R 25 Regulations
Course Structure
Electronics and Communication Engineering
Academic Year: 2025-26

I-Year, Semester-I

S.No	Course Code	Course Title	L	T	P	Credits
1		Matrices and Calculus	3	1	0	4
2		Advanced Engineering Physics	3	0	0	3
3		Programming for Problem Solving	3	0	0	3
4		Introduction to Electrical Engineering	2	0	0	2
5		Engineering Drawing and Computer Aided Drafting	2	0	2	3
6		English for Skill Enhancement	3	0	0	3
7		Advanced Engineering Physics Lab	0	0	2	1
8		Programming for Problem Solving Lab	0	0	2	1
9		English Language and Communication Skills Lab	0	0	2	1
10		Induction Programme				
		Total Credits	**16**	**1**	**8**	**21**

I-Year, Semester-II

S.No	Course Code	Course Title	L	T	P	Credits
1		Ordinary Differential Equations and Vector Calculus	3	1	0	4
2		Engineering Chemistry	3	0	0	3
3		Python Programming	3	0	0	3
4		Data Structures	3	0	0	3
5		Network Analysis and Synthesis	3	0	0	3
6		Python Programming Lab	0	0	2	1
7		Engineering Chemistry Lab	0	0	2	1
8		Data Structures Lab	0	0	2	1
9		Electrical Engineering Lab	0	0	2	1
10		Engineering Workshop	0	0	2	1
		Total Credits	**15**	**1**	**10**	**21**

B.Tech, ECE

MA101BS: MATRICES AND CALCULUS

I B.Tech – I Sem

L	T	P	C
3	1	0	4

Pre-requisite: Mathematical Knowledge at pre-university level

Course Objectives: To learn

1. Applying basic operations on matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form
4. Geometrical approach to the mean value theorems and their application to the mathematical problems.
5. Finding maxima and minima of functions of two and three variables.
6. Evaluation of multiple integrals and their applications.

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

1. Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
2. Find the Eigen values and Eigenvectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Solve the applications of the mean value theorems.
5. Find the extreme values of functions of two variables with/without constraints.
6. Evaluate the multiple integrals and apply the concept to find areas and volumes.

UNIT – I: Matrices

Rank of a matrix by Echelon form and Normal form,Inverse of Non-singular matrices by Gauss- Jordan method. System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations. Gauss Jacobi iteration method, Gauss Seidel Iteration Method.

UNIT – II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values, Eigen vectors and their properties,Diagonalization of a matrix,CayleyHamilton Theorem (withoutproof) Finding inverse and power of a matrix by Cayley-Hamilton Theorem. Quadratic forms and Nature of the Quadratic FormsReduction of Quadratic form to canonical form by Orthogonal Transformation.

UNIT – III: Single Variable Calculus

Limit and Continuous of functions and its properties. Mean value theorems: Rolle's theorem,Lagrange's Mean value theorem with their Geometrical Interpretation and applicationsCauchy'sMean value Theorem,Taylor's Series (Allthetheoremswithoutproof).Maclaurin's

series.

UNIT – IV: Multivariable Calculus (Partial Differentiation and applications)

Definitions of Limit and continuity, Partial Differentiation: Euler's Theorem, Total derivative, Jacobian–Functional dependence & independence, Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT – V: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian and polar coordinates), Change of order of integration (only Cartesian form), Change of variables for double integrals (Cartesian to polar).
Evaluation of Triple Integrals.
Applications: Areas by double integrals and volumes by triple integrals.

TEXT BOOKS:

1) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36thEdition,2010.
2) R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5thEditon, 2016.

REFERENCE BOOKS:

1) Erwin Kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley&Sons, 2006.
2) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.
3) N.P.Bali and Manish Goyal,A textbook of Engineering Mathematics,Laxmi Publications, Reprint, 2008.
4) H. K. Dass and Er. RajnishVerma, Higher Engineering Mathematics, S Chand and Company Limited.

Useful Links

B.Tech, ECE

PH102BS: ADVANCED ENGINEERING PHYSICS

I B.Tech – I Sem

L	T	P	C
3	0	0	3

Pre-requisite: 10+2 Physics

Course Objectives:

1. To study crystal structures, defects, and material characterization techniques like XRD and SEM.
2. To understand fundamental concepts of quantum mechanics and their applications in solids and nano-materials.
3. To introduce quantum computing principles, quantum gates, and basic quantum algorithms.
4. To learn the properties and applications of magnetic and dielectric materials.
5. To explore the working and applications of lasers and fiber optics in modern technology.

Course Outcomes:

CO1: Analyze crystal structures, identify defects, and apply XRD and SEM techniques for material Characterization.

CO2: Apply quantum mechanical principles to explain particle behavior and energy band formation in solids.

CO3: Understand quantum computing concepts, use quantum gates and Explain basic quantum algorithms CO4: Classify magnetic and dielectric materials and explain their properties, synthesis, and applications.

CO4: Explain the principles of lasers and fibre optics and their applications in communication and sensing.

UNIT – I: Crystallography & Material Characterization

Introduction: Unit cell, space lattice, basis, lattice parameters; crystal structures, Bravais lattices, packing factor: SC, BCC, FCC; Miller indices, inter-planar distance; defects in crystals (Qualitative): point defects, line defects, surface defects and volume defects. Concept of nanomaterials –Surface to volume ratio , X -ray diffraction: Bragg's law, powder method, calculation of average crystallite size using Debye-Scherer's formula, scanning electron microscopy (SEM): block diagram, working principle

UNIT - II: Quantum Mechanics

Introduction, de-Broglie hypothesis, Heisenberg uncertainty principle, physical significance of wave function, postulates of quantum mechanics: operators in quantum mechanics, Eigen values and Eigen functions, expectation value; Schrödinger's time independent wave equation, particle in a 1D box, Bloch's theorem (qualitative), Kronig-Penney model (qualitative): E-k diagram, effective mass of electron, formation of energy bands, origin of band gap, classification of solids, Concept of discrete energy levels and quantum confinement in nano materials.

UNIT - III: Quantum Computing

Introduction, linear algebra for quantum computation, Dirac's Bra and Ket notation and their properties, Hilbert space, Bloch's sphere, concept of quantum computer, classical bits, Qubits,

multiple Qubit system, quantum computing system for information processing, development of of quantum systems, quantum measurements, entanglement, quantum gates, challenges and advantages of quantum computing over classical computation, quantum algorithms: Shor, Grover.

UNIT - IV: Magnetic and Dielectric Materials

Introduction to magnetic materials, origin of magnetic moment-classification of magnetic materials, hysteresis, Weiss domain theory of ferromagnetism, soft and hard magnetic materials, synthesis of ferrimagnetic materials using Sol-gel method, Applications: magnetic hyperthermia for cancer treatment, magnets for EV, Giant Magneto Resistance (GMR) device.
Introduction to dielectric materials, types of polarization (qualitative): electronic, ionic & orientation; ferroelectric, piezoelectric, pyroelectric materials and their applications: Ferroelectric Random-Access Memory (Fe-RAM).

UNIT - V: Laser and Fibre Optics

Introduction to laser, characteristics of laser, Einstein coefficients and their relations, meta stable state, population inversion, pumping, lasing action, Ruby laser, He-Ne laser, CO2 laser, semiconductor diode laser, applications: Bar code scanner, LIDAR for automatic vehicle.

Introduction to fibre optics, total internal reflection, construction of optical fibre, acceptance angle, numerical aperture, classification of optical fibres, losses in optical fibre, applications: optical fibre for communication system, sensor for structural health monitoring.

TEXT BOOKS:

1. Walter Borchardt-Ott, *Crystallography: An Introduction*, Springer
2. Charles Kittel, *Introduction to Solid State Physics*, John Wiley & Sons, Inc
3. Thomas G. Wong, *Introduction to Classical and Quantum Computing*, Rooted Grove

REFERENCE BOOKS:

1. Jozef Gruska, *Quantum Computing*, McGraw Hill
2. Michael A. Nielsen & Isaac L. Chuang, *Quantum Computation and Quantum Information*, Cambridge University Press.
3. John M. Senior, *Optical Fiber Communications Principles and Practice*, Pearson Education Limited

Useful Links :

- https://shijuinpallotti.wordpress.com/wp-content/uploads/2019/07/optical-fiber-communications-principles-and-pr.pdf
- https://www.geokniga.org/bookfiles/geokniga-crystallography_0.pdf
- https://dpbck.ac.in/wp-content/uploads/2022/10/Introduction-to-Solid-State-PhysicsCharles-Kittel.pdf
- https://www.thomaswong.net/introduction-to-classical-and-quantum-computing-1e4p.pdf
- https://www.fi.muni.cz/usr/gruska/qbook1.pdf
- https://profmcruz.wordpress.com/wp-content/uploads/2017/08/quantum-computation-and-quantum-information-nielsen-chuang.pdf

B.Tech, ECE

PROGRAMMING FOR PROBLEM SOLVING

I B.Tech – I Sem

L	T	P	C
3	0	0	3

Pre-requisite: 10+2 Maths

Course Objectives: The course aims to

1. Understand problem-solving methodologies using algorithms and flowcharts.
2. Learn fundamentals of C programming language constructs.
3. Implement control structures, functions, and modular programming techniques.
4. Use arrays, strings, structures, pointers, and file handling to solve computational problems.
5. Use pre-processor directives and user-defined data types to enhance code modularity and maintainability

Course Outcomes: By the end of the course, students will be able to:

1. Design algorithms and flowcharts to solve problems and Write C programs using appropriate data types, operators, and expressions.
2. Use control flow constructs such as conditional and loop statements to implement logic.
3. Manipulate arrays, strings, and structures to solve real-world problems.
4. Apply modular programming using functions and recursion effectively.
5. Demonstrate effective use of pointers and dynamic memory allocation.
6. Perform file operations and use pre processor directives in C programs.

UNIT – I: Introduction to C Programming

Problem Solving: Algorithms, Flowcharts, Pseudo code with examples

Structure of a C Program, Compilation and Execution Process, Variables, Constants, Data Types. Operators: Arithmetic, Relational, Logical, Assignment, Bitwise, Unary, Conditional Type Conversion ,Expressions and precedence and Expression Evaluation, Input and Output: formatted/unformatted I/O

UNIT – II: Control Structures and Arrays

Conditional Branching: if, if-else, nested if-else, if else if ladder, switch-case, Iteration: for, while, do-while ,Jump Statements: break, continue, goto

Arrays: Declaration, Initialization and Access, One Dimensional Arrays and Two Dimensional Arrays ,Applications in Problem Solving

UNIT – III: Strings and Functions

String Handling: Declaration, Initialization, Standard Functions: strlen, strcat, strcpy, strcmp, Manual string manipulation (without string.h)

Functions: Declaration, Definition, Calling, Types /Categories of user defined functions,

Parameter Passing: Call by Value Recursion: The Nature of Recursion, Tracing a Recursive Function,

Recursive Mathematical Functions, Scope and Storage Classes (auto, extern, static, register)

UNIT – IV: Structures, Pointers and Dynamic Memory

Structures and Unions: Declaration, Initialization, Nested Structures, Array of Structures, Passing Structures to Functions, Union

Pointers: Declaration, Initialization, Pointer Arithmetic, Pointers with Arrays, Functions: Call by Reference, Passing Arrays to Functions ,Pointers with Structures

Dynamic Memory Allocation: malloc, calloc, realloc, free ,Self-referential Structure

UNIT – V: File Handling and Preprocessor Directives

Text and Binary Files, File Operations: Opening, reading, writing, closing, File handling functions: fopen, fclose, fread, fwrite, fprintf, fscanf File Positioning: fseek, ftell, rewind, Preprocessor Directives: #define, #include, #ifdef, #ifndef, Command Line Arguments, User-Defined Data Types: enum, typedef

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B. Koffman, Problem solving and Program Design in C 7th Edition, Pearson.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill.
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB.
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

Useful Links

- https://onlinecourses.swayam2.ac.in/imb25_mg71/preview
- https://onlinecourses.nptel.ac.in/noc24_cs02/preview
- https://www.geeksforgeeks.org/c-programming-language/
- https://www.tutorialspoint.com/cprogramming/index.htm

B.Tech, ECE

INTRODUCTION TO ELECTRICAL ENGINEERING

I B.Tech – I Sem	L	T	P	C
	2	0	0	2

Pre-requisite: Mathematics

Course Objectives:

1. To understand DC and Single & Three phase AC circuits
2. To study and understand the different types of DC, AC machines and Transformers
3. To import the knowledge of various electrical installations and the concept of power, power factor and its improvement.

