

HYDERABAD INSTITUTE OF TECHNOLOGY AND MANAGEMENT						
B.TECH. HR-24 COURSE STRUCTURE						
CSE-DATA SCIENCE						
(Applicable for the batch admitted from 2024-25 onwards)						
Induction Program-2 Weeks						
I-Semester (1 Year)						
S. No.	Course code	Course title	Hours Per Week			Credits
			L	T	P	
1	24BS1MT01	Matrix Algebra and Calculus	3	1	0	4
2	24BS1CH01	Chemistry for Engineers	3	0	0	3
3	24HS1MB01	Business Economics and Financial Analysis	2	0	0	2
4	24ES1ME02	Design Thinking Lab	0	1	2	2
5	24ES1CS01	Programming for Problem Solving*	3	1	2	5
6	24ES1ME01	Engineering/IT Workshop*	0	2	2	3
7	24BS1CH02	Chemistry for Engineers Lab	0	0	2	1
		TOTAL	11	5	8	20
II-Semester (1 Year)						
S. No.	Course code	Course title	Hours Per Week			Credits
			L	T	P	
1	24BS2MT02	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	24BS2PH01	Applied Physics	3	0	0	3
3	24ES2CD01	Basic Web Development*	3	1	2	5
4	24ES2CD02	Fundamentals of Digital Hardware Design	3	0	0	3
5	24BS2PH02	Applied Physics Lab	0	0	2	1
6	24HS2EG01	English for Skill Enhancement	2	0	0	2
7	24HS2EG02	English for Skill Enhancement Lab	0	0	2	1
8	24ES2CD03	Digital Hardware Design-Lab	0	0	2	1
		TOTAL	14	2	8	20

B. Tech I Year–I Sem	L	T	P	C
Subject Code:24BS1MT01	3	1	0	4

MATRIX ALGEBRA AND CALCULUS

(Common to EEE/MECH/ECE/CSE/CSD/CSM)

Pre-requisite: Basics of Matrices, Differentiation and Integration

Course Objectives: To provide the student with

1. Concept of rank of a matrix and applying this concept to find the solution for system of equations, if it exists.
2. Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form of a matrix.
3. Partial differentiation, concept of total derivative.
4. Finding maxima and minima of function of two and three variables.
5. Evaluation of surface areas and volumes of revolutions of curves.
6. Evaluation of multiple integrals and their applications.

MODULE I

Matrices: Types of real matrices, symmetric, skew-symmetric and orthogonal matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method;

System of linear equations: Consistency of Homogeneous and Non-Homogeneous equations, LU Decomposition method

MODULE II

Eigen Values and Eigen Vectors: Eigen values and eigenvectors and their properties, Diagonalization of matrices; Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem.

MODULE III

Complex Matrices and Quadratic Forms: Types of complex matrices; Hermitian; Skew, Hermitian, Unitary Matrices and its properties; Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical form using Orthogonal Transformation and Congruent Transformation.

MODULE IV

Functions of Several Variables: Definitions of Limits, Continuity. Partial differentiation: partial derivatives of first and second order, Euler's theorem, Total derivative, Jacobian, Functional dependence, Taylor's theorem of two variables (without proof). Maxima and Minima of two variables, Lagrange's method of undetermined Multipliers. Indefinite Integrals Gamma and Beta Functions (For Students reference)

MODULE V

Multiple Integrals and Applications of Integrals: Applications of Definite Integrals (Surface and Volume of Solid revolution), Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form), Change of variables (for Two variables). Evaluation of Triple integrals, Change of variables (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 44th Edition, 2021.
2. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, John Wiley & Sons, 2020.

REFERENCE BOOKS:

1. Linear Algebra and its Applications, Gilbert Strang, Cengage Publication.
2. Advanced Modern Engineering Mathematics Glyn James, 5th edition, Prentice Hall, 2018.
3. Engineering Mathematics, Srimanta Pal, Subodh C. Bhunia, Oxford University Press, 2015

MOOC Courses:

1. Calculus: <https://nptel.ac.in/courses/111/107/111107108/>
2. Calculus: <https://nptel.ac.in/courses/111/105/111105122/>

E- Books:

1. Advanced Engineering Mathematics by R.K. Jain <https://1lib.in/book/16822856/8e87eb>
2. Higher Engineering Mathematics" B.S. Grewal <https://1lib.in/book/2352263/9368cb>
3. Advanced Engineering Mathematics by Erwin Kreyszig <https://1lib.in/book/1213502/92e465>
4. Advanced Modern Engineering Mathematics by Glyn James <https://1lib.in/book/1204739/431eb2>

Course Outcomes: After learning the contents of this subject, the student must be able to

B.Tech. I Year–I Sem/II Sem**L T P C****Subject Code:****3 0 0 3****24BS1CH01/24BS2CH01****CHEMISTRY FOR ENGINEERS****(Common to CSM/CSD/MECH)****Course Objectives:**

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT - I: Water and its treatment: [8]

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 Battery Chemistry & Corrosion [8]

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 - Introduction 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 - III: Polymeric materials: [8]

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 - IV: Energy Sources: [8]

Introduction, Calorific value of fuel – HCV, LCV- Dulong's 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: Spectroscopy and its application [8]

UV-Visible -Introduction to spectroscopy, Lamberts- Beer's law, Principles of UV-Visible Spectroscopy, instrumentation, selection rules, types of electronic transitions, Franck-Condon principle, chromophore and auxochrome, bathochromic shift, hypochromic shift, hypsochromic shift, hyperchromic shift and applications of UV-Visible (electronic) spectroscopy

IR Spectroscopy- Principles of IR spectroscopy, types of vibrations (stretching & bending), selection rules, instrumentation, number of fundamental vibrations, functional group interpretation and applications of IR spectroscopy.

NMR Spectroscopy- Introduction and Principle to NMR, selection rules, Instrumentation, De-shielding and shielding, Chemical shifts, Measurement of chemical shifts and applications, spin-spin coupling, coupling constant, Introduction to Magnetic resonance imaging (MRI) and its applications.

TEXT

BOOKS: 1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010

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

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

B. Tech I Year–I Sem	L	T	P	C
Subject Code:24BS1MS01	2	0	0	2

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS
(Common to CSE/ECE/EEE/ME/ CSM/CSD/ CSC/CSO Branches)

Pre-requisite: Nil

Course Objectives:

1. Describe concepts of business economics and demand analysis to help in optimal decision making in business environment
2. Differentiate the functional relationship between Production and factors of production and able to compute breakeven point to illustrate the various uses of breakeven analysis
3. Identify various market structures and discuss their implications for resource allocation
4. Explain various accounting concepts and different types of financial ratios for knowing financial positions of business concern.
5. To analyse the financial accounting by applying ratio analysis

UNIT I INTRODUCTION TO BUSINESS AND ECONOMICS

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT II DEMAND AND SUPPLY ANALYSIS

Elasticity of Demand: Demand, Law of Demand, Elasticity, Types of Elasticity, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand,

Demand Forecasting: Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply

UNIT III PRODUCTION, COST, MARKET STRUCTURES & PRICING

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions. Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis.

UNIT IV: INTRODUCTION TO FINANCIAL ACCOUNTING

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance

Final Accounts: Elements of Financial Statements, Preparation of Final Accounts: Trading account, Profit & Loss Account, Balance sheet

UNIT V FINANCIAL RATIOS ANALYSIS:

Concept of ratio analysis, importance and types of ratios, Liquidity ratios, Profitability ratios, Proprietary ratios, solvency ratios, leverage ratios analysis and interpretation (simple problems)

Text Books:

1. Aryasri, "Managerial Economics and Financial Analysis", TMH publications, 4th Edition, 2012.
2. M. Kasi Reddy, Saraswathi, "Managerial Economics and Financial Analysis", PHI Publications, New Delhi, 2nd Edition, 2012.
3. Varshney, Maheswari, "Managerial Economics", Sultan Chand Publications, 11th Edition, 2009.

Reference Books:

1. S. A. Siddiqui, A. S. Siddiqui, "Managerial Economics and Financial Analysis", New Age International Publishers, Hyderabad, Revised 1st Edition, 2013.
2. S. N. Maheswari, S. K. Maheswari, "Financial Accounting", Vikas publications, 3rd Edition, 2012.
3. J. V. Prabhakar Rao, P. V. Rao, "Managerial Economics and Financial Analysis", Maruthi Publishers, Reprinted Edition, 2011.
4. Vijay Kumar, Appa Rao, "Managerial Economics and Financial Analysis", Cengage Publications, 1st Edition, Paperback, 2011.

Web Resources:

1. [https:// books.google.co.in/books/about/Managerial economics and financial analysis](https://books.google.co.in/books/about/Managerial_economics_and_financial_analysis).
2. [http://www.ebooktake.in/pdf/title/managerial-economics-and-financial analysis](http://www.ebooktake.in/pdf/title/managerial-economics-and-financial-analysis).
3. [http://all4ryou.blogspot.in/2012/06/mefa-managerial-economics and financial analysis](http://all4ryou.blogspot.in/2012/06/mefa-managerial-economics-and-financial-analysis).
4. [http://books.google.com/books/about/Managerial economics and financial analysis](http://books.google.com/books/about/Managerial_economics_and_financial_analysis)

Course Outcomes:

1. CO1: Students will be able to understand economics and business economic concepts
2. CO2: Students will be able to differentiate different business organisations and nurture the idea of start-ups
3. CO3: Students will be able to analyze operations of markets under varying competitive conditions
4. CO4: Apply accounting concepts and methods to interpret financial statements for evaluating the financial position and performance of organizations

B.Tech I Year–I/II Sem	L	T	P	C
Subject Code: 24ES1ME02/24ES2ME02	0	1	2	2

Design Thinking

Pre-requisite:

Course Objectives:

1. Apply domain knowledge to the design of community based projects.
2. Identify and acquire new knowledge as a part of the problem solving / design process.
3. Design prototype on multidisciplinary concepts and an appreciation for the contributions from individuals from multiple disciplines.
4. Build a role that their discipline can play in social contexts.
5. Provide significant service to the community while learning; gain an understanding of the role that engineering (and their discipline) can play in society.

Module 1:

Problem Identification

Introduction to EPICS, Idea Generation, Brain storming

Societal Survey

Rural area Survey (societal issues), Idea Generation and Group Discussions.

Module 2:

Specification Development

Customer Requirement, Design Constraints, Engineering Specifications

Product Survey

Community Partner allotment, Design Thinking activity

Module 3:

Conceptual Design

Decision matrix, community partner interview, Brainstorming (possible solutions)

Poster Presentation

Documentation & Team wise presentation

Module 4:**Project Specification**

Prototype Development, Testing, customer feedback

Project Specification

Prototype presentation, Feedback Report of customer & advisor, Action plan for the next prototype

Module 5:**Detailed Design**

Report preparation on conceptual design, Prototype Development, Testing, customer feedback, Presentation

Detailed Design

Make progress on the project and appropriately engage project partners, Complete Design review feedback summary, and Individual and Project documentation

Text Books:

Dahir, M., "Educating Engineers for the Real World", Technology Review, Aug/Sept. 1993, pp. 14-16

Reference Books:

Govindarajan M, Natarajan S, Senthil Kumar V.S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

Web Resources:

<https://engineering.purdue.edu/EPICS/Resources/Lectures>.

