1. Kumar, S. & Lata, P. (2011). Communication Skills. Oxford University Press.
2. Balasubramanian, T. (2008). A Text book of English Phonetics for Indian Students, Macmillan.
3. Thorpe, E. (2006). Winning at Interviews, Pearson Education.
4. Sethi, J. et al. (2005). A Practical Course in English Pronunciation (with CD), Prentice Hall of
5. Effective Technical Communication by M Ashraf Rizvi

## 2010271: BASIC ELECTRICAL ENGINEERING LAB

**B.Tech I Year I Semester** **L T P C**
**0 0 2 1**

**Course Objectives:**

To analyze a given network by applying various electrical laws and network theorems

- To know the response of electrical circuits for different excitations
- To calculate, measure and know the relation between basic electrical parameters.
- To analyze the performance characteristics of DC and AC electrical machines

**Course Outcomes:**

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

**List of experiments/demonstrations:**

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Verification of superposition theorem.
4. Verification of Thevenin's and Norton's theorem.
5. Resonance in series RLC circuit.
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer.
8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
9. Three Phase Transformer: Verification of Relationship between Voltage sand Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
10. Measurement of Active and Reactive Power in a balanced Three-phase circuit.
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
13. Performance Characteristics of a Three-phase Induction Motor.
14. Torque-Speed Characteristics of a Three-phase Induction Motor.
15. No-Load Characteristics of a Three-phase Alternator.

## 2010021:ENVIRONMENTAL SCIENCE

**B.Tech. I Year I Semester.**

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**Course Objectives:**

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations
- Understanding the importance of natural resources
- Understanding the different standards of environmental pollution

**Course Outcomes:** Based on this course, the Engineering graduate will

- Understand the technologies on the basis of ecological principles
- Apply the environmental regulations which in turn helps in sustainable development.
- Understand the various classifications of ecosystems and natural resources.
- Apply environmental regulations to different acts.
- Evaluate the values of social, ethical and aesthetic.

**UNIT-I**

**Ecosystems:** Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, Field visits.

**Learning Outcomes:**

- Understand the importance of ecosystem.
- Explain the various classifications.
- Apply to different cycles.
- Analyse the importance field visit.
- Evaluate the flow of energy.

**UNIT-II**

**Natural Resources: Classification of Resources:** Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

**Learning Outcomes:**

- Understand the importance of natural resources.
- Explain the various classifications of natural resources.
- Apply to different renewable resources.
- Analyse the usage of resources.
- Evaluate the value of renewable and non renewable energy sources.

**UNIT-III**

**Biodiversity And Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

**Learning Outcomes:**

- Understand the importance of Biodiversity.
- Explain the types of Biodiversity.
- Apply to different Biotic Resources.
- Analyse the importance Biodiversity And Biotic Resources.
- Evaluate the values of social, ethical and aesthetic.

**UNIT-IV**

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

**Learning Outcomes:**

- Understand the importance of Pollution and control technologies.
- Explain the classifications of pollutions.
- Apply to environment.
- Analyse the importance waste management.
- Evaluate the value of Ozone depletion and Ozone depleting substances.

**UNIT-V**

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building.

**Learning Outcomes:**

- Understand the importance of Environmental Policy, Legislation.
- Explain the various acts.
- Apply to different Environmental Management Plan.
- Analyse the importance of environmental education.
- Evaluate the value of green building.

**TEXT BOOKS:**

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2 Environmental Studies by R. Rajagopalan, Oxford University Press.

**REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Studies by Anubha Kaushik, 4$^{th}$ Edition, New age international publishers.

## 2020002: ENGINEERING MATHEMATICS-II

**B.Tech. I Year II Semester** **L T P C**
**3 1 0 4**

**Course Objectives:** To learn

- Methods of solving the differential equations of 1st and higher order.
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, etc.
- Concept of Sequence and nature of the series.
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

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

**Co 1:** Identify whether the given differential equation of first order is exact or not

**Co 2:** Solve higher differential equation and apply the concept of differential equation to real world problems.

**Co3:** Analyse the nature of sequence and series.

**Co 4:** Apply the del operator to vector and scalar valued functions.

**Co5**: Evaluate the line, surface and volume integrals and converting them from one to Another.

**UNIT-I: First Order and First-Degree ODE and its applications**

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

**Learning outcomes**:

- Identify whether the given differential equation of first order is exact or not.
- Apply the concept of differential equation to real world problems.
- Understand the conepts of linear and Non linear differential equations.
- Analyze Exact and Non Exact differential equations.
- Explain formation of differential equations, Homogeneous equations.