Course Outcomes:

1. Understand and analyze basic Electrical circuits
2. Study the working principles of Electrical Machines and Transformers
3. Introduce components of Low Voltage Electrical Installations

UNIT – I: D.C. Circuits

Introduction to R, L and C elements, Independent voltage and current sources, KVL & KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits

UNIT – II: A.C. Circuits

Introduction to sinusoidal waveforms, phasor representation, the concept of power and power factor, Analysis of 1-phase RLC series and parallel circuits, resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections

UNIT – III: Transformers

Principle of operation, equivalent circuit, losses, regulation and efficiency. Introduction to Auto-transformer.

UNIT – IV: Electrical Machines

Principle of operation of DC machine, performance characteristics of dc shunt machine. Principle of operation of a 3-phase induction motor, torque-slip characteristics. Principle of operation of synchronous

generator.

UNIT – V: Electrical Installations

Components of LT Switchgear: SFU, MCB, ELCB, Types of Wires and Cables, Earthing. Types of Batteries, and Characteristics. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

B.Tech, ECE

ENGINEERING DRAWING AND COMPUTER AIDED DRAFTING

I B.Tech – I Sem

L	T	P	C
2	0	2	3

Course Objectives:

1. To introduce the fundamentals of engineering drawing and projection systems.
2. To develop skills in constructing orthographic, isometric, and sectional views.
3. To train students in interpreting and creating technical drawings using CAD tools.
4. To familiarize students with dimensioning standards and drafting conventions.
5. To bridge manual drafting techniques with computer-aided drafting practices.

Course Outcomes: At the end of the course, the student will be able to:

1. Understand and apply the principles of orthographic and isometric projections.
2. Create sectional views and dimensioned drawings using BIS standards.
3. Use CAD software to generate 2D engineering drawings.
4. Visualize and construct solid models from 2D views.
5. Interpret and produce engineering drawings of mechanical components and assemblies.
6. Demonstrate drafting skills for practical and industrial applications.

UNIT – I: Introduction to Engineering Graphics (Conventional)

Principles of Engineering Graphics and their Significance, Geometrical Constructions, Scales, Plain and Diagonal, Conic Sections including the Rectangular Hyperbola, General method only. Cycloid, Epicycloid and Hypocycloid.

UNIT - II: Orthographic Projections (Conventional and Computer Aided)

Principles of Orthographic Projections, Conventions, Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections, points, lines and planes. Introduction to Computer aided drafting, views, commands and conics.

UNIT – III: Projections of Regular Solids (Conventional and Computer Aided)

Auxiliary Views, Sections or Sectional views of Right Regular Solids, Prism, Cylinder, Pyramid, Cone, Auxiliary views, Computer aided projections of solids, sectional views

UNIT – IV: Development of Surfaces (Conventional)

Prism, Cylinder, Pyramid and Cone.

UNIT – V: Isometric Projections (Conventional and Computer Aided)

Principles of Isometric Projection, Isometric Scale, Isometric Views, Conventions, Isometric Views of Lines, Plane Figures, Simple and Compound Solids, Isometric Projection of objects having non, isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice- versa, Conventions. Conversion of orthographic projection into isometric view.

Note:

1. The End Semester Examination will be in conventional mode.
2. CIE – I will be in conventional mode.
3. CIE – II will be using Computer.

TEXT BOOKS:

1. Engineering Drawing, N. D. Bhatt, Charotar, 54th Edition, 2023.
2. Engineering Drawing and graphics Using AutoCAD, T. Jeyapoovan and Vikas, S. Chand and company Ltd., 3rdEdition,2010.

REFERENCE BOOKS:

1. Engineering Drawing, Basant Agrawal and C.M. Agrawal, McGraw Hill, 3rd Edition, 2019.
2. Engineering Graphics and Design, WILEY, John Wiley and Sons Inc, 3rdEdition, 2020.
3. Engineering Drawing, M. B. Shah and B.C. Rane, Pearson, 2nd Edition, 2009.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford, 1st Edition, 2015.
5. Computer Aided Engineering Drawing, K. Balaveera Reddy, CBS Publishers, 2nd Edition, 2015.

B.Tech, ECE

English for Skill Enhancement

I B.Tech – I Sem	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course Objectives:

a. Improve their vocabulary
b. Use appropriate sentence structures in their oral and written communication.
c. Develop their reading and study skills.
d. Equip students to write paragraphs, essays, precis and draft letters
e. Acquire skills for Technical report writing.

Course Outcomes: Students will be able to:

a. Choose appropriate vocabulary in their oral and written communication.
b. Demonstrate their understanding of the rules of functional grammar and sentence structures.
c. Develop comprehension skills from known and unknown passages
d. Write paragraphs, essays, precis and draft letters
e. Write abstracts and reports in various contexts

UNIT – I
Theme: Perspectives
Lesson on 'The Generation Gap' by Benjamin M. Spock from the prescribed textbook titled English for the Young in the Digital World published by Orient Black Swan Pvt. Ltd.
Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Words Often Misspelt - Synonyms and Antonyms
Grammar: Identifying Common Errors in Writing with Reference to Parts of Speech particularly Articles and Prepositions – Degrees of Comparison
Reading: Reading and Its Importance- Sub Skills of Reading – Skimming and Scanning
Writing: Sentence Structures and Types -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing Precisely –Nature and Style of Formal Writing.

UNIT – II:
Theme: Digital Transformation
Lesson on 'Emerging Technologies' from the prescribed textbook titled English for the Young in the Digital World published by Orient Black Swan Pvt. Ltd.
Vocabulary: Homophones, Homonyms and Homographs
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Reading Strategies-Guessing Meaning from Context – Identifying Main Ideas – Exercises for Practice
Writing: Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence – Linkers and Connectives - Organizing Principles in a Paragraph – Defining- Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence - Essay Writing - Writing Introduction and Conclusion.

UNIT – III:
Theme: Attitude and Gratitude
Poems on 'Leisure' by William Henry Davies and 'Be Thankful' - Unknown Author from the prescribed textbook titled English for the Young in the Digital World published by Orient Black Swan Pvt. Ltd.
Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English
Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers andTenses
Reading: Sub-Skills of Reading – Identifying Topic Sentence and Providing Supporting Ideas - Exercises for Practice
Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with CV/Resume –Difference between Writing a Letter and an Email - Email Etiquette

UNIT – IV:
Theme: Entrepreneurship
Lesson on 'Why a Start-Up Needs to Find its Customers First' by Pranav Jain from the prescribed textbook titled English for the Young in the Digital World published by Orient Black Swan Pvt. Ltd.
Vocabulary: Standard Abbreviations in English – Inferring Meanings of Words through Context – Phrasal Verbs – Idioms.
Grammar: Redundancies and Clichés in Written Communication – Converting Passive to Active Voice and Vice-Versa.
Reading: Prompt Engineering Techniques– Comprehending and Generating Appropriate Prompts - Exercises for Practice
Writing: Writing Practices- Note Making-Précis Writing.

UNIT – V:
Theme: Integrity and Professionalism
Lesson on 'Professional Ethics' from the prescribed textbook titled English for the Young in the Digital World published by Orient Black Swan Pvt. Ltd.
Vocabulary: Technical Vocabulary and their Usage– One Word Substitutes – Collocations.
Grammar: Direct and Indirect Speech - Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)
Reading: Survey, Question, Read, Recite and Review (SQ3R Method) – Inferring the Meaning and Evaluating a Text- Exercises for Practice
Writing: Report Writing - Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Technical Report.

TEXT BOOKS:
3. Board of Editors. 2025,*English for the Young in the Digital World,* Orient Black Swan Pvt. Ltd.

REFERENCE BOOKS:
8. Swan, Michael. (2016),*Practical English Usage,* Oxford University Press. New Edition.
9. Karal, Rajeevan. 2023,*English Grammar Just for You,* Oxford University Press. New Delhi

10. 2024,*Empowering with Language: Communicative English for Undergraduates,* Cengage Learning India Pvt. Ltd. New Delhi
11. Sanjay Kumar & Pushp Lata. 2022,*Communication Skills – A Workbook,* Oxford University Press. New Delhi
12. Wood,F.T. (2007),*Remedial English Grammar*, Macmillan
13. Vishwamohan, Aysha. (2013),*English for Technical Communication for Engineering Students,* Mc Graw-Hill Education India Pvt. Ltd.

Useful Links

- https://hostnezt.com/cssfiles/english/Practical%20English%20Usage%20by%20Michael%20Swan.pdf
- https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/6/__UG_B.A._English_112%2064_Remedial%20English%20Grammar_4066.pdf
- https://aissmschmct.in/wp-content/uploads/2020/07/BOOK-BSc-HS-Sem-III-HS308-Communication-Skills-1.pdf
- https://ebooks.lpude.in/new-scheme/arts/ma_english/sem_1/DEENG539_ACADEMIC_ENGLISH.pdf

B.Tech, ECE

ADVANCED ENGINEERING PHYSICS LAB

I B.Tech – I Sem

L	T	P	C
3	0	0	3

Pre-requisite: 10+2 Physics

Course Objectives:

1. To provide practical exposure to advanced concepts in solid-state and modern physics
2. To synthesize and study the physical properties of materials like semiconductors, ferromagnetic, and ferroelectric substances
3. To perform semiconductor characterization using Hall effect and band gap experiments
4. To explore the working principles of lasers and optical fibers through hands-on experiments
5. To develop skills in data analysis, interpretation, and scientific reporting

Course Outcomes:

CO1: Synthesize and analyze nanomaterials such as magnetite (Fe_3O_4) using chemical methods.
CO2: Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials.
CO3: Characterize semiconductors using Hall effect and energy gap measurement techniques.
CO4: Demonstrate working knowledge of laser systems and optical fiber parameters through experimental study.
CO5: Apply scientific methods for accurate data collection, analysis, and technical report writing.

List of Experiments :

1. Synthesis of magnetite (Fe_3O_4) powder using sol-gel method.
2. Determination of energy gap of a semiconductor.
3. Determination of Hall coefficient and carrier concentration of a given semiconductor.
4. Determination of magnetic moment of a bar magnet and horizontal earth magnetic field.
5. Study of B-H curve of a ferro magnetic material.
6. Study of P-E loop of a given ferroelectric crystal.
7. Determination of dielectric constant of a given material
8. Determination of Curie's temperature of a given ferroelectric material.
9. A. Determination of wavelength of a laser using diffraction grating.
   B. Study of V-I & L-I characteristics of a given laser diode.
10. A. Determination of numerical aperture of a given optical fibre.
    B. Determination of bending losses of a given optical fibre.

B.Tech, ECE

PROGRAMMING FOR PROBLEM SOLVING LAB

I B.Tech – I Sem

L	T	P	C
0	0	2	1

Pre-requisite: 10+2 Maths

Course Objectives: The course aims to

1. Develop proficiency in C programming by understanding syntax, semantics, and program structure.
2. Enhance problem-solving abilities using control structures, arrays, strings, functions, recursion, pointers, and structures.
3. Apply modular programming concepts to implement efficient and reusable code.
4. Utilize dynamic memory allocation, file handling, and command-line arguments for real-world programming scenarios.
5. Strengthen analytical thinking through implementation of numerical, pattern generation, and data processing problems.

Course Outcomes: By the end of the course, students will be able to:

1. Write and execute C programs using fundamental programming constructs such as input/output, operators, and control structures.
2. Implement problem solutions involving arrays, strings, and matrices for data processing applications.
3. Apply functions (including recursion) for modular and structured program development.
4. Use pointers and structures effectively for efficient data manipulation and storage.
5. Implement file operations and command-line arguments to handle persistent data storage and program flexibility.
6. Analyze, design, and test C programs for numerical, logical, and pattern-based problems with proper documentation and coding style.

Practice session:

1) Demonstration Programs on printf( ),scanf( )
2) Write a simple C program that prints the results of all the operators available in C. Read required operand values from standard input

Programs on numbers using control structures

1) Write a C program for find the max and min from the three numbers.
2) Write a C program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >=

   70% = Distinction. Read percentage from standard input.

3) Write a C program, which takes two integer operands and one operator from the user,

performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement).

4) Write a program that finds if a given number is a prime number.
5) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
6) Write a C program that finds if a given number is a Armstrong number or not
7) Write a C program that finds if a given number is strong number or not
8) Write a C program that finds if a given number is a Automorphic number or not
9) Write a C program to generate all the prime numbers between 1 and n.

Programs on Pyramid of stars and numbers

Write a C program to construct as follows:

1)
```
   *
  ***
 *****
*******
```

2)
```
*
**
***
****
*****
****
***
**
*
```

3)
```
    *
   ***
  *****
 * ******
  *****
   ***
    *
```

4)
```
1111
2222
3333
4444
```

5)
```
1
22
333
4444
```

6)
```
1
23
456
78910
```

Programs using Arrays and Strings

1) Write a C program to find the minimum, maximum and average in an array of integers.

2) Write a C program to Finding the frequency of elements in an array
3) Write a C program to Counting Distinct Elements in an Array
4) Write a C program to Remove Duplicate elements from an array
5) Write a C program to find addition of two matrices of order m x n ,p x q
6) Write a C program to find multiplication of two matrices of order m x n ,p x q
7) Write a C program for Spiral traversal on a Matrix
8) Write a C program to rotate matrix by 90 degrees
9) Write a C program to Count the number of vowels in a given string.
10) Write a C program to check if two strings are anagrams or not.
11) Write a C program to insert a sub-string in to a given main string from a given position.
12) Write a C program to delete n Characters from a given position in a given string.
13) Write a C program to determine if the given string is a palindrome or not (Spelled Same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

14) Write a C program to count the lines, words and characters in a given text.
15) Write a C program to Count common sub-sequence in two strings

Programs using functions and Recursion

1. Write a C program to swap to numbers using call by value.
2. Write a C program that uses both non recursive and recursive functions for the following
   a) To find the factorial of a given integer.
   b) To find the GCD (greatest common divisor) of two given integers.
   c) To find X^n
   d) Find Nth term of a Fibonacci sequence

Programs using Pointers and Structures

1. Write a C program to swap two numbers using call by reference
2. Write a C program for reading elements into array using pointer and display them
3. Write a C program to create an one dimensional array dynamically using malloc() to store n elements and find sum, average of array elements
4. Write a C program to reverse the string using character pointer
5. Write a C program to create a student record with fields roll number, name and mobile number of the student using structures concept
6. Write a Cprogram to manage student records, where each record contains a student's name, roll number, and marks using array of structures concept.
7. Write a C Program to display the date using nested structures concept

Programs using SFiles

1. Write a C Program to read the data from a standard input device,store it in a file and then display the content of a file to standard output device
2. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
3. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).
4. Write a C Program to reverse the contents of a File

5. Write a C program to demonstrate the concept of command line arguments
6. Write a C program to find the reverse of a number provided as a command line argument.

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B. Koffman, Problem solving and Program Design in C 7th Edition, Pearson.

2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill.

3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB.

4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).

5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.

6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

Useful Links

- https://www.hackerrank.com/domains/c
- https://leetcode.com/problemset/all/?difficulty=EASY
- https://www.codechef.com/practice?end_rating=999

B.Tech, ECE

English Language and Communication Skills

Lab

I B.Tech – I Sem	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Listening Skills
Course Objectives:
1. To enable students, develop their active listening skills.
2. To equip students with necessary training in listening, so that they can comprehend the speech of people from different linguistic backgrounds.

Speaking Skills
3. To improve their pronunciation and neutralize accent.
4. To enable students express themselves fluently and appropriately
5. To practise speaking in social and professional contexts

Learning Outcomes: Students will be able to:
1. Listen actively and identify important information in spoken texts
2. Interpret the speech and infer the intention of the speaker
3. Improve their accent for intelligibility
4. Speak fluently with clarity and confidence.
5. Use the language in real life situations

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:
a. **Computer Assisted Language Learning (CALL) Lab which focuses on listening skills**
b. **Interactive communication Skills (ICS) Lab which focuses on speaking skills**

Exercise – I
CALL Lab:
Instruction: Speech Sounds-Listening Skill - Importance – Purpose - Types- Barriers- Active Listening
Practice: Listening to Distinguish Speech Sounds (Minimal Pairs) - Testing Exercises

ICS Lab:
Diagnostic Test – Activity titled 'Express Your View'
Instruction: Spoken and Written language - Formal and Informal English - Greetings - Introducing Oneself and Others
Practice: Any Ice-Breaking Activity

Exercise – II:
CALL Lab:
Instruction: Listening vs. Hearing - Barriers to Listening
Practice: Listening for General Information - Multiple Choice Questions - Listening Comprehension Exercises (It is essential to identify a suitable passage with exercises for practice.)

ICS Lab:

Instruction: Features of Good Conversation – Strategies for Effective Communication
Practice: Role Play Activity - Situational Dialogues –Expressions used in Various Situations –Making Requests and Seeking Permissions – Taking Leave - Telephone Etiquette

Exercise – III:
CALL Lab:
Instruction: Errors in Pronunