**COURSE STRUCTURE**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **I BTECH I SEM** | | | | | | | | | |
| **Induction Program – UHV-I (Duration 15 Days)** | | | | | | | | | |
| **COURSE CODE** | **COURSE TITLE** | **COURSE AREA** | **HOURS/ WEEK** | | | **CREDIT** | **Internal Marks** | **External marks** | **Total Marks** |
| L | T | P |
| AS22-00BS05 | Linear Algebra & Differential Equations | BSC | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| AS22-00BS11 | Applied Physics | BSC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| AS22-05ES02 | Programming for Metacognitive | ESC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| AS22-02ES01 | Basic Electrical Engineering | ESC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| **PRACTICAL COURSES** | | | | | | | | | |
| AS22-00BS12 | Applied Physics Lab | BSC | 0 | 0 | 3 | 1.5 | 40 | 60 | 100 |
| AS22-05ES05 | Programming for Metacognitive Lab | ESC | 0 | 0 | 3 | 1.5 | 40 | 60 | 100 |
| AS22-03ES03 | Engineering Practices | ESC | 0 | 0 | 4 | 2 | 40 | 60 | 100 |
| AS22-03ES01 | Engineering Graphics Through Auto CAD Practice | ESC | 0 | 0 | 4 | 2 | 40 | 60 | 100 |
| **TOTAL** | | | | | | **20** | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **I BTECH II SEM** | | | | | | | | | | | | | | | | | | | |
| **COURSE CODE** | **COURSE TITLE** | | **COURSE AREA** | | **HOURS/ WEEK** | | | | | | **CREDIT** | | **Internal Marks** | | **External marks** | | **Total Marks** | | |
| **L** | | **T** | | **P** | |
| AS22-00BS07 | | Advanced Calculus & Vector Calculus | | BSC | | 3 | | 1 | | 0 | | 4 | | 40 | | 60 | | 100 | | |
| AS22-00BS01 | | Applied Chemistry | | BSC | | 3 | | 0 | | 0 | | 3 | | 40 | | 60 | | 100 | | |
| AS22-05ES07 | | Data Structures | | ESC | | 3 | | 0 | | 0 | | 3 | | 40 | | 60 | | 100 | | |
| AS22-04ES02 | | Semiconductor Devices & Circuits | | ESC | | 3 | | 0 | | 0 | | 3 | | 40 | | 60 | | 100 | | |
| AS22-00HS01 | | English | | HSMC | | 3 | | 0 | | 0 | | 3 | | 40 | | 60 | | 100 | | |
| **PRACTICAL COURSES** | | | | | | | | | | | | | | | | | | | | | |
| AS22-00BS03 | | Applied Chemistry Lab | | BSC | | 0 | | 0 | | 3 | | 1.5 | | 40 | | 60 | | | 100 | |
| AS22-05ES08 | | Data Structures Lab | | ESC | | 0 | | 0 | | 3 | | 1.5 | | 40 | | 60 | | | 100 | |
| AS22-00HS02 | | English language & Communication Skills Lab | | HSMC | | 0 | | 0 | | 2 | | 1 | | 40 | | 60 | | | 100 | |
| **VALUE ADDED COURSE** | | | | | | | | | | | | | | | | | | | | | |
| AS22-12PW11 | | Independent Project/MOOCS | | PW | | Three Week Duration | | | | | | | | | | | | | | |
| **TOTAL** | | | | | | | | | | | **20** | | | | | | | | |

**B. TECH**

**FIRST YEAR**

**FIRST SEMESTER SYLLABUS**

# LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

# I B.TECH., I SEMESTER (Common to CSE, IT, CSM, AIDS & CSG)

|  |  |
| --- | --- |
| Course Title: Linear Algebra and Differential Equations | Course Code: AS22-00BS05 |
| Teaching Scheme (L:T:P): 3:1:0 | Credits: 4 |
| Type of Course: Lecture + Tutorial | Total Contact Periods: 48Hrs + 16Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Intermediate Mathematics | |

# COURSE OBJECTIVES

* 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.
* Concept of nature of the series.
* Methods of solving the differential equations of first order.
* Methods of solving the differential equations of higher order.

# COURSE OUTCOMES

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C111.1 | Convert the set of linear equations in to matrix notation and analyze its solution |
| C111.2 | Apply the concept of orthogonal transformation and reduce quadratic form to canonical form |
| C111.3 | Analyze the nature of quadratic forms. |
| C111.4 | Analyze the nature of series. |
| C111.5 | Determine whether the given differential equation of first order is exact or not. |
| C111.6 | Apply the concept of higher order ODE to real world problems. |

**COURSE CONTENT** (SYLLABUS)

**UNIT I: MATRICES**

Rank of a matrix by Echelon form and Normal form, solving system of Homogeneous and Non-Homogeneous equations, Gauss Jacobi Iteration Method, Gauss Seidel Iteration Method.

**UNIT-II: EIGEN VALUES AND EIGEN VECTORS**

Eigen values and Eigenvectors and their properties; Cayley-Hamilton Theorem (without proof): finding inverse and power of a matrix by Cayley-Hamilton Theorem; Diagonalization; Quadratic forms and Nature, Index and Signature of the Quadratic Forms.

**UNIT-III: INFINITE SERIES**

Infinite Series: Convergent, Divergent and Oscillatory Series; Series of positive terms: Comparison test, p-test, D-Alembert’s ratio test; Cauchy’s nth root test, Raabe’s test; Alternating series: Leibnitz test; Absolute and Conditionally Convergences.

**UNIT IV: FIRST ORDER ODE**

Exact equations; non-Exact equations; Linear equations; Bernoulli’s equations; Newton’s Law of Cooling; Law of Natural Growth and Decay.

**UNIT V: HIGHER ORDER LDE**

Higher Order Linear Differential Equations with Constant Coefficients; Solutions of Homogeneous and Non-Homogeneous Linear Differential Equations, Method of Variation of Parameters.

**Text Books:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43nd Edition, 2014.
2. R.K.Jain, S.R.K. Iyengar Advanced Engineering Mathematics, Narosa Publishing House Pvt.Ltd.,5 thEdition,2016

**References Books:**

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

**APPLIED PHYSICS**

**I B.Tech., I SEM-CSE, AIML, CSD**

**I B.Tech., II SEM-IT, EEE, ECE, AIDS, CE**

|  |  |
| --- | --- |
| **Course Title: APPLIED PHYSICS** | **Course Code: AS22-00BS11** |
| Teaching Scheme (L:T:P): 3:1:0 | Credits: 3 |
| Type of Course: Lecture + Tutorial | Total Contact Periods: 48Hrs +16Hrs |
| Continuous Internal Evaluation-30 Marks | Semester End Exams-70 Marks |
| Prerequisites:   1. The student must have basic knowledge of units and dimension of physical quantities, principles of mechanics and laws of optics. 2. The student must be aware of basics of waves and oscillations, fundamental principles of electromagnetic theory. 3. The student must have fundamental knowledge of mathematical concepts like vector algebra, integration and differentiation. | |

**Course Overview:**

This course deals with quantum principles and explore their applications in studying the behavior of fundamental entities of atom. It deals with semiconductor devices which are employed in designing electronic systems and in communication field. It deals with the fundamental properties of dielectric and magnetic materials and explore their application in all engineering streams. Also it introduces to the concept of Quantum computing

**Course Objective**

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric materials.
4. Study the fundamental concepts related to the magnetic and superconducting materials
5. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
6. Study the characteristics of lasers and optical fibres.

**Course Outcomes(s)**

|  |  |
| --- | --- |
| **CO#** | **Course Outcomes** |
| C112.1 | Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. |
| C112.2 | Identify the role of semiconductor devices in science and engineering Applications. |
| C112.3 | Explore the fundamental properties of dielectrics and their applications. |
| C112.4 | Explore the fundamental properties of magnetic, superconductivity materials and their applications. |
| C112.5 | Appreciate the features and applications of Nanomaterials. |
| C112.6 | Understand various aspects of Lasers and Optical fiber and their applications in diverse fields. |

**COURSE CONTENT** (SYLLABUS)

# UNIT - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, - photoelectric effect- deBroglie hypothesis - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function – time independent Schrodinger wave equation - particle in one dimensional potential box.

Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) - Fermi**-**Dirac distribution - Bloch’s theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

# UNIT - II: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

# UNIT - III: DIELECTRIC, MAGNETIC AND SUPERCONDUCTING MATERIALS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Hysteresis- soft and hard magnetic materials -magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics Superconductors: Introduction, Meissner effect, type – I and type – II Superconductors, Applications of Superconductors

# UNIT - IV: NANOTECHNOLOGY

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods – top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM &TEM - applications of nanomaterials.

# UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations- lasing action - pumping methods- ruby laser, He-Ne laser , CO2 laser, Argon ion Laser, Nd:YAG laser- semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection- construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers- losses in optical fiber - optical fiber for communication system - applications.

# TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy” A Text book of Engineering Physics”-

S. Chand Publications, 11th Edition 2019.

1. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
2. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4thEdition,2021.
3. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2ndEdition,2022.
4. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

# REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1stEdition, 2007.

**Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):**

1. <https://onlinecourses.nptel.ac.in/noc20_ph24/preview>
2. <https://onlinecourses.nptel.ac.in/noc20_ph16/preview>
3. <https://www.coursera.org/learn/semiconductor-physics>
4. https://onlinecourses.nptel.ac.in/noc21\_cs103/preview
5. <https://www.coursera.org/lecture/leds-semiconductor-lasers/active-optical-devices-specialization-introduction-0jner>

**Web Reference/E-Books:**

1. <https://ocw.mit.edu/courses/physics/8-231-physics-of-solids-i-fall-2006/download-course-materials/>
2. <http://web.mit.edu/6.732/www/texts.html>
3. <https://nptel.ac.in/courses/115/105/115105099/>
4. <https://nptel.ac.in/courses/115/104/115104109/>

# PROGRAMMING FOR METACOGNITIVE

# I B.TECH., I SEMESTER (Common to CSE, IT & CSG)

|  |  |
| --- | --- |
| Course Title: Programming for Metacognitive | Course Code: AS22-05ES02 |
| Teaching Scheme (L:T:P): 3:0:0 | Credits: 3 |
| Type of Course: Lecture + Tutorial | Total Contact Periods: 48Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Mathematics knowledge, Analytical and Logical skills | |

**COURSE OVERVIEW:**

This course introduces students to the field of computer science as a discipline for solving problems through computation and provides the foundation for more advanced courses on programming and software development.

**COURSE OBJECTIVE**

* 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(S)**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C113.1 | Designs algorithms and draws flowcharts for solving problems. |
| C113.2 | Converts the algorithms/flowcharts to C programs. |
| C113.3 | Develops the code and tests a given logic in C programming language. |
| C113.4 | Dissects a problem into functions and develops modular reusable code. |
| C113.5 | Demonstrates arrays, pointers, strings and structures in C. |
| C113.6 | Demonstrates File Operations in C. |

**COURSE CONTENT (SYLLABUS)**

**UNIT - I**

**Introduction to Problem Solving:** Overview of Computers, Block Diagram of a Computer, Characteristics of a Computer, Hardware vs Software, How to develop a Program? (Pseudo Code, Algorithms and Flowcharts), Software Development Life Cycle. Structured Programming, Types of Programming Languages.

**Overview of C:** Introduction to C, Basic structure of C program, Creating and Running a C Program The C Character Set, Identifiers and Keywords, Data Types, Constants, Variables and Arrays, Declarations, Expressions and Statements. (TB1).

**UNIT – II**

**Operators and Expressions:** Arithmetic Operators, Unary Operators, Relational and Logical Operators, Assignment Operators, Conditional Operator, Library Functions.

**Input and Output statements:** Single Character Input, Single Character Output, Entering Input Data – The scanf function, Writing Output Data – The printf function, The gets and puts functions, Interactive programming. (TB1)

**UNIT – III**

**Control and Iterative Statements:** Decision Statements, The if Staement, The if-else Statement, Nested if-elses, Forms of if, Use of Logical Operators, The else if Clause, The ! Operator, Hierarchy of Operators, The Conditional Operators, The Iteration or Loop Control Statements, Loops, The while Loop, The for Loop, Nesting of loops, Multiple Initializations in For loop, The break statement, The continue statement, The do-while Loop, Decisions using switch, switch vs if-else ladder. (TB2)

**Functions:** Introduction, Definition of function, Declaration of Function and Function prototypes, The return Statement, Types of Functions, Function with Operators, Function and Decision Statements, Function and Loop Statements. Command Line Arguments, Storage Classes in C (TB3)

**UNIT – IV**

**Arrays and Strings:** Introduction to Arrays, Defining an array, Processing an Array, Passing arrays to functions, Multidimensional arrays, Overview of Strings, Defining a string, NULL character, Initialization of Strings, Reading and Writing a String, Processing a String, Character Arithmetic, Library Functions for strings.(TB1)

**Pointers:** Introduction to Pointers, Features of pointers, Pointer Declaration, Arithmetic Operations with Pointers, Pointers and Arrays, Pointers and Two Dimensional Arrays, Array of Pointers, Pointers to Pointers, Pointers to Strings, Void Pointers. Call by Value and Call by Reference. Macros in C (TB3)

**UNIT – V**

**Structures and Unions:** Introduction to Structures, Features of Structures, Declaration and Initialization of Structures, Structure within Structure, Array of Structures, Pointer to Structure, Structure and Functions, typedef, Bit Fields, Enumerated Data type, Union.(TB3)

**Files:** Introduction to Files, Opening and Closing a file, Reading and Writing from a text file, Processing a File(Text and Binary Files)(TB2)

**Text Books:**

1. Byron Gottfried, Programming with C, 4th Edition, McGrawHill Education
2. Yashwanth Kanethkar, Let Us C, BPB Publications(11th Edition)
3. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).
4. Ashok N. Kamthane, Programming in C, 2/e, Pearson Education.
5. Programming with C, by K.R. Venugopal, Tata Mcgraw Hill Publishing Co Ltd

**References Books:**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education. 4.Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

**Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):**

1. <https://www.coursera.org/learn/computational-thinking-problem-solving>
2. nptel.ac.in/courses/106105085/4
3. nptel.ac.in/courses/106105085/2

**Web Reference/E-Books:**

1. <https://onlinecourses.nptel.ac.in/noc18_cs33/preview>
2. <http://www.thenewboston.com/>
3. <https://www.codesdope.com/>
4. https://numericalmethodstutorials.readthedocs.io/en/latest/

# BASIC ELECTRICAL ENGINEERING

# I B.TECH., I SEMESTER (Common to ECE, CSE, CSM & CSG)

|  |  |
| --- | --- |
| Course Title: Basic Electrical Engineering | Course Code: AS22-02ES01 |
| Teaching Scheme (L:T:P): 3:1:0 | Credits: 3 |
| Type of Course: Lecture + Tutorial | Total Contact Periods: 48Hrs + 16Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Basics of Physics and Mathematics | |

**COURSE OVERVIEW**

Electrical engineering principles are taught in this course. Topics include circuit theory, alternating current theory, DC Machines, induction, motors, Synchronous Machine, cabling, batteries and Switches.

**COURSE OBJECTIVES**

To introduce the concepts of electrical circuits and its components

To understand DC circuits and AC single phase & three phase circuits

To study and understand the different types of DC/AC machines and Transformers.

To import the knowledge of various electrical installations.

**COURSE OUTCOMES**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C114.1 | Understand the basic concepts of Electrical Circuits. |
| C114.2 | Study various concepts in AC circuits |
| C114.3 | Discuss the concepts of DC Machines and BLDC Motor. |
| C114.4 | Discuss the concepts of transformer, Induction motor and Synchronous machines |
| C114.5 | Describe the operation of different types of cables, wires and  batteries. |
| C114.6 | understand the Performance of different protecting equipment‘s like MCB, FUSE. |

**COURSE CONTENT** (SYLLABUS)

**UNIT-I: D.C. CIRCUITS**

Electrical circuit elements R, L and C, voltage and current sources, Kirchhoff’s laws, analysis of simple circuits with DC excitation. Theorems-Superposition theorem, Thevenin ‘s theorem and Norton‘s Theorem, Maximum Power Transfer Theorem.