**UNIT-II: Higher Order Linear Differential equations**

Linear differential equations of second and higher order with constant coefficients, RHS term of the type $e^{ax}$ , Sin ax, Cos ax, and $x^n$ , $e^{ax}$ V(x), $x^n$ V(x), method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

**Learning outcomes**:

- Identify essential characteristics of linear differential equations with constant coefficients.
- Apply higher order DE's for solving some real world problems.
- Understand the differential equations with constant coefficients by appropriate method.
- Analyse Legendre's equation and Cauchy-Euler equation.
- Explain Method of variation of parameters.

**UNIT-III: Sequences & Series**

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences. Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test, logarithmic test; Cauchy's Integral test; Cauchy's root test; Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

**Learning outcomes**:

- Identify the Sequence, types of sequences.
- Apply the concept of sequence and series to real world problems.
- Understand the logical knowledge of forming the series.
- Analyze the nature of sequence and series.
- Explain Alternating series.

**UNIT-IV: Vector Differential Calculus**

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

**Learning outcomes**:

- Identify scalar and vector point functions.
- Apply Del to scalar and vector point functions.
- Understand the concepts of Solenoidal and irrotational vectors.
- Analyze the physical interpretation of Gradient, Divergence and curl.
- Explain vector identies.

**UNIT-V: Vector Integral Calculus**

Line integral-Work done, Surface Integrals-Flux of a vector valued function and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

**Learning outcomes**:

- Identify the work done in moving a particle along the path over a force field.
- Apply Greens, Stokes and Divergence theorems in evaluation of double and triple integrals.
- Understand the concepts of Line Integral.
- Analyze the Flux of a vector valued function.
- Explain Vector valued theorems to real world problems.

**TEXT BOOKS:**


1 B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

2 Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006

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


**REFERENCES:**


1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

## 2020006: APPLIED PHYSICS

**B.Tech. I Year II Semester**

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**Course Objectives:**

- Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
- Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics, optoelectronics and dielectric and magnetic properties and a broad base of knowledge in physics.
- The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
- To study applications in engineering like memory devices, transformer core and electromagnetic machinery.

**Course Outcomes:** Upon graduation:

- The student would be able to learn the fundamental concepts on Quantum behavior of matter in its micro state.
- The knowledge of fundamentals of Semiconductor devices and their applications.
- Design, characterization and study of properties of optoelectronic devices help the students to prepare new materials for various engineering applications.
- Study about Lasers and fiber optics which enable the students to apply to various systems involved with communications.
- The course also helps the students to be exposed to the phenomena of dielectric and magnetic properties.

**UNIT-I: Quantum Mechanics**

Introduction to quantum physics, Black body radiation, Photoelectric effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

**Learning Outcomes:**

**Understand** the fundamental concepts of quantum mechanics.
**Explain** the physical significance of wave function.
**Apply** Schrödinger's wave equation for a free particle.
**Analyze** the particle behavior in different potential regions.
**Evaluate** the significance of energy values in one dimensional box.

**UNIT-II: Semiconductor Physics**

Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier transport: diffusion and drift, p-n junction diode, Zener diode and their V-I Characteristics, Bipolar Junction Transistor (BJT): Construction, Principle of operation, Hall effect.

**Learning Outcomes:**

**Understand** the energy band formation of semiconductors.
**Explain** the properties of n-type and p-type semiconductors.
**Apply** the Hall effect for various types of semiconductors.
**Analyze** the various types of diodes.
**Evaluate** the hall coefficient of semiconductors.

**UNIT-III: Optoelectronics**

Radiative and non-radiative recombination mechanisms in semiconductors, LED : Device structure, Materials, Characteristics and figures of merit, Semiconductor photodetectors: Solar cell, PIN and Avalanche photodiode and their structure, working principle and Characteristics.

**Learning Outcomes:**

Understand the basic principle involved in LED.
Explain about various types of photodiodes.
Apply the knowledge on various diodes.
Analyze the working of PIN and Avalanche diodes.
Evaluate the characteristics of diodes.

**UNIT-IV: Lasers and Fibre Optics**

**Lasers:** Introduction to Lasers, Coherence, Population inversion, Pumping, Lasing action, Types of Lasers: Ruby laser, Carbon dioxide ($CO_2$) laser, He-Ne laser, Semiconductor laser; Applications of laser.

**Fibre Optics:** Introduction, Block diagram of fiber optic communication system, Total internal reflection, Acceptance angle and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

**Learning Outcomes:**

Understand about Laser and fiber optics.
Explain the working principle of laser and optical fibers.
Apply optical fibers in communication system.
Analyze the applications of optical fibers in medical, communication and other fields.
Evaluate the laser and fiber optic concepts in various fields.

**UNIT-V: Dielctric and Magnetic Properties**

**Dielectric properties:** Introduction to dielectrics, Polarisation, Permittivity and Dielectric constant, Types of polarisation (Qualitative), Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectrics.

**Magnetic properties:** Introduction to magnetism, Magnetisation, permeability and susceptibility, Classification of magnetic materials, Domain theory of ferro magnetism, Hysteresis, Applications of magnetic materials.

**Learning Outcomes:**

Understand the concept of polarization in dielectric materials.
Explain various types of polarization of dielectrics and classification of magnetic materials.
Apply Lorentz field and Claussius- Mosotti relation in dielectrics.
Analyze the ferromagenetism on the basis of domain theory.
Evaluate the applications of dielectric and magnetic materials.

**TEXT BOOKS:**


1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand


**REFERENCES:**


1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL.

## 2020501:PROGRAMMING FOR PROBLEM SOLVING

**B.Tech. I Year II Sem.** **L T P C**
**3 1 0 4**

**Course Objectives:**

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

**Course Outcomes:** The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code..
- Searching and sorting problems.

***Unit - 1: Introduction to Programming***

**Introduction to computers**: disks, primary and secondary memory, processor, operating system, compilers, creating and running of program, Number systems, Pseudo code, algorithm, flowchart.

**Introduction to C Programming Language:** Basic structure of C program, Syntax and Logical Errors in compilation, 'C' tokens: Identifiers, variables, Data types, Operators(Arithmetic, Relational, Logical, Bit-wise, Increment and Decrement, size of, Conditional operator, Assignment, Special operator), expressions and precedence, Expression evaluation, Precedence and Associativity, type conversion, Command line arguments.

***Unit - II: Control statements, Arrays***

**Conditional statements:** Writing and evaluation of conditionals and consequent branching with if, if-else, nested if-else and switch statements.

**Iterative Statements**: while, do-while, for, Nested loops

**Jumping Statements**: break, continue and goto

**I/O:** Simple input and output with scanf and printf, formatted I/O, stdin, stdout,stderr.

**Arrays:** Types of arrays, creating, accessing and manipulating elements of arrays.

***Unit - III: Strings, Structures and Unions, Pointers***

**Strings:** Introduction to strings, handling strings as array of characters, string I/O functions, string handling functions, arrays of strings

**Structures and unions:** Defining structures, Initializing structures, Array of structures, nested structures, Bit Fields, unions.

**Pointers:** Defining pointers, Address and Indirection operators, pointers to arrays and structures, use of pointers in self-referential structures, Enumeration Data types

***Unit - IV: Functions and Dynamic memory allocation***

**Functions:** Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, call by reference, void function, Structure to functions, Some C standard functions and libraries, Storage classes (auto, extern, static and register)

**Recursion:** Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions.

**Dynamic Memory Allocation**: Allocating and freeing memory, Allocating memory for arrays of different data types.

***Unit - V: Preprocessor and File handling in C:***

**Preprocessor:** Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef.

**Files:** Text and Binary files, File structure, Creating, Reading and Writing text and binary files, Appending data to existing files, Writing and Reading structures using binary files, File Status functions, File Positioning functions.

**TEXT BOOKS:**

1. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)
2. Let us C by YashavantKanetkar BPB publications (16th Edition)

**REFERENCE BOOKS:**

1. programming in ANSI C by Balaguruswamy,(7th Edition)
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
3. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education HerbertSchildt, C: The Complete Reference, McGrawHill, 4th Edition

## 2020371:Engineering Drawing Practice

**B.Tech. I Year II Semester** **L T P C**
**1 0 4 3**

**Pre Requisites:** Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

**Course Objective:**

- The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation.
- To prepare the student to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- To get exposure to a CAD package.