<https://unnatbharatabhiyan.gov.in:8443/new-website/>

<http://www.engineeringchallenges.org/GrandChallengeScholarsProgram.aspx>

<https://www.ewb-india.org/>

Course Outcomes:

1. CO1 – Apply disciplinary knowledge to real and possibly ill-defined problems.
2. CO2 – Collaborate with people from other disciplines and develop an appreciation for multi-disciplinary contributions in design.
3. CO3 – Build the broad set of skills needed to be successful in the

changing global workplace and world.

4. CO4 – Acquire knowledge regarding project management.

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 - Low														
Course Outcomes (COs)	Program Outcomes (POs)												Program Specific Outcomes*	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	M	M	M		H		M	H	M	M	H	M	M
CO2	H	M	M	M		H		M	H	M	M	H	M	M
CO3	H	M	M	M		H		M	H	M	M	H	M	M
CO4	H	M	M	M		H		M	H	M	M	H	M	M

* If more PSOs are there in a particular branch, required no of columns can be added.

B.Tech I Year–I Sem	L	T	P	C
Subject Code: 24ES1CS01	3	1	2	5

**Programming for Problem Solving
(Common to CSE/CSM/CDS/ECE/EEE)**

Prerequisite: Basic mathematical, analytical and logical capability

Course Objectives:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. Enable learners to design, develop and apply logic to solve mathematical and scientific problem.

Module I

Introduction to Computer

Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs

Algorithms, Flowcharts, Pseudo code with examples, from algorithm to Programs and Source Code.

Basic Elements of C

Introduction to C programming – C character set – Identifiers, keywords, data types, constants, variable, declarations, expressions, statements, symbolic constants, Operators and Expressions Operator precedence and associativity of operators -Input and Output Functions-Library Functions - Header Files

Programs:

1. Write an Algorithm to find Area, Diameter and Circumference of a Circle.
2. Draw a flowchart to compute the final price of an item after figuring in sales tax.
3. Write a C program to evaluate algebraic expression $(ax+b)/(ax-b)$

Module II

Selection-Decision Making and Repetition

Decision Making: if statement - if-else statement - else-if ladder –Looping statements –While –do-while- Still more looping-For statement, Nested control statements- switch statement – the break statement -? : Operator - Continue statement - goto statement.

Arrays and Strings

Defining and Processing an Array - Passing Arrays to Functions - Multidimensional Arrays - Arrays and Strings - Enumerated Data Types-**Programs using sorting, searching and merging of arrays.**

Programs:

1. Write a C program to find whether a character is consonant or vowel using switch statement.
2. Write a C program to compute the gross salary of Mr. HARISH. Input his basic salary. His DA is 40% of basic salary, and HRA is 20% of basic salary
3. Write a C program to compute sum of the elements stored in an array using pointers and user defined function.
4. Write a C program to use function to insert a sub-string in to given main string from a given position.
5. Write a C program that uses functions to perform Multiplication of Two Matrices.

Module III**Storage Classes**

Storage Classes -Automatic Variables -External Variables – Static and Register Variables.

User Defined Functions

Need for User defined functions, a multifunction program- Elements of user defined functions
Definition of Functions- Return values and their Types- Function Calls-Function Declaration
Category of functions- Nesting of functions –Recursion.

Programs:

1. Write a C program to find the factorial of a given integer using recursive function.
2. Write a C program Check prime and Armstrong number by making functions.
3. Write a C program Check whether a number can be expressed as the sum of two prime numbers.

Module- IV**Pointers**

Pointer Fundamentals - Pointer Declarations - Passing Pointers to Functions - Arrays and Pointers - Pointers and One-Dimensional Arrays - Pointers and Multidimensional Arrays - Operations on Pointers

Structures & Unions

Defining a Structure - Processing a Structure – User defined Data Types – Nested structure - Structures and Pointers - Passing Structures to Functions - Self Referential Structures- Arrays and & Structures Union.

Programs:

1. Write a C program, by using structure to read and print data of n employees (Name, Employee Id and Salary)

2. Write a C program, which Declare a union containing 5 string variables (Name, House Name, City Name, State and Pin code) each with a length of C_SIZE (user defined constant). Then, read and display the address of a person using a variable of the union.

Module V

Dynamic Memory Management

Dynamic Memory Allocation –Allocating a Block of memory, multiple blocks, releasing used space, altering the size of block.

Preprocessor Directives

Commonly used Preprocessor commands like include, define, elif, else, endif, undef, if, ifdef, ifndef

Programs:

1. Write a C program for #ifdef, #else and #endif
 - “#ifdef” directive checks whether particular macro is defined or not. If it is defined, “If” clause statements are included in source file.
 - Otherwise, “else” clause statements are included in source file for compilation and execution.
2. Write a C program to Display array elements using calloc() function

TEXT BOOKS:

1. Byron S. Gottfried, “Programming with C”, Second Edition, Tata McGraw Hill, 2010.
2. S.K. Srivastava and Deepali Srivastava “C in Depth” BPB Publications,3rd Revised and Updated Edition.

REFERENCE BOOKS:

1. Reema Thareja, “Programming in C”, Oxford university press, 2nd Edition, 2016.
2. W. Kernighan Brian, Dennis M. Ritchie, “The C Programming Language”, PHI Learning, 2nd Edition, 1988.
3. Yashavant Kanetkar, “Exploring C”, BPB Publishers, 2nd Edition, 2003.
4. Schildt Herbert, “C: The Complete Reference”, Tata McGraw Hill Education, 4th Edition, 2014.
5. R. S. Bichkar, “Programming with C”, Universities Press, 2nd Edition, 2012.
6. Dey Pradeep, Manas Ghosh, “Computer Fundamentals and Programming in C”, Oxford University Press, 2nd Edition, 2006.
7. Stephen G. Kochan, “Programming in C”, Addison-Wesley Professional, 4th Edition, 2014.

WEB RESOURCES:

- <http://computer.howstuffworks.com/c.htm>
- <http://www.le.ac.uk/cc/tutorials/c/>

- <http://www.eskimo.com/~scs/cclass/notes/top.html> (for notes)
- <http://www.cprogramming.com/tutorial.html>
- <http://www2.its.strath.ac.uk/courses/c/>

E-BOOKS:**Course Outcomes:**

CO1 - Apply the fundamentals of computer and programming language, to draw flow chart, algorithm to solve given program.

CO2 - Comprehend the general structure of C program using control structures, functions, recursion to support reusability.

CO3 - Apply searching and sorting algorithms for the given list of elements

CO4 - Design an application to solve real world problem.

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 - Low															
Course Outcomes (COs)	Program Outcomes (POs)												Program Specific Outcomes*		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1	2										2		
CO2	3	1	2										1		
CO3					2								1		
CO4					2								1		

B.Tech I Year–I/II Sem	L	T	P	C
Subject Code: 24ES1ME01	0	2	2	3

**Engineering Workshop/IT Workshop Lab
(Common to All Branches)**

Prerequisites: Practical skill

Course Objectives:

1. To provide the basic knowledge of fundamental tools used by engineers in a manufacturing environment, wiring in electrical circuits, design of electronic components on PCB and knowledge on computer peripherals.
2. To gain a basic working knowledge required for the production of various engineering products.

List of Experiments:

PART A: Engineering

Workshop Note: Any FIVE experiments should be conducted from all Trades

1. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
2. Fitting – (V-Fit, Step Fit , Dovetail Fit & Semi-circular fit)
3. Tin-Smithy – (Open Scoop, Rectangular Tray & Conical Funnel)
4. Black Smithy – ('S' hook or Round rod to Ring)
5. House wiring-(One lamp control by using Two 2-way switches (staircase wiring), Wiring of distribution box with MCB, Wiring of three bulbs - Series & parallel connections).

PART B: IT

Workshop Note: Any FIVE experiments should be conducted

1. Draw the block diagram of the PC and peripherals that can be assembled and disassembled.

2. Every student should individually install MS windows/ Linux/Dual Booting on the personal computer.
3. Installation of Application software in PC (Modelling/Simulation /Automation)
4. Hardware Troubleshooting: Students have to be given a Pthatch does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.
5. Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.
6. Internet & World Wide Web: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations.

TEXTBOOKS:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha
3. Experiments in Basic Electrical Engineering by S.K.Bhattacharya , Rastogi- NAI.
4. Industrial Safety management by Deshmukh –TMH

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP
3. Residential and Commercial Industrial Electrical systems Vol.2 by Joshi-TMH
4. Residential and Commercial Industrial Electrical systems Vol.3 by Joshi-TMH
5. Industrial Safety management by Deshmukh –TMH

Web resources:

1. <https://www.electricaltechnology.org/2012/11/how-to-control-lamp-by-single-way-or.html>
2. <https://circuitdigest.com/electronic-circuits/5v-2a-smmps-power-supply-circuit->

B.Tech. I Year–I Sem/II Sem	L	T	P	C
Subject Code:	0	0	2	1
24BS1CH02/24BS2CH02				

CHEMISTRY FOR ENGINEERS LAB
(Common to MECH/CSM/CSD)

Pre-requisite: Concepts of Chemistry at 10+2 level

Course Objectives:

The student will be able to learn

- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids, bases and ions using conductometry, potentiometric and colorimetric titrations.
- Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory and skills related to the lubricant properties of oils.
- Students will perform virtual experiments electrical vehicles and solar cells with its applications.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA.
2. Determination of chloride content of water by Argentometry.
3. Estimation of the concentration of an acid by Conductometry.
- 4. Determination of an acid concentration using pH meter.**
- 5. Determination of copper by Colorimetric method.**
6. Estimation of the amount of Fe⁺² by Potentiometry.
7. Preparation of Bakelite.
8. Preparation of Nylon – 6.
9. Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.
10. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.
11. Batteries for electrical vehicles.
12. Functioning of solar cell and its applications.

Reference Books:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi(2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

Course Outcomes: Students will be able to

CO1: Estimate the hardness and chloride content in given water sample.

CO2: Determine the strength of the given sample by appropriate instrumental method and viscometry techniques.

CO3: Synthesis of Bakelite and nylon-6 polymers.

CO4: Perform simulation experiments of electrical vehicles and solar cell with its applications

CO-PO Mapping Chart

(3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low

Course Outcomes(COs)	Program Outcomes (POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3											
CO2	3											
CO3	3											
CO4	3				3							

B. Tech I Year–II Sem	L	T	P	C
Subject Code: 24BS2MT02	3	1	0	4

ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(Common to EEE/MECH/ECE/CSE/CSD/CSM)

Pre-requisite: Mathematics of 10+2 level

Course Objectives: To provide the student with

1. Methods of solving Ordinary Differential Equations of first & higher order and their applications.
2. Concept of Laplace Transforms, inverse Laplace Transforms and their properties.
3. Solving ordinary differential equations using Laplace transforms techniques.
4. The Physical quantities involved in engineering field related to vector valued function.
5. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

MODULE I

First Order ODE: Exact differential equations, Integrating factors, Linear and Bernoulli's equations.

Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth/decay.

MODULE II

Higher Order Ordinary Differential Equations

Higher order homogeneous and non-homogeneous linear differential equations with constant coefficients. Non-homogeneous terms of the type e^{ax} , $\cos ax$, $\sin ax$, x^k , $e^{ax}V$ and xV . Method of variation of parameters. Cauchy-Euler's and Legendre's differential equations.

MODULE III

Laplace Transforms: Laplace Transform of standard functions; first and second shifting theorems; Laplace transforms of functions when they are multiplied and divided by 't'. Laplace transforms of derivatives and integrals of function; Laplace transforms of Unit step and Impulse functions; Laplace transform of periodic functions. Applications of Laplace transforms to integrals.

Inverse Laplace Transforms: Finding inverse Laplace transforms by different methods, convolution theorem (without proof), Solving Ordinary Differential Equations with constant coefficient with given conditions by Laplace Transform method.

MODULE IV

Vector Differentiation: Scalar and vector point functions, Concepts of gradient, divergence and curl of functions in Cartesian framework, Solenoidal fields, irrotational fields.

B.Tech. I Year I Sem /II Sem**L T P C****Course Code: 24BS1PH01/ 24BS2PH01****3 0 0 3**

APPLIED PHYSICS
(Common to CSE/EEE/ECE/MEC/CSM/CSD)

Course Objectives:

The objectives of this course for the student are to:

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. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
4. Study the characteristics of lasers and optical fibres.
5. Study the fundamental concepts related to the dielectric, magnetic and nano materials.

Pre-requisite: Basic definitions and concepts of Intermediate Physics (10+2)

Module I QUANTUM PHYSICS (10hrs)

Quantum Mechanics: Introduction to quantum physics, Planck's radiation law - photoelectric effect – de-Broglie's 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.

Module II SEMICONDUCTORS AND DEVICES (8hrs)

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.

Module III: WAVE OPTICS & NANOTECHNOLOGY (10 hrs)

Interference: Coherence, division of amplitude and division of wave front, Newton's rings experiment.

Diffraction: Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit, diffraction grating, determination of wavelength of light using diffraction grating.

Nanotechnology: Nano scale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, top-down fabrication: ball milling, characterization: TEM.

Module IV: LASERS AND FIBRE OPTICS (8 hrs)

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations lasing action - pumping methods- ruby laser, He-Ne laser, semiconductor laser diode-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 - applications.

Module V: DIELECTRIC, MAGNETIC MATERIALS (10 hrs)

Dielectric Materials: Dielectric constant, polarization, polarization vector, susceptibility, - types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyro electric materials – applications.

Magnetic Materials: Origin of magnetic moment, -hysteresis - soft and hard magnetic materials - magnetostriction, magneto resistance – applications.

Energy Source: Conductivity of liquid and solid electrolytes- super-ionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries,

Text Books:

1. Applied Physics, Dr. M. N. Avadhanulu, Dr. TVS Arun Murthy, - S Chand and Company Ltd. Publications.
2. Engineering Physics, P. K. Palanisamy, SCITECH Publications, Enlarged & Revised 2014 Edition.

Reference Books:

1. Concepts of modern Physics by Arthur Beiser, McGraw-Hill Education, 7th edition, SIE
2. Semiconductor Optoelectronics: Physics and Technology, J. Singh, Mc Graw-Hill Inc., (1995).
3. Modern Engineering Physics by Dr.K.Vijaya Kumar, Dr. S.Chandralingam, S.CHAND & COMPANY LTD., Publishers.
4. Applied Physics by P.K.Mittal, I K International Publishers
5. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd, 7th Edition
6. Modern Physics R Murugesan , Kiruthiga Sivaprasath S.Chand publications
7. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012
8. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley & Sons, 11th Edition, 2018
9. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019
10. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019
11. Essentials of Nanoscience & Nanotechnology, Dr Narasimha Reddy Katta, 2021.

MOOC Courses:

1. “Semiconductor Optoelectronics” By Prof. M. R. Shenoy, Department of Physics, IIT Delhi NPTEL visit <http://nptel.iitm.ac.in>
2. “Laser: Fundamentals and Applications” By Prof. Manabendra Chandra, IIT Kanpur NPTEL visit https://onlinecourses.nptel.ac.in/noc20_cy17

Course Outcomes:

- CO1: Explain the concepts of Quantum Physics in describing particle at micro state.
- CO2: Understand the working mechanism and characteristics of semiconductor optoelectronic devices.

- CO3: Explore the characteristics of lasers & optical fibres and their applications in various sectors by using the concepts of wave optics.
- CO4: Apply the properties of dielectric, magnetic and Nano materials in diver's fields of applications.

CO-PO Mapping Chart												
(3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	Program Outcomes (POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3									2		1
CO2	3									2		1
CO3	3									2		1
CO4	3									2		1

B.Tech I Year–II Sem	L	T	P	C
Subject Code: 24ES2CD01	3	1	2	5

Basic Web Development*

Prerequisite:

Course Objectives:

- Be able to read and write HTML5 and CSS3.
- Know the importance of object-oriented aspects of Scripting and JavaScript for web page
- Understand of server-side script using PHP
- Learn Database programming with PHP and MySQL

Course Outcomes:

- Understand the fundamentals of the Internet and web design to create visually appealing and functional websites.
- Develop HTML and CSS to structure and style web pages effectively.
- Apply JavaScript to add interactivity to web pages and enhance user experience.
- Develop dynamic, server-side applications with PHP and connect them to a MySQL database for data management.

Module I

INTERNET FUNDAMENTALS:

What is Internet? Introduction to internet and its applications, World Wide Web (WWW) and its evolution, uniform resource locator (URL), browsers – internet explorer, Netscape navigator, opera, Firefox, chrome, Mozilla. search engine, web saver – apache, IIS, proxy server, HTTP protocol

WEB DESIGN:

Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation

Module II

BASICS OF HTML:

Structure of HTML page, HTML tags for data formatting, tables, links, images, meta tags, frames, html form tags, media, APIs, HTML5 tags and validation.

BASICS OF CSS:

Need for CSS, Syntax and structure, CSS rules for Backgrounds, Colors and properties, manipulating texts, Fonts, borders and boxes, Margins, Padding Lists, CSS Positioning. Animations, Tool-Tips, Style images, Variables, Media Queries, Wildcard Selectors (*, ^ and \$) in CSS

Programs:

1. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
2. Create a web page using two image files, which switch between one another as the mouse pointer moves over the images. Use the on Mouse Over and on Mouse Out event handlers.
3. Write a HTML Program to display list of fruits, vegetables and cereals using ordered list.

Module III**INTRODUCTION TO JAVA:**

Introduction to object-oriented Programming-Features of Java – Data types, variables and arrays – Operators – Control statements – Classes and Methods – Inheritance. Packages and Interfaces –Exception Handling

CLIENT-SIDE SCRIPTING USING JAVASCRIPT:

Client-Side Scripting using JavaScript Syntax of JavaScript, Execution of JavaScript, Internal, Embedded and External JavaScript, JavaScript: variables, arrays, functions, conditions, loops, Pop up boxes, JavaScript objects and DOM, JavaScript inbuilt functions, JavaScript validations

Programs:

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form.
2. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade
3. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay

Module- IV**INTRODUCTION TO PHP:**

Difference between Client side and Server-side scripting, Structure of PHP page, – Advantages of PHP – Installation & Configuration PHP Syntax: variables, decision and looping with examples.

SERVER-SIDE SCRIPTING – PHP:

PHP and HTML, Arrays and Functions, String, Form processing, File uploads, Dates and time zone, working with Regular Expressions, Exception Handling, Basic concepts of Session and State, State management using query string, hidden form controls, Cookies, Session variables

Programs:

1. Write a PHP program to print Armstrong Number
2. Write a XHTML code to provide a form that collects names and telephone numbers. The phone numbers must be in the format ddd-ddd-dddd. Write a PHP script that checks

the submitted telephone number to be sure that it confirms to the required format and then returns a response that indicates whether the number was correct.

3. Write an XHTML document to include an anchor tag, that calls a PHP document also write the called PHP document which returns a randomly chosen greeting from a list of five different greetings. The greetings must be stored as constant strings in the script. A random number between 0 and 4 can be computed with these line. #set the seed for mtrand with the number of microseconds #since the last full second of the clock `mt_srand((double) microtime() * 1000000); $number=mtrand(0,4); #computes a random integer 0-4` Write the PHP script for above to count the number of visitors and display that number for each visitor. Hint: Use a file to store

Module V

DATABASE PROGRAMMING WITH PHP AND MYSQL:

Basic MySQL commands, PHP functions for database connectivity, Implementation of CRUD operations using PHP, Prepared Statement and stored procedure execution in PHP

ADVANCED WEB PROGRAMMING CONCEPTS:

Asynchronous Web Programming, Difference between synchronous and asynchronous web programming, AJAX, and JQuery, Web service and API development using PHP

Programs:

1. Write a PHP program to print Palindrome Number or not
2. Create Database using PHP MySQLi
3. Write a PHP program to print fibonacci series.

TEXT BOOKS:

3. Programming the World Wide Web -Robert W.Sebesta (Pearson Education) (Second Edition).
4. Learning PHP, MySQL, JavaScript, CSS & HTML5, 3rd Edition, Robin Nixon, O'Reilly

REFERENCE BOOKS:

1. PHP: The Complete Reference By Steven Holzner, McGrawhill
2. Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program 5th Edition.
3. Web Technology, Moseley and Savaliya, Wiley India
4. PHP and MySQL Web Development - Welling – (Pearson Education)-Fourth Edition

WEB RESOURCES:

HTML:

- a. <https://developer.mozilla.org/en-US/docs/Web/HTML>
- b. <https://www.w3schools.com/html/>
- c. <https://www.tutorialspoint.com/html/index.htm>

CSS:

- a. <https://developer.mozilla.org/en-US/docs/Web/CSS>
- b. <https://www.manning.com/books/css-in-depth>

c. <https://www.w3schools.com/css/> d. <https://www.tutorialspoint.com/css/index.htm>

Java Script:

a. <https://javascript.info/>

b. <https://github.com/getify/You-Dont-Know-JS>

c. <https://www.w3schools.com/js/> d.

<https://www.tutorialspoint.com/javascript/index.htm>

PHP:

a. <https://www.w3schools.com/php/>

b. <https://www.tutorialspoint.com/php/index.htm>

CO-PO/PSO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 - Low															
Course Outcomes (COs)	Program Outcomes (POs)												Program Specific Outcomes*		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1	2										2		
CO2	3	1	2										1		
CO3					2								1		
CO4					2								1		

B. Tech I Year – II Sem	L	T	P	C
Subject Code:24ES2CD02	3	0	0	3

Fundamentals of Digital Hardware Design

Prerequisite: Basic knowledge on computers

Course Objectives:

This course provides in-depth knowledge of Digital logic techniques of digital circuits, which is the basis for design of any digital circuit.

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To impart the concepts of combinational, sequential logic circuits.
3. To learn the concepts of sequential circuits for designing counters

Course Outcomes: Upon completion of the course, the student should be able to

1. Describe numerical information in different forms and Boolean Algebra theorems
2. Apply Boolean Theorems-maps to solve Boolean Expressions
3. Analyse the combinational and sequential circuits
4. Design synchronous and Asynchronous counters

Module I: Number Systems & Boolean Algebra:

Number Systems: Number base conversions: Binary, Octal, Decimal, Hexa-decimal, Complements of Numbers, Codes- Weighted and Non-weighted codes and its Properties,

Boolean algebra: Basic Theorems and Properties, Switching Functions- Canonical and Standard Form, Algebraic Simplification, Digital Logic Gates, EX-OR gates, Universal Gates. The Karnaugh Map Method, don't care map entries

Module II: Combinational Logic Circuits:

Basic Arithmetic Circuits- Half adder, Full adder, Half subtractor, Full subtractor, 4-bit parallel adder/subtractor.

Combinational logic circuits: 2-bit comparator, Multiplexers, Implementation of Boolean functions using Multiplexers, Decoders, Implementation of Boolean functions using Decoder, Demultiplexers, Encoder, Priority Encoder

Module III: Sequential Circuits Fundamentals:

Introduction to Sequential Circuits: Basic Architectural Distinctions between Combinational and Sequential circuits, SR Latch, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops,

Flip flop Conversions: Excitation Table of all Flip Flops, Timing and Triggering Consideration, Conversion from one type of Flip-Flop to another.

Module IV: Sequential Logic Applications:

Sequential Logic Applications: Registers and Counters: Shift Registers – Left, Right and Bidirectional Shift Registers, Universal shift register, Applications of Shift Registers

Module V:

Design of Counters: Design and Operation of Ring and Twisted Ring Counter, Operation of Asynchronous and Synchronous Counters.

B.Tech. I Year I Sem/II Sem**L T P C****Course Code: 24BS1PH02/ 24BS2PH02****0 0 2 1**

APPLIED PHYSICS LAB
(Common to CSE/EEE/ECE/MEC/CSM/CSD)

Pre-requisite: Concepts of Applied Physics Theory and knowledge of intermediate (10+2) physics

Course Objectives: The objectives of this course for the student to

1. Capable of handling instruments related to the Hall Effect and photoelectric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behaviour of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting

List of Experiment (Perform any 8 of the following experiment)

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. V-I characteristics of a p-n junction diode and Zener diode
4. Input and output characteristics of BJT (CE configurations)
5. Diffraction Grating:
 - a) To determine the wavelength of given laser and grating parameters
 - b) To determine the wavelength of a given light source using grating (spectrometer)
6. Newton's Rings Experiment:
 - a) To determine the radius of curvature of given Plano convex lens
7. Optical fiber:
 - a) To determine Numerical aperture and Acceptance angle of a given optical fiber cable.
8. Energy band gap of Semiconductor:
 - a) To determine Energy band gap of a semiconductor diode
9. Optoelectronics Devices:
 - a) Light Emitting Diode: To study the V-I characteristics of LED
 - b) Solar Cell: To study the V-I characteristics of Solar cell
10. Study B-H curve of a magnetic material.
11. Determination of dielectric constant of a given material
12. Characteristics of series and parallel LCR circuits.
13. Determination of the resistivity of semiconductor by two probe method.

Text Books:

B. Tech I Year–II Sem	L	T	P	C
Subject Code:24BS1EG01	2	0	0	2

English for Skill Enhancement

PREREQUISITE(S):

1. Basic knowledge of English language
2. Structure of Sentences/ Sentence formation
3. Basic Grammar rules (LSRW Skills)
4. Basic Communication Skills

COURSE OBJECTIVES:

1. To improve the language proficiency of students in English with an emphasis on vocabulary, Grammar, Reading and Writing skills.
2. To comprehend the given texts and respond appropriately
- 3.
4. To integrate their ideas with those of others using summary, paraphrasing, analysis, and synthesis of relevant sources.
- 5.
6. To develop learning skills and communication skills in formal and informal situations.
- 7.
8. The students will analyses work(s) of literature in one or more interpretive contexts or frameworks

UNIT – I

Chapter entitled ‘**Toasted English**’ by R.K. Narayan from “**English: Language, Context and Culture**” published by Orient BlackSwan, Hyderabad.

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. Types of Conjunction and their usages

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

Vocabulary: Words Often Misspelled - 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 Study the use of Graphic elements in texts.

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 , One word Substitute

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, Summarizing -identifying main idea

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 Business Vocabulary their Usage

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

Reading: Reading Comprehension and-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

Note: Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.

- Note: 1.** As the syllabus of English given in AICTE Model Curriculum-2018 for B. Tech First Year is Open-ended, besides following the prescribed textbook, it is required to prepare teaching/learning materials by the teachers

collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.

5. **Note: 2.** Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents. They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:

- *English for Engineers*. Sudarshana, N.P. and Savitha, C. Cambridge University Press. 2018.
- “English: Language, Context and Culture” by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.
- https://www.cambridgeone.org/class/learner/user_clms_8241785/bundle/ic1
- <https://www.cambridge.org/bs/cambridgeenglish/catalog/adult-courses/interchange-5th-edition/components>

REFERENCE BOOK

1. *Practical English Usage*, Swan, M. Oxford University Press. 2016
2. *Effective Academic Writing* by Liss and Davis (OUP)
3. *Communication Skills*. Kumar, S and Lata, P. Oxford University Press. 2018
4. Richards, Jack C. (2022) *Interchange Series*. Introduction, 1,2,3. Cambridge University Press
5. *Remedial English Grammar*. Wood, F.T. Macmillan. 2007
6. Wood, F.T. (2007). *Remedial English Grammar*. Macmillan.
7. *On Writing Well* Zinsser, William. Harper Resource Book. 2001
8. Chaudhuri, Santanu Sinha. (2018). *Learn English: A Fun Book of Functional Language, Grammar and Vocabulary*. (2nd ed.,). Sage Publications India Pvt. Ltd.
9. *Study Writing*. Hamp-Lyons, L. Cambridge University Press. 2006
10. *Technical Communication*. Wiley India Pvt. Ltd. (2019).
11. Vishwa Mohan, Aysha . (2013). *English for Technical Communication for Engineering Students*. Mc Graw-Hill Education India Pvt. Ltd.
12. Swan, Michael. (2016). *Practical English Usage*. Oxford University Press. Fourth Edition

E-books:

1. [High School English Grammar \(issuhub.com\)](http://issuhub.com)
2. <https://www.fluentu.com/blog/english/free-english-ebooks/>

Eloquent MOOC Courses:

1. <http://nptel.ac.in/courses/109106067/>
2. <http://nptel.ac.in/courses/109104031/>
3. <http://www.englishpage.com/listening/>
4. https://onlinecourses.swayam2.ac.in/aic21_ge24/preview

5. https://onlinecourses.swayam2.ac.in/nos22_sc61/preview

Course Outcomes:

After undergoing this course, students will be able to:

CO 1: Understand explicit and implicit meaning of a text through known and unknown passages.

CO 2: Demonstrate Language skills in both formal and informal communication.

CO 3: Construct sentences using logical flow of thought and organize ideas.

CO 4: Select appropriate words, phrases & grammatical units and apply them in both spoken & written communications.

CO-PO Mapping Chart (3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	Program Outcomes (POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1									2	2		
CO2									2	2		
CO3									2	2		
CO4									3	3		

B.Tech I Year–I/II Sem	L	T	P	C
Subject Code: 24HS1EG02/24HS2EG02	0	0	2	1

English for Skill Enhancement Laboratory

Course Objectives:

1. To facilitate computer-assisted multimedia instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students speaking in English and neutralize their mother tongue interference.
5. To train students use language appropriately speaking in various activities like role plays, group discussions, interviews and presentation skills etc.

Note: All the following exercises have to be followed.

Exercise I

CALL Lab- Introduction to Speech Sounds

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- Ice-Breaking activity and JAM session

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, Discussion on eating habits

Exercise II

CALL Lab- *Understand:* **Structure of Syllables** – Word Stress– Weak Forms and Strong Forms – Sentence Stress – Intonation. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Sentence Stress – 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- Word Stress & Formation

Understand: Errors in Pronunciation-the Interference of Mother Tongue (MTI). *Practice:* Common Indian Variants in Pronunciation – Differences between British and American Pronunciation, Testing Exercises- Listening for General/ Specific Details. *Practice:* Listening Comprehension Tests. Testing Exercises

ICS Lab- Descriptions and Giving Directions

Understand: Descriptions- Narrations- Giving Directions and Guidelines. Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise IV**CALL Lab - Interpersonal Communication Skills & Building Vocabulary**

Starting a conversation – responding appropriately and relevantly – using the right body language – Discourse Skills- using Visuals-Graphical organization - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word

ICS Lab- Oral Presentation Skills

Understand: Structured Talks - Non-verbal Communication- Presentation Skills-Individual and Group,

Practice: Making a Short Speech – Extempore- Making a Presentation- Individual and Group

Exercise V**CALL Lab-****ICS Lab -Introduction to Group Discussion and Interview Skills**

Understand: Group Discussion- Interview Skills. Practice: Group Discussion- Mock Interviews through Tele-conference & video-conference. Etiquette

Lab Manuals

1. ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities” by Board of Editors: Hyderabad: Orient Black Swan Pvt. Ltd. 2016. Print.
2. Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. “EMBARK- English for undergraduates” Delhi: Cambridge University Press. 2016. Print.

Suggested Software

- 1) Cambridge Advanced Learners’ English Dictionary with CD.
- 2) Grammar Made Easy by Darling Kindersley.
- 3) Punctuation Made Easy by Darling Kindersley.
- 4) Oxford Advanced Learner’s Compass, 10th Edition.
- 5) English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- 6) English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- 7) TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS).

Reference Books:

1. *Effective Communication Skills: Tips on How to Improve Your Social Skills and Interact with Others Effectively* by Robert Cunningham, Independently Published, 2018
2. *Professional Communication* by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. *English for Technical Communication for Engineering Students*, Ayesha Vishwamohan, Tata Mc Graw-Hill 2009.

4. *English Vocabulary in Use series*, Cambridge University Press 2008.

Course Outcomes:

1. CO1: Acquire vocabulary and use it contextually
2. CO2: Apply listening and speaking skills effectively
3. CO3: Develop proficiency in academic reading and writing
4. CO4: Build up the possibilities of job prospects

CO-PO Mapping Chart												
(3/2/1 indicates strength of correlation) 3 – High; 2 – Medium; 1 – Low												
Course Outcomes (COs)	Program Outcomes (POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1									2	3		
CO2									3	2		
CO3									2	2		
CO4									2	2		

B.Tech I Year–II Sem	L	T	P	C
Subject Code: 24ES2CD03	0	0	2	1

DIGITAL HARDWARE DESIGN LAB

Course Objectives:

1. To understand the use of logic gates and to design basic gates using universal gates
2. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems
3. To understand the concepts and design techniques of combinational logic circuits
4. To understand the concepts and design techniques of sequential logic circuits

1: Realization of Boolean Expressions using Gates

2: Design and realization logic gates using universal gates

3: Generation of clock using NAND / NOR gates

4: Design a 4 – bit Adder /Subtractor

5: Design and realization of a 4 – bit gray to Binary and Binary to Gray Converter

6: Design and realization of 8x1 MUX using 2x1MUX

7: Design and realization of 2-bit comparator

8: Design and realization of an 8-bit parallel load and serial out shift register using flip-flops

9: Design and realization of a Synchronous counter using flip-flops

10: Design and realization of Asynchronous counters using flip-flops

Course Outcomes: Upon completing this course, the students will be able to

1. To understand the concepts and design techniques of sequential logic circuits
2. Understand how to generate different logic gates using Universal gates
3. Analyze and design combinational circuit like Adder/Subtractor, Comparators, MUX etc.
4. Design and develop sequential circuits like Shift Registers and Counters