**UNIT-II: A.C. CIRCUITS**

Representation of sinusoidal waveform, phasor representation, peak and RMS values, power triangle, power factor, Analysis of single-phase AC circuits consisting of RLC combinations,

Three-phase balanced circuits. Line and phase (V-I) relations in 3 phase balanced circuits. star and delta connections.

**UNIT-III: DC MACHINES**

DC Generators: Constructional details and working of DC Generator, Methods of excitation and Applications.

DC Motors: Principle of operation, speed control of shunt excited DC motor. Applications of various DC motors.

BLDC Motors: Principle of operation, Applications

**UNIT-IV: TRANSFORMERS AND INDUCTION MOTORS**

Transformers: construction and working Principle of transformer, losses and efficiency.

Induction motors: construction and working Principle of three phase induction motor and its applications

Synchronous Generator: Construction and working of synchronous generator and its applications.

**UNIT-V: ELECTRICAL INSTALLATIONS**

Components of LT Switchgear: Fuse-Need of Fuse, Fuse element materials. Circuit breaker, MCB, ELCB, MCCB. Types of Wires and Cables, Need of Earthing and its types.

Batteries: Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

**Text Books:**

1. Basic Electrical Engineering, A. Chakrabarti, S. Debnath, Tata McGraw Hill, 2012.
2. Basic Electrical Engineering‖ - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.

**References Books:**

1. L.S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press, 2011
2. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
3. Principle of Electrical Engineering‖, V.K Mehta, R. Mehta, S. Chand Limited, 2011.
4. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

**Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):**

1. NPTEL Videos on Course ―Basic Electrical Technology‖ Co-ordinated by IISc Bangalore. Link: <https://nptel.ac.in/courses/108/108/108108076/>
2. NPTEL Videos on Course ―Basic Electrical Technology‖ Co-ordinated by IIT Kharagpur. Link: <https://nptel.ac.in/courses/108/105/108105053/>

**Web Reference/E-Books:**

1. Basic Electrical Engineering By U.A.Bakshi, V.U.Bakshi · 2009

Link: [https://www.google.co.in/books/edition/Basic\_Electrical\_Engineering/Pp47n-](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/Pp47n-yyVEYC?hl=en&gbpv=1&dq=basic%2Belectrical%2Bengineering%2Bbooks&printsec=frontcover) [yyVEYC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/Pp47n-yyVEYC?hl=en&gbpv=1&dq=basic%2Belectrical%2Bengineering%2Bbooks&printsec=frontcover)

1. Basic Electrical Engineering By Chakrabarti · 2009

<https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVAAK> [4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVAAK4C?hl=en&gbpv=1&dq=basic%2Belectrical%2Bengineering%2Bbooks&printsec=frontcover)

1. Basic Electrical Engineering By R. K. Rajput · 2009

# [https://www.google.co.in/books/edition/Basic\_Electrical\_Engineering/NamQz0aZM](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/NamQz0aZMukC?hl=en&gbpv=1&dq=basic%2Belectrical%2Bengineering%2Bbooks&printsec=frontcover) [ukC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/NamQz0aZMukC?hl=en&gbpv=1&dq=basic%2Belectrical%2Bengineering%2Bbooks&printsec=frontcover)

**ENGINEERING GRAPHICS THROUGH AUTO CAD PRACTICE**

# I B.TECH., I SEMESTER (Common to CSE, CSM & CSG)

|  |  |
| --- | --- |
| Course Title: Engineering Graphics Through Auto CAD Practice | Course Code: AS22-03ES01 |
| Teaching Scheme (L:T:P): 1:0:3 | Credits: 2 |
| Type of Course: Lecture + Practical | Total Contact Periods: 64Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Nill | |

**COURSE OVERVIEW**

Engineering graphics & Design has a well-defined set of standards by which technical drawings are produced. This course teaches the language of engineering graphics from basic sketching through 3-D solid modeling using computer aided design (CAD) software AutoCAD.

**COURSE OBJECTIVES**

The objectives of this course are to

* To know the conventions used in Engineering Drawing and comprehend the tools to be used in AutoCAD software.
* To understand the importance of engineering curves.
* To learn to use the orthographic projections for points, lines, planes and solids in different positions.
* To make the students draw the projections of the sections of solids and development of surfaces.
* To understand the isometric projections.
* To create simple solid models of various domain applications.

**COURSE OUTCOMES**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C115.1 | Apply the concepts of engineering curves in construction using AutoCAD. |
| C115.2 | Solve the problem of projections of points and lines, in different positions using AutoCAD. |
| C115.3 | Solve the problem of projections of planes and solids in different positions using AutoCAD. |
| C115.4 | Solve the problems of Projections of sections of solids and development of surfaces and its positions using AutoCAD. |
| C115.5 | Solve the problems on Conversion of Isometric Views to Orthographic Views Conventions using AutoCAD. |
| C115.6 | Solve the problems on Orthographic Projections and its conversions using AutoCAD. |

**COURSE CONTENT** (SYLLABUS)

**Introduction to AutoCAD Software:** The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

**UNIT I:**

**Introduction to Engineering Drawing:** Principles of Engineering drawing and their significance, Conventions, Drawing Instruments.

**Engineering Curves:** Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves- Epicycloids and Hypocycloids.

**UNIT II:**

**Orthographic Projections, Projections of Points & Straight Lines:** Principles of Orthographic Projections – Conventions; Projections of Points in all positions; Projections of lines inclined to both the planes.

**Projections of Planes:** Projections of Planes- Surface Inclined to both the Planes.

**UNIT III:**

**Projections of Regular Solids:** Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method.

**UNIT IV:**

**Projection of Sections of Solids and Development of Surfaces:** Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids, cylinders and cones.

**UNIT V:**

**Isometric Projections and Transformations:** Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and Compound Solids. Vice-versa, Conventions.

**Text Books:**

**1.**Engineering Drawing, N. D. Bhatt, 53rd Edition, Charotar Publishing House, 2016.

**2.**Textbook on Engineering Drawing, K. L. Narayana & P. Kannaiah, SciTech Publishers, 2010.

**3.**Engineering Drawing and Computer Graphics, M. B. Shah & B. C. Rana, Pearson Education, 2010.

**4.**Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education.

**5.**Engineering graphics and design, Pradeep Jain, A.P Gautam and Ankitha Maheshwari.

**References Books:**

**1.**Mastering AutoCAD 2019 and AutoCAD LT 2019, George Omura and Brian C. Benton (Auto CAD 2019), 1st Edition, John Wiley & Sons, Indianapolis, Indiana.

**2.**AutoCAD Software Theory and User Manuals.

**3.**Engineering Design, George E.Dieter,Linda C.Schmidt/third edition.

**4.**Engineering Drawing and design, Cencell Jonson,Jay D.Helsel,Dennis R.Short.

**Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):**

**1.**[https://nptel.ac.in/courses/112/103/112104019/](https://nptel.ac.in/courses/112/103/112103019/)

2.<https://nptel.ac.in/courses/112/104/112104172/>

**Web Reference/E-Books:**

1. [http://nptel.ac.in/courses/112104019](http://nptel.ac.in/courses/112103019)
2. <http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html>
3. [https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture\_notes/env\_health\_scienc e\_students/engineeringdrawing.pdf](https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_scienc%20e_students/engineeringdrawing.pdf)

**APPLIED PHYSICS LAB**

**I B.Tech., I SEM-CSE, AIML, CSD**

**I B.Tech., II SEM-IT, EEE, ECE, AIDS, CE**

|  |  |
| --- | --- |
| Course Title: APPLIED PHYSICS LAB | Course Code: AS22-00BS12 |
| Teaching Scheme (L:T:P): (0:0:3) | Credits: 1.5 |
| Type of Course: Practical | Total Contact Periods: 48Hrs |
| Continuous Internal Evaluation-30 Marks | Semester End Exams-70 Marks |
| Prerequisites:   1. The student must know the usage of basic tools for measurement of physical quantities. 2. The students must have knowledge of error analyses, types of errors, principles of optics, mechanics, waves and Oscillations | |

**Course Overview:**

The course deals with experiments in various fields of physics such as Wave Optics, Wave mechanics, Electronics, Electricity and Magnetism.

**Course Objective**

1. To determine the work function of given material
2. To explore the characteristics of semiconductors and optoelectronic devices.
3. To classify the semiconductor materials into p-type or n-type semiconductor and study the V-I characteristics of Diode and BJT
4. To study the dielectric constant and B-H curve
5. To determine the properties of LASERs and optical fibers
6. To identify the method of least squares fitting

**Course Outcomes(s)**

|  |  |
| --- | --- |
| **CO#** | **Course Outcomes** |
| C116.1 | Evaluate work Function of a photo metal using photo electric effect. |
| C116.2 | Analyze the V-I characteristics of Solar cell and LED. |
| C116.3 | Identify the type of semiconductor using Hall Effect and study the V-I characteristics of Diodes and BJT |
| C116.4 | Estimate the dielectric constant and plot the B-H curve |
| C116.5 | Estimate the light gathering ability and beam divergence of the given LASER. |
| C116.6 | Compute the least square fitting with torsional pendulum |

**COURSE CONTENT** (SYLLABUS)

**The Students has to perform any eight of the following experiments**

1. Photoelectric effect: To determine the work function of given material.
2. Solar Cell: To study V-I Characteristics of Solar Cell.
3. Energy Gap: To determine the energy gap of a given Semiconductor.
4. Hall Effect: To determine Hall voltage and Hall Coefficient of given semiconductor material.
5. V-I characteristics of a p-n junction diode and Zener diode
6. LED: To study the V-I characteristics of LED.
7. Input and output characteristics of BJT (CE, CB & CC configurations)
8. Determination of dielectric constant of a given material
9. Study B-H curve of a magnetic material.
10. LCR Circuit: To study the frequency response of LCR series and parallel resonance circuit.
11. A) Determination of the beam divergence of the given LASER beam

B) Determination of Acceptance Angle and Numerical Aperture of an optical fiber.

1. Understanding the method of least squares – torsional pendulum as an example

**References Books:**

1. S. Balasubramanian, M.N. Srinivasan “A Text book of Practical Physics”- S Chand Publishers, 2017.
2. Practical physics by Dr. Aparna, V.G.S.publications.
3. Physics practical lab manual –SPEC

**Online Resources**

1. [**https://nptel.ac.in/courses/115/105/115105120/**](https://nptel.ac.in/courses/115/105/115105120/)
2. [**https://nptel.ac.in/courses/115/105/115105110/**](https://nptel.ac.in/courses/115/105/115105110/)
3. [**https://nptel.ac.in/courses/115/105/115105121/**](https://nptel.ac.in/courses/115/105/115105121/)
4. [**https://www.futurelearn.com/courses/teaching-practical-science-physics**](https://www.futurelearn.com/courses/teaching-practical-science-physics)
5. [**https://www.vlab.co.in/broad-area-physical-sciences**](https://www.vlab.co.in/broad-area-physical-sciences)

# PROGRAMMING FOR METACOGNITIVE LAB

# I B.TECH., I SEMESTER (Common to CSE, IT & CSG)

|  |  |
| --- | --- |
| Course Title: Programming for Metacognitive Lab | Course Code: AS22-05ES05 |
| Teaching Scheme (L:T:P): 0:0:3 | Credits: 1.5 |
| Type of Course: Practical | Total Contact Periods: 48Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Mathematics knowledge, Analytical and Logical skills | |

**COURSE OVERVIEW:**

This course provides the fundamental concepts of programming using C language, apply the control structures, iterations statements, arrays, functions, strings, pointers, structures, unions and files. This course also explains the concepts of searching and sorting techniques in C language.

**COURSE OBJECTIVE**

* 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(S)**

|  |  |
| --- | --- |
| **CO#** | **Course Outcomes** |
| C117.1 | Develops algorithms for simple problems. |
| C117.2 | Translate given algorithms to a working and correct program. |
| C117.3 | Identifies and correct syntax errors as reported by the compilers. |
| C117.4 | Identifies and correct logical errors encountered during execution. |
| C117.5 | Demonstrates data operations using arrays, strings, structures and pointers of different types |
| C117.6 | Creates, reads and writes to and from simple text and binary files |

**COURSE CONTENT**

**Practice Sessions:**

Week 1:

* Work on Linux Environment to create a C Program
* Write a C Program to display “Hello World”
* Write a C Program to display Your name 5 times.

Week 2:

* Write a C Program to read two numbers add them and display their sum.
* Write a C Program to read the radius of a circle, calculate its area and display it.
* Write a C Program read p, n, r and calculate Simple Interest.
* For Advanced Learners: Write a C Program to calculate Compound Interest.

Week 3:

* Write a C program to check whether a number is even or odd
* Write a C program to check and print whether a user is eligible to vote or not.

Conditions:

* Minimum age required for voting is 18.
* You can use decision making statement.
* Write a C program to check whether an alphabet is Vowel or Consonant Conditions:
* Create a character type variable with name of alphabet and take the value from the user. Use Conditional Statements to solve.

Week 4:

* Write a C program to check whether number is positive, negative or zero

Conditions:

* Create variable with name of number and the value will be taken by user from console
* Create this c program code using else if ladder statement.
* Write a C program to calculate Electricity bill.

Conditions:

For first 50 units – Rs. 3.50/unit

For next 100 units – Rs. 4.00/unit

For next 100 units – Rs. 5.20/unit

For units above 250 – Rs. 6.50/unit

Week 5:

* Write a C Program to display 1 to 10 Numbers using while loop.
* Write a C Program to display even numbers below 20 using do..while loop.
* Write a C Program to display sum of 20 natural numbers using for loop.

Week 6:

* Write a C program to find cube of any number using function.
* Write a C program to find diameter, circumference and area of circle using functions.
* Write a C program to find maximum and minimum between two numbers using functions.
* Write a C program to check whether a number is even or odd using functions.

Week 7:

* Write a C Program to find the factorial of a given number using recursive function.
* Write a C Program to print the first 10 Natural Numbers using recursive function.
* Write a C Program to solve Towers of Hanoi Problem using recursive function.

Week 8:

* Write a C Program to take 5 values from the user and store them in an array and display the elements in the array.
* Write a C Program to read 10 values in an array and display all even numbers in the array.
* Write a C Program to read 5 floating values in an array and display the sum and average of the elements in it.

Week 9:

* Write a C Program to read elements into a 2 dimensional array and display them.
* Write a C Program to read two matrices and display their sum.
* Write a C Program to read two matrices and display their product.(Matrix Multiplication).

Week 10:

* Write a C program to find length of a string.
* Write a C program to copy one string to another string.
* Write a C program to concatenate two strings.
* Write a C program to check whether a given string is palindrome or not.
* Write a C program to find total number of alphabets, digits or special character in a string.
* Write a C program to count total number of vowels and consonants in a string.

Week 11:

* Write a C program to store and print the roll no., name, age and marks of a student using structures.
* Write a C program to store the roll no. (Starting from 1), name and age of 5 students and then print the details of the student with roll no. 2.
* Write a C program to add, subtract and multiply two complex numbers using structures to function.
* Write a C Program to swap two strings(Call by Reference)

Week 12:

* Write a short C program that declares and initializes (to any value you like) a double, an int, and a string. Your program should then print the address of, and value stored in, each of the variables. Use the format string "%u" to print the addresses as unsigned (32-bit non-negative) integers.

Hint: Remember that you can use the & character to find addresses.

Reminder: 1 byte = 8 bits, and a 32-bit integer requires the space of 4 bytes.

* Write a C Program to swap two strings (Call by Reference)

Week 13:

* Write a C program to create a file and write contents, save and close the file.
* Write a C program to read file contents and display on console.
* Write a C program to read numbers from a file and write even, odd and prime numbers to separate file.
* Write a C program to count characters, words and lines in a text file.
* Write a C Program to store the information of 5 students and do the following operations of 1. Add Record 2. Display Record 3. Update Record Using the functions such as fread(), fwrite(), fseek() etc.(Using Binary File Operations)

**TEXT BOOKS:**

1. Byron Gottfried, Schaum’s Outline of Programming with C, McGraw-Hill.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

**REFERENCES BOOKS:**

1. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
2. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
3. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

**Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):**

1. <http://nptel.ac.in/courses/106105085/>
2. <http://nptel.ac.in/courses/106106127/>

**Web Reference/E-Books:**

1. [www.leetcode.com](http://www.leetcode.com/)
2. [www.thenewboston.com](http://www.thenewboston.com/)
3. [www.codesdope.com](http://www.codesdope.com/)

# ENGINEERING PRACTICES

# I B.TECH., I SEMESTER (Common to CSE, CSM & CSG)

|  |  |
| --- | --- |
| Course Title: Engineering Practices | Course Code: AS22-03ES03 |
| Teaching Scheme (L:T:P): 0:0:4 | Credits: 2 |
| Type of Course: Practical | Total Contact Periods: 64Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Nill | |

**COURSE OVERVIEW**

Mechanical Engineering Practices is a place where students acquire knowledge on the operation of various processes involved in manufacturing and production. The Workshop Practice course makes students competent in handling practical work in engineering environment.

**COURSE OBJECTIVES**

The objectives of this course are to

* To Study of different hand operated power tools, uses and their demonstration.
* To gain a good basic working knowledge required for the production of various engineering products.
* To provide hands on experience about use of different engineering materials, tools, equipment’s and processes those are common in the engineering field.
* To develop a right attitude, team working, precision and safety at work place.
* It explains the construction, function, use and application of different working tools, equipment and machines.
* To have practical exposure to various welding and joining processes.
* Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

**COURSE OUTCOMES**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C118.1 | Study and practice on machine tools and their operations. |
| C118.2 | Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding. |
| C118.3 | Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling. |
| C118.4 | Apply basic electrical engineering knowledge for house wiring practice. |
| C118.5 | Fabricate the given material to desired product in a particular pattern by tin smithy. |
| C118.6 | Mould the component to desire pattern and shape by black smithy. |

**COURSE CONTENT** (SYLLABUS)

At least two exercises from each trade:

1. TRADES FOR EXERCISES

Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint).

Fitting – (V-Fit, Dovetail Fit & Semi-circular fit).

Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel).

Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern).

Welding Practice – (Arc Welding & Gas Welding).

House-wiring – (Parallel & Series, Two-way Switch and Tube Light).

Black Smithy – (Round to Square, Fan Hook and S-Hook).

1. TRADES FOR DEMONSTRATION & EXPOSURE

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tool in construction and Wood Working.

**TEXT BOOKS**

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

**REFERENCE BOOKS**

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

**ONLINE RESOURCES**

1. https://nptel.ac.in/courses/112/107/112107145/

2. https://nptel.ac.in/courses/112/107/112107144/

**E-BOOKS**

1. <https://books.google.co.in/books/about/MECHANICAL_WORKSHOP_PRACTIC> [E.html?id=rHhJlb-\_ye4C](https://books.google.co.in/books/about/MECHANICAL_WORKSHOP_PRACTICE.html?id=rHhJlb-_ye4C)
2. <https://www.youtube.com/watch?reload=9&v=4gpjof5ESKQ>

**B. TECH**

**FIRST YEAR**

**SECOND SEMESTER SYLLABUS**

# ADVANCED CALCULUS AND VECTOR CALCULUS

# I B.TECH., II SEMESTER (Common to CSE, IT, CSM, AIDS & CSG)

|  |  |
| --- | --- |
| Course Title: Advanced Calculus and Vector Calculus | Course Code: AS22-00BS07 |
| Teaching Scheme (L:T:P): 3:1:0 | Credits: 4 |
| Type of Course: Lecture + Tutorial | Total Contact Periods: 48Hrs + 16Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Knowledge on Derivatives, Integrations, Functions | |

# COURSE OBJECTIVES

* Geometrical approach to the mean value theorems.
* Partial differentiation, concept of total derivative. Finding maxima and minima of function of Several variables.
* Evaluation of multiple integrals and their applications.
* 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

|  |  |
| --- | --- |
| **CO#** | **Course Outcomes** |
| C121.1 | Describe the applications of the mean value theorems. |
| C121.2 | Categorize the extreme values of functions of two variables with constraints and without constraints. |
| C121.3 | Analyze and apply the concept of multiple integrals to find areas, volumes. |
| C121.4 | Acquires various skills pertaining to differential and vector calculus and apply them in different fields of Engineering. |
| C121.5 | Define Directional Derivative and Scalar Potential Function. |
| C121.6 | Evaluate the line, surface and volume integrals and convert them from one to another. |

**COURSE CONTENT** (SYLLABUS)

**UNIT-I: SINGLE VARIABLE CALCULUS**

Mean value theorems (all the theorems without proof): Rolle’s Theorem, Lagrange’s Mean value theorem with their Geometrical Interpretation, Cauchy’s Mean value Theorem. Taylor’s Series and Maclaurin’s Series.

**UNIT-II: MULTIVARIABLE CALCULUS**

Partial Differentiation; Euler’s Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables with constraints, without constraints; method of Lagrange’s Multipliers.

**UNIT III: MULTIPLE INTEGRALS**

Evaluation of Double Integrals (Cartesian and Polar); Change of Variables (Cartesian to Polar); Change of Order of Integration (Cartesian form); Areas and Volumes by Double Integrals. Triple Integrals (Cartesian form).

**UNIT IV: VECTOR DIFFERENTIATION**

Vector Point Function; Scalar Point function; Gradient of a scalar function; Divergent; Curl of a Vector point function; Solenoidal, Irrotational Vector point functions; Directional Derivative; Angle between two Surfaces; Scalar Potential Function.

**UNIT V: VECTOR INTEGRATION**

Line Integral; Surface Integral; Volume Integral; Green’s Theorem; Gauss’s Divergence Theorem; Stoke’s Theorem (without proofs) and Applications.

**Text Books:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2010.
2. S.R.K. Iyengar and R.K.Jain, Advanced Engineering Mathematics, Narosa Publishing House,5th Edition, 2016.

**References Books:**

1. Dr. M.D. Rai Singhania, Ordinary and Partial Differential Equations, S.Chand and Company Ltd.,18 th Edition,2008.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.
3. Murray R.Spiegel, Seymour Lipschutz, Dennis Spellman, VectorAnalysis: Schaum’s Outlines Series,Tata McGrawHill,2 nd Edition,2009.

# APPLIED CHEMISTRY

# I B.TECH., II SEMESTER (Common to CSE, CSM & CSG)

|  |  |
| --- | --- |
| Course Title: Applied Chemistry | Course Code: AS22-00BS01 |
| Teaching Scheme (L:T:P): 3:0:0 | Credits: 3 |
| Type of Course: Lecture + Tutorial | Total Contact Periods: 48Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Intermediate Chemistry | |

**COURSE OVERVIEW**

The primary objective of an Engineering Chemistry course is to introduce the students to the concepts and applications of chemistry in Engineering. It should cultivate in them an ability to identify chemistry in each piece of finely engineered products used in households and industry. This course aims to strengthen the fundamental concepts of chemistry and then builds an interface with their industrial applications. It deals with applied and industrially useful topics, such as Water Technology, Molecular Orbital Concepts, Electrode Potential, Electrodes, types of batteries and their industrial applications, Fuels, UV-VIS, IR and NMR concepts.

**COURSE OBJECTIVES**

* To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
* To know the modern technology and interpret different problems involved in industrial utilization of water.
* To acquire the skills pertaining to Polymers and Engineering Materials to apply them for various engineering fields etc.
* To acquire the knowledge of Electrochemistry and batteries which are essential for engineers in Industry.
* To acquire the knowledge of reaction mechanisms and drug synthesis
* To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

# COURSE OUTCOMES

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C122.1 | Acquire the Scientific Attitude by means of distinguishing, analyzing and solving various Engineering problems. |
| C122.2 | Identify and interpret different problems involved in industrial utilization of water |
| C122.3 | Interpret the knowledge of polymers and other materials and their applications to various engineering fields |
| C122.4 | Summarize the principles and concepts of electrochemistry, corrosion to predict the behaviour of a system under different variables. |
| C122.5 | Define and distinguish the various reaction mechanisms as well as understands the concepts of drug synthesis. |
| C122.6 | Apply the concepts on basic spectroscopy and application to medical and other fields. |

**COURSE CONTENT** (SYLLABUS)

**Unit – I: (10 Hrs)**

**Water and its Treatment:** Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of F- ion by ion- selective electrode method.

# Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

**Unit – II: Polymeric materials: (10 Hrs)**

Definition – Classification of polymers with examples – Types of polymerization –Addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene

**Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP).

**Rubbers:** Natural rubber and its vulcanization.

**Elastomers:** Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

**Conducting polymers:** Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

**Biodegradable polymers:** Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

**Unit - III: (12 Hrs)**

**Battery Chemistry & Corrosion**

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells- Introdction and applications of Solar cells.

**Corrosion:** 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- Cathodic protection – Sacrificial anode and impressed current methods.

**Unit - IV: (8 Hrs)**

# Energy Sources:

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula.Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch’s process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages.

**Unit-V (8 Hrs)**

**Spectroscopic Techniques and applications:** Introduction, Principles of Electronic Spectroscopy: Beer-Lamberts law,Types of electronic transitions, applications of UV–Visible spectroscopy.

IR Spectroscopy: Introduction, Principle, Modes of Molecular vibrations, selection rules, Force Constant, Wave number regions of Some common organic functional groups (C-H, NH2, OH, -COOH, C=O, C N, C=C, C C, C-O-C), Applications of IR Spectroscopy.

1H-NMR Spectroscopy, Principles of NMR spectroscopy, Chemical shift - Shielding and Deshielding effects, Chemical shifts of some organic protons, Applications of NMR, Introduction to Magnetic Resonance Imaging.

# Text books:

# Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010

# Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016

# A text book of Engineering Chemistry by M.Thirumala Chary, E.Laxminarayana and K. Shashikala , Pearson Publications, 2021.

# Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

# Reference Books:

# Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)

1. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

# DATA STRUCTURES

# I B.Tech., II SEMESTER (Common to CE, EEE, CSE, IT, CSM, CSG & AIDS)

|  |  |
| --- | --- |
| Course Title: Data Structures | Course Code: AS22-05ES07 |
| Teaching Scheme (L:T:P): 3:0:0 | Credits: 3 |
| Type of Course: Lecture + Tutorial | Total Contact Periods: 48Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Programming for Problem Solving | |

**COURSE OVERVIEW**

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with their applications.

**COURSE OBJECTIVES**

* To understand the basic concepts such as linear and non-Linear data structures.
* To understand the notations used to analyze the Performance of algorithms.
* To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
* To choose an appropriate data structure for a specified application.
* To understand and analyze various searching and sorting algorithms.
* To learn how to implement lists, stacks, queues, trees, graphs, search trees in C to solve problems

**COURSE OUTCOMES**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C123.1 | Explain basic concepts of algorithms and Asymptotic Notations |
| C123.2 | Explain basic concepts of Data Types, Linear and Non-Linear Data structures. |
| C123.3 | Explain Non-Linear Data structures like trees and graphs. |
| C123.4 | Implements and know the application of algorithms for sorting. |
| C123.5 | Understand and implement Searching and Sorting Techniques. |
| C123.6 | Design programs using a variety of data structures, including Binary and general tree structures, search trees. |

**COURSE CONTENT** (SYLLABUS)

**UNIT - I**

**Introduction to Data Structures**: Data Structures Operations, What is an Algorithm, Importance of Time Complexity and Space Complexity, Mathematical Notations and Functions, Algorithmic **Notations:** Complexity of Algorithms, Omega Notation, Theta Notation, Little oh Notation, Explaining notations on Linear Search and Binary Search operations.

**UNIT-II**

**Introduction to Linear Data Structures:** Arrays, Representation of linear array in memory, Traversing Linear array, Inserting and Deleting elements in the array.

**Sorting and Searching Techniques:** Sorting Techniques – Selection Sort, Bubble Sort, Recursive Bubble Sort, Insertion Sort, Merge Sort, Quick Sort, , Searching(Linear Search, Binary Search),.

**UNIT-III**

**Linked Lists:** Introduction to Linked List, Representation of Linked List in memory. Traversing a Linked List, Searching a Linked list.

**Operations on Linked Lists**: Algorithms to insert nodes into a linked list, Inserting – at the beginning of a list, Inserting – after a given node, Inserting – Into a sorted Linked list, Algorithms to delete a node from a linked list, Deleting – a node following a given node, Deleting – a node with a given item of information, Circular Linked List

**UNIT-IV**

**Stacks:** Introduction to Stacks, Array Representation of Stacks, Linked Representation of Stacks, Arithmetic Expression, Polish Notations, Evaluation of a Postfix expression, transforming infix expression into Postfix conversion of an expression, Importance of Stacks and Recursion, Solving Towers of Hanoi Problem.

**Queues:** Introduction to Queues, Representation of Queues, Linked Representation of Queues, DeQueues, Priority Queues, Circular Queues.

**UNIT-V**

**Trees :** Introduction to Binary Trees, Complete Binary Tree, Extended Binary Tree, Representing Binary Trees in memory. Linked Representation of Binary Tree. Sequential Representation of Binary Tree, Traversal Techniques. Binary Search Tree – operations (Insert, delete, search, traversal), AVL Trees – operations (Insert, delete, search, traversal).

**Graphs :** graph Representations, Graph Traversal techniques- BFS & DFS.

**Text Books**

1. Data structures, Seymour Lipschutz, Tata McGRAW Hill.

2. C and Data Structures, Ashok N. Kamthane, Pearson Education.

**References Books:**

1. Classic Data Structures, D. Samanta, 2nd edition,PHI.

2. C Programming and Data Structures, Balagurusamy, Tat McGRAW Hill.

**Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):**

1. https://[www.coursera.org/learn/data-structures](http://www.coursera.org/learn/data-structures)
2. https://[www.coursera.org/specializations/data-structures-](http://www.coursera.org/specializations/data-structures-) algorithms
3. [http://nptel.ac.in/courses//data-structures](http://nptel.ac.in/courses/data-structures)

**Web Reference/E-Books:**

* + <http://gvpcse.azurewebsites.net/pdf/data.pdf>
  + <http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data->[Structures.pdf](http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data-Structures.pdf)
  + <http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247-> [Page1.htm](http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247-Page1.htm)
* <http://nptel.ac.in/courses/106102064/1>

# SEMICONDUCTOR DEVICES AND CIRCUITS

**I B.TECH., II SEMESTER (Common to CSE, CSM & CSG)**

|  |  |
| --- | --- |
| Course Title: Semiconductor Devices and Circuits | Course Code: AS22-04ES02 |
| Teaching Scheme (L:T:P): 3:0:0 | Credits: 3 |
| Type of Course: Lecture + Tutorial | Total Contact Periods: 48Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Basic knowledge of physics. | |

**COURSE OVERVIEW**

The creation of electronic circuits requires knowledge of the physics and device technology for the emission and flow control of [electrons](https://en.wikipedia.org/wiki/Electron) in [vacuum](https://en.wikipedia.org/wiki/Vacuum) and matter. It uses active devices to control electron flow by [amplification](https://en.wikipedia.org/wiki/Amplifier) and [rectification](https://en.wikipedia.org/wiki/Rectifier). Electronics has had a major effect on the development of modern society.

**COURSE OBJECTIVES**

* To introduce components such as diodes, BJTs and FETs.
* To know the applications of components.
* To know the switching characteristics of components
* To know the need of biasing in Transistors
* To understand of various types of transistor’s with its principle of operation

**COURSE OUTCOMES**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C124.1 | Understand and analyze the characteristics of various components of semiconductor devices and its applications |
| C124.2 | Understand and remember the applications of semiconductor diodes with examples. |
| C124.3 | Analyze different types of transistor configurations with its parameters |
| C124.4 | Understand and Analyze the relation between current amplification factors of the three configurations |
| C124.5 | Analyze different biasing techniques of three terminal semiconductor Bipolar Semiconductor devices. |
| C124.6 | Understand and remember the operation of different types of FET’s with its characteristics. |

**COURSE CONTENT (SYLLABUS)**

**UNIT I**

JUNCTION DIODE CHARACTERISTICS AND SOME SPECIAL DIODES

Qualitative Theory of P-N Junction, Diode and its characteristics, Static and Dynamic resistances, Diode current equation, Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Zener diode and its characteristics ,Breakdown Mechanisms in Semi-Conductor (Avalanche and Zener breakdown) Diodes, Varactor Diode, LED, LCD and photo diode characteristics.

**UNIT II**

DIODE APPLICATIONS

Half wave and Full wave rectifiers and its comparisons. Inductor filter, Capacitor filter, L- section filter, - section filter and comparison of various filter circuits, Application of a zener diode as a voltage regulator.

**UNIT III**

BIPOLAR JUNCTION TRANSISTOR

Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Volt-ampere characteristics of CB, CE and CC. Transistor current components, Transistor as a switch, switching times, BJT acts as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha, Beta and Gamma, Analysis of CE Amplifier, Comparison of CE,CB,CC configurations.

**UNIT IV**

BIASING AND STABILISATION

Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Bias, Self-Bias, Bias Stability, Stabilization Factors, Stabilization against variations in VBE, and , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability.

**UNIT V**

FIELD EFFECT TRANSISTORS

Types-The Junction Field Effect Transistor (construction, principle of operation, symbol)- pinch -off Voltage -Volt -Ampere characteristics, FET small signal model, MOSFET (construction, principle of operation, symbol) MOSFET characteristics in enhancement and depletion modes.

**TEXT BOOKS**

1. Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson
3. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education.

**REFERENCE BOOKS**

1. The Art of Electronics, Horowitz, 3rdEdition Cambridge University Press
2. Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
3. Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, McGraw Hill.

**ONLINE RESOURCES**

1. <https://nptel.ac.in/courses/115/102/115102014/>
2. <https://nptel.ac.in/courses/117/101/117101106/>
3. <https://www.coursera.org/learn/electronics>
4. <https://onlinecourses.nptel.ac.in/noc20_ee77/preview>
5. <https://www.classcentral.com/course/swayam-semiconductor-devices-and-circuits-19997>
6. <https://sggs.ac.in/wp-content/uploads/2020/08/SWAYAM-NPTEL-Equivalence-Courses-w.e.f.2020-21-Electronics.pdf>

**E-BOOKS**

1. <https://www.pdfdrive.com/basic-electronics-for-scientists-and-engineers-e28939124.html>

# ENGLISH

# I B.TECH., II SEMESTER (Common to CSE, CSM & CSG)

|  |  |
| --- | --- |
| Course Title: English | Course Code: AS22-00HS01 |
| Teaching Scheme (L:T:P): 3:0:0 | Credits: 3 |
| Type of Course: Lecture | Total Contact Periods: 48Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Basic knowledge of English language, Grammar, basic reading skills, Different types of vocabulary in different types of situations. | |

**COURSE OVERVIEW**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

**COURSE OBJECTIVES**

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.
4. Develop study skills and communication skills in formal and informal situations.
5. Train the students to use language appropriately for Interviews, Group discussions and Public speaking
6. Enhance and empower the students in communication skills by concentrating on LSRW skills.

**COURSE OUTCOMES**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C125.1 | Understand the importance of vocabulary and sentence structures. |
| C125.2 | Choose appropriate vocabulary and sentence structures for their oral and written communication. |
| C125.3 | Demonstrate their understanding of the rules of functional grammar. |
| C125.4 | Develop comprehension skills from the known and unknown passages. |
| C125.5 | Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts. |
| C125.6 | Acquire basic proficiency in reading and writing modules of English. |

**COURSE CONTENT (SYLLABUS)**

# UNIT - I

**Chapter entitled ‘Of Parents and Children’ from the Essays of Francis Bacon**

**Vocabulary**: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

**Grammar:** Identifying Common Errors in Writing with Reference to Articles and Prepositions.

**Reading:** Reading and Its Importance- Techniques for Effective Reading.

**Writing:** 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.

# UNIT - II

Chapter entitled **‘Appro JRD’ by Sudha Murthy** from ***“English: Language, Context and Culture” published*** by Orient BlackSwan, Hyderabad.

**Vocabulary:** Words Often Misspelt - Homophones, Homonyms and Homographs

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

**Reading:** Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

**Writing:** Nature and Style of Writing- Defining /Describing People, Objects, Places and Events

– Classifying- Providing Examples or Evidence.

# UNIT - III

Chapter entitled **‘Lessons from Online Learning’ by F.Haider Alvi, Deborah Hurst et al** from

***“English: Language, Context and Culture”*** published by Orient BlackSwan, Hyderabad. **Vocabulary**: Words Often Confused - 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 – Intensive Reading and Extensive Reading – Exercises for Practice.

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

# UNIT - IV

Chapter entitled **‘Art and Literature’ by Abdul Kalam** from ***“English: Language, Context and Culture”*** published by Orient BlackSwan, Hyderabad.

**Vocabulary**: Standard Abbreviations in English

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

**Reading**: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

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

# UNIT - V

Chapter entitled **‘Go, Kiss the World’ by Subroto Bagchi** from ***“English: Language, Context and Culture”*** published by Orient BlackSwan, Hyderabad.

**Vocabulary**: Technical Vocabulary and their Usage

**Grammar:** Common Errors in English (*Covering all the other aspects of grammar which were not covered in the previous units*)

**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.

**TEXT BOOKS**

1. “English: Language, Context and Culture” by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

**REFERENCE BOOKS**

1. 1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

**WEB/ ONLINE REFERENCES:**

1. Practice English Your Own-

https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf

2. Longman English Grammar Practice-

file:///C:/Users/user/Downloads/Longman\_English\_Grammar\_Practice\_intermediate\_Self\_Study\_Edition%20(learnenglishteam.com).pdf

3. English Grammar through stories by Alan Townend-

file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf

# APPLIED CHEMISTRY LAB

# I B.TECH., II SEMESTER (Common to CSE, CSM & CSG)

|  |  |
| --- | --- |
| Course Title: Applied Chemistry Lab | Course Code: AS20-00BS03 |
| Teaching Scheme (L:T:P): 0:0:3 | Credits: 1.5 |
| Type of Course: Practical | Total Contact Periods: 48Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Applied Chemistry | |

**COURSE OBJECTIVES:**

The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

* Estimation of hardness in water to check its suitability for drinking purpose.
* Quantitative analysis of acids and bases by conductometric, potentiometric, and pH metric titrations.
* To determine the rate constant of reactions from concentrations as a 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:**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C126.1 | Ability to perform experiments illustrating the principles of chemistry relevant to the study of science and engineering. |
| C126.2 | record the amount of hardness and chloride content in water and interpret the significance of its presence in water. |
| C126.3 | Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time. |
| C126.4 | Predict the significance of properties like adsorption, conductance, viscosity, PH and Surface tension. |
| C126.5 | demonstrate the technique of thin Layer Chromatography (TLC) and synthesize drug molecules widely used in industry. |
| C126.6 | Demonstrate the ability to perform qualitative and quantitative analysis of a given chemical compound. |

**LIST OF EXPERIMENTS**

1. Determination of total hardness of water by Complexometric method using EDTA

2. Estimation of alkalinity of a given water sample

3. Estimation of an HCl by Conductometric titrations

4. Estimation of HCl by Potentiometric titrations

5. Estimation of Iron using Standard KMnO4.

6. Estimation of acid value of coconut oil.

7. Determination of viscosity of castor oil and ground nut oil by using Ostwald’s viscometer.

8. Determination of surface tension of a give liquid using Stalagmometer

9. Synthesis of Aspirin

10.Thin layer chromatography calculation of Rf values. eg ortho and para nitro phenols

11. Estimation Saponification value of a lubricant oil.

12. Preparation Nylon-6

**Reference Books:**

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.

**Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):**

1. <http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec38.html>
2. <http://vlabs.iitb.ac.in/vlab/labscs.html>
3. <https://www.vlab.co.in/broad-area-chemical-engineering>

**Web Reference/E-Books:**

|  |  |  |
| --- | --- | --- |
| S.No | Advanced concepts in syllabus | Website Referred |
| 1 | Determination of total hardness of water by Complexometric method using EDTA | <http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec38.html> |
| 2 | Estimation of alkalinity of a given water sample |  |
| 3 | Estimation of an HCl by Conductometric titrations | <http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec38.html> |
| 4 | Estimation of HCl by Potentiometric titrations | <http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec38.html> |
| 5 | Estimation of Iron using Standard KMnO4. |  |
| 6 | Determination of acid value of coconut oil | <https://www.youtube.com/watch?v=b1PbQ7jjVVM> |
| 7 | Determination of viscosity of castor oil and ground nut oil by using Ostwald’s viscometer. | https://labmonk.com/determination-of-viscosity-of-liquid-using-ostwald-viscometer |
| 8 | Determination of surface tension of a give liquid using Stalagmometer | https://www.youtube.com/watch?v=qvUyVrUb8Fo |
| 9 | Synthesis of Aspirin | <https://chem.libretexts.org/Bookshelves/Ancillary_Materials/Laboratory_Experiments/Wet_Lab_Experiments/Organic_Chemistry_Labs/Experiments/1%3A__Synthesis_of_Aspirin_(Experiment)>  https://www.researchgate.net/publication/262911382\_Alternative\_Synthesis\_of\_Paracetamol\_and\_Aspirin\_Under\_Non-conventional\_Conditions |
| 10 | Thin layer chromatography calculation of Rf values. eg ortho and para nitro phenols | https://dukee2020.com/product\_thin\_layer\_chromatography\_tlc.html?gclid=Cj0KCQjwnqH7BRDdARIsACTSAdson-qYZJu3D2d\_QsJYQEklz0TEmIK\_zoGcEs3LnHr2184kX-GYDoMaAvWdEALw\_wcB |

# DATA STRUCTURES LAB

# I B.TECH., II SEMESTER (Common to CE, EEE, CSE, IT, CSM, CSG & AIDS)

|  |  |
| --- | --- |
| Course Title: Data Structures Lab | Course Code: AS22-05ES08 |
| Teaching Scheme (L:T:P): 0:0:3 | Credits: 1.5 |
| Type of Course: Practical | Total Contact Periods: 48 Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Mathematics Knowledge, Analytical and Logical skills | |

**COURSE OVERVIEW**

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

**COURSE OBJECTIVES**

* Covers various concepts of C programming language
* Introduces searching and sorting algorithms
* Provides an understanding of data structures such as stacks and queues
* Implementing all data structures covered in the theory.

**COURSE CONTENT (SYLLABUS)**

1. Write a program that uses functions to perform the following operations on singly linked list.
   1. Creation ii) Insertion iii) Deletion iv) Display
2. Write a program that uses functions to perform the following operations on doubly linked list.
   1. Creation ii) Insertion iii) Deletion iv) Display
3. Write a program that uses functions to perform the following operations on circular linked list.
   1. Creation ii) Insertion iii) Deletion iv) Display
4. Write a program that implement stack (its operations) using
   1. Arrays ii) Pointers
5. Write a program that implement Queue (its operations) using
   1. Arrays ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort
7. Write a program that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers:
   1. Linear search ii) Binary search(Recursive and Non-Recursive)
8. Write a C program to perform Binary Search Tree operations (Insertion, Deletion, Traversal)
9. Write a C program to perform AVL Tree operations
10. Write a C Program to perform Graph Traversal Techniques – BFS and DFS.

## TEXT BOOKS:

1. Data Structures, Seymour Lipzchutz, Tata McGRAW Hill.
2. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
3. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein,

PHI/Pearson Education.

## REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition,
2. R. F. Gilberg and B. A. Forouzan, Cengage Learning.

# ENGLISH LAB

# I B.TECH., II SEMESTER (Common to CSE, CSM & CSG)

|  |  |
| --- | --- |
| Course Title: English Lab | Course Code: AS22-00HS02 |
| Teaching Scheme (L:T:P): 0:0:2 | Credits: 1 |
| Type of Course: Practical | Total Contact Periods: 32Hrs |
| Continuous Internal Evaluation: 40 Marks | Semester End Exam: 60 Marks |
| Prerequisites: Basic knowledge of English language, Grammar, speaking skills, able to communicate in English language, vocabulary in different of situations | |

**COURSE OVERVIEW**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English Language Communication Skills Lab has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In ELCS Lab the focus should be on the skills development in the areas of vocabulary, grammar, reading and speaking. For this, the teachers should use the prescribed Lab manual for detailed study. The students should be encouraged in improving communication skills in the lab. The time should be utilized for activity-based learning. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

**COURSE OBJECTIVES**

* To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
* To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
* To bring about a consistent accent and intelligibility in students’ pronunciation of English by providing an opportunity for practice in speaking
* To improve the fluency of students in spoken English and neutralize the impact of dialects.
* To train students to use language appropriately for public speaking, group discussions and interviews

**COURSE OUTCOMES**

|  |  |
| --- | --- |
| CO# | Course Outcomes |
| C128.1 | Learn how to pronounce words using phonetic transcription |
| C128.2 | Improves collaborative skills and maximizes speaking skills |
| C128.3 | Develops Neutralization of accent for intelligibility |
| C128.4 | Understand the nuances of English language through audio- visual experience and group activities |
| C128.5 | Neutralise their accent for intelligibility |
| C128.6 | Speak with clarity and confidence which in turn enhances their employability skills |

**COURSE CONTENT (SYLLABUS)**

# Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

1. **Computer Assisted Language Learning (CALL) Lab**

# Interactive Communication Skills (ICS) Lab

**Listening Skills:**

Objectives

* 1. To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
  2. To 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

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

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

The following course content is prescribed for the **English Language and Communication Skills Lab**.

# Exercise I CALL Lab:

*Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

# ICS Lab:

*Understand:* Spoken vs. Written language- Formal and Informal English.

*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– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

*Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - *Testing Exercises*

# ICS Lab:

*Understand:* Features of Good Conversation – Strategies for Effective Communication.

*Practice:* Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

# Exercise III

# CALL Lab:

*Understand:* Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

*Practice:* Common Indian Variants in Pronunciation *–* Differences between British and American Pronunciation -*Testing Exercises*

# ICS Lab:

*Understand:* Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

*Practice:* Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

# Exercise IV CALLLab:

*Understand:* Listening for General Details.

*Practice:* Listening Comprehension Tests - *Testing Exercises*

# ICS Lab:

*Understand:* Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

*Practice:* Making a Short Speech – Extempore- Making a Presentation.

# Exercise V CALLLab

*Understand:* Listening for Specific Details.

*Practice:* Listening Comprehension Tests -*Testing Exercises*

# ICS Lab:

*Understand:* Group Discussion

*Practice:* Group Discussion

**TEXT BOOKS**

A Textbook of English phonetics for Indian students by [T. Balasubramanian](https://www.goodreads.com/author/show/7824968.T_Balasubramanian)

1. ELCS LAB Manual- A workbook for CALL and ICS Lab Activities, by Orient BlackSwan
2. Group Discussion and Interview Skills by [Priyadarshi Patnaik](https://www.goodreads.com/author/show/64527.Priyadarshi_Patnaik)
3. Intonation in Context Student's Book: Intonation Practice for Upper- Intermediate and Advanced Learners of English by [Barbara Bradford](https://www.goodreads.com/author/show/4407482.Barbara_Bradford) and [David](https://www.goodreads.com/author/show/71420.David_Brazil) [Brazil](https://www.goodreads.com/author/show/71420.David_Brazil) (Editor)

**REFERENCE BOOKS**

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* Cambridge University Press
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**ONLINE RESOURCES**

Practice English Your Own- <https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf>

**E-BOOKS**

1. <https://scholar.harvard.edu/files/adam/files/phonetics.ppt.pdf>
2. <https://gdpi.hitbullseye.com/MBA/free-ebooks.php>
3. <https://www.mbarendezvous.com/pdf/GroupDiscussionEbook.pdf>
4. [https://www.ldsassoc.com/wp-content/uploads/2019/04/intonation\_e-](https://www.ldsassoc.com/wp-content/uploads/2019/04/intonation_e-book.pdf) [book.pdf](https://www.ldsassoc.com/wp-content/uploads/2019/04/intonation_e-book.pdf)
5. <https://www.teachingenglish.org.uk/sites/teacheng/files/TeachingSpeaking_> [4\_stressintonation\_v01.pdf](https://www.teachingenglish.org.uk/sites/teacheng/files/TeachingSpeaking_4_stressintonation_v01.pdf)