**Course Outcomes:**

1. Familiarize with BIS standards and conventions used in engineering graphics.
2. Draw various engineering curves e.g., ellipse, parabola, cycloids and involutes etc and construct various reduced scales e.g., plain and diagonal scale.
3. Develop the lateral surfaces of simple solids
4. Ability to draw orthographic projections and isometric projections of given engineering components.
5. Visualize different views like elevation and plan for a given line, plane figures or solid objects.
6. Apply drafting techniques and use 2D software e.g., AutoCAD to sketch 2D plane figures.

**UNIT – 1 INTRODUCTION TO ENGINEERING DRAWING**

Principles of Engineering Graphics and their Significance-Drawing Instruments and their Uses-Conventions in Drawing-BIS -Lettering and Dimensioning.

**Geometrical Constructions**: Bisecting a Line, Arc. Dividing A Line into 'N' Equal Parts, Construction of Polygons, Division of Circle into Equal Parts (8 And 12)

**Construction of Scales:** Plain, Diagonal and Vernier Scale.

**Conic Sections:** Ellipse, Parabola, Hyperbola and Rectangular Hyperbola- General Methods only.

**Engineering Curves:** Cycloid, Epicycloid, Hypocycloid

**Involutes:** For Circle, Triangle, Square, Pentagon and Hexagon.

**Learning Outcome:**

1. To understand the basic standards, conventions of engineering drawing and how to use the instruments in drawing.
2. Learn and draw the various types of curves used in engineering application.

**UNIT – 2 ORTHOGRAPHIC PROJECTIONS**

Principles- Assumptions- Different Angles of Projection.

**Projections of Points**- orientation in all the quadrants

**Projections of Lines**- Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

**Projections of Planes:** Surface Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

**Learning Outcome:**

1. Knowledge in various planes of projections
2. To draw the front view, top view and side views of the given geometrical elements

**UNIT – 3 PROJECTIONS OF SOLIDS**

Classification of solids- Axis- Parallel, Perpendicular, Inclined to one plane and Inclined to both planes- Prisms, Pyramids, Cylinder and Cone

**Learning Outcome:**

1. To understand the various solid types
2. To draw all the views of the given solid in all possible orientations.

**UNIT – 4 SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES**

Types of Section Planes, Sectioning Prisms, Pyramids, Cylinders and Cones using various planes.

Development of surfaces of right Regular Solids- Parallel Line Method, Radial Line Method.

**Learning Outcome:**

1. To identify the cut surfaces and represent the sectional views graphically when the solid is sectioned.
2. To develop the surfaces of solid using various methods.

**UNIT – 5 ISOMETRIC PROJECTIONS AND PERSPECTIVE PROJECTIONS**

Principles, Isometric Views of Planes, Solids- Box Method, Offset Method, Compound solids, Sectioned Solids. Conversion of Isometric to Multi view projection and vice versa.

**Learning Outcome:**

1. Knowledge in principles of isometric projection
2. Conversion of isometric to orthographic and vice-versa.

**Text Books:**

1. N.D.Bhatt, Elementary Engineering Drawing, Charotar Publishers,2012.
2. Basanth Agrawal and C M Agrawal –Engineering Drawing 2e –,McGraw-Hill Education(India) Pvt.Ltd.

**References:**

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishers
2. Engineering Drawing- Johle/Tata Macgraw Hill.
3. K.Veenugopal, –Engineering Drawing and Graphics + Autocad New Age International Pvt.Ltd, 2011.

## 2020071: APPLIED PHYSICS LAB

| **B.Tech. I Year II Semester** | **L** | **T** | **P** | **C** |
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**COURSE OBJECTIVES:**

- To gain practical knowledge by applying the experimental methods to correlate with the theoretical knowledge of physics concepts.
- To learn the usage of electrical and optical systems for measurements.
- Apply the analytical techniques and graphical analysis to the experimental data.
- To develop intellectual communication skills through discussion on basic principles of scientific concepts in a group.

**COURSE OUTCOMES:**

- Understand the concepts of the error and analysis.
- Explain the different measuring devices and meters to record the data with precision.
- Apply the experimental skills to design new experiments in engineering.
- Analyze the theoretical knowledge and correlate with the experiment.
- Evaluate the various parameters accurately.

**List of Experiments:**

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

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

3. Photoelectric effect: To determine work function of a given material.

4. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.

5. LASER: To study the V-I characteristics of LASER sources.

6. Optical fibre: To determine the Numerical aperture and bending losses of Optical Fibres

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

8. Hall effect: To determine Hall co-efficient of a given semiconductor.

9. LCR Circuit: To determine the resonance frequency and Quality factor of LCR Circuit.

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

**Note: Any 8 experiments are to be performed**

## 2020571:PROGRAMMING FOR PROBLEM SOLVING LAB

**B.Tech. I Year II Semester**

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*[Note: The programs may be executed using any available Open Source/ Freely available IDE Some of the Tools available are:*
*Code Lite: https://codelite.org/ Code::Blocks: http://www.codeblocks.org/*
*DevCpp :http://www.bloodshed.net/devcpp.html Eclipse: http://www.eclipse.org*
*This list is not exhaustive and is NOT in any order of preference]*

**Course Objectives:** The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To create, read from and write to text and binary files

**Course Outcomes:** The candidate is expected to be able to:

- Formulate the algorithms for simple problems
- Able to develop programs based on condition checking
- Implement pyramid programs
- Able to perform matrix applications
- Modularize the code with functions so that they can be reused
- Create, read and write to and from simple text and binary files

***Simple numeric problems:***

a. Write a program for the simple, compound interest.
b. Write a program for calculating area, perimeter of a rectangle, triangle and square.
c. Write a program for calculating area and perimeter of a circle.
d. Write a program to implement bit-wise operators.
e. Write a program for converting Fahrenheit to Celsius.
f. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.
g. Write a simple program to find largest of two and three numbers using conditional operator.
h. Write a program for swapping two numbers with and without using third variable and using bitwise operators.

***Condition branching and statements:***

a. Write a program for finding largest of three numbers.
b. Write a program that declares Class awarded for a given percentage of marks, where marks<40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.

c. Write a C program to find the roots of a Quadratic equation.
d. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

***Condition branching and loops:***

a. Write a program to find whether the given number is a prime or not.
b. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
c. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, number=5 and no. of rows = 3, the output should be:

5 x 1 = 5
5 x 2 =10
5 x 3 =15

d. Write a program that shows the binary equivalent of a given positive number between 0 to255.
e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to calculate the following, where x is a fractional value.
$1-x/2+x^2/4-x^3/6$
h. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:$1+x+x^2+x^3+\ldots.+x^n$. For example: if n=3 and x=5, then the program compute 1+5+25+125.
i. Write a C program to construct a pyramid of numbers as follows:

| | | | | |
|---|---|---|---|---|
| 1 | * | 1 | 1 | * |
| 1 2 | * * | 2 3 | 2 2 | * * |
| 1 2 3 | * * * | 4 5 6 | 3 3 3 | * * * |
| | | | 4 4 4 4 | * * |
| | | | | * |

j. Write a C program to find given number is Armstrong number or not.
k. Write a C program to find given number is Perfect number or not.

***Arrays, Strings, Pointers and Structures:***

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a program to compute Mean, Variance, Standard Deviation, Sorting of n elements in single dimension array.
c. Write a C program that perform the following:
    i. Addition of Two Matrices
    ii. Multiplication of Two Matrices
    iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
d. Write a C program that sorts a given array of names.
e. Write a C program that perform the following operations:
    i. To insert a sub-string in to a given main string from a given position.
    ii. To delete n Characters from a given position in a given string.
f. Write a program for reading elements using pointer into array and display the values using array.

g. Write a program for display values reverse order from array using pointer.
h. Write a program through pointer variable to sum of n elements from array.
i. Write a program to implement student information by using structure to function.
j. Write a program to sort student id or name using structures.

***Functions:***

a. Write a C program to find factorial of a given number using functions.
b. Write a C program to perform swapping using functions.
c. Write a C program to find LCM, GCD of two numbers using functions.
d. Write a C program to implement sorting using functions.
e. Write a C program to create and print two dimensional array using functions.
f. Write a C program to find factorial of a given number using recursion.
g. Write a C program to find Fibonacci series using recursion
h. Write a C program to implement Towers of Hanoi problem using recursion.

***Files:***

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their upper case equivalents.
c. Write a C program to count the occurrence of a character in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

***Reference Books***


1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
2. Let us C byYashavantKanetkar BPB publications (16th Edition)
3. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
5. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, and Pearson Education.
7. Herbert Schildt, C: The Complete Reference, McGrawHill, 4thEdition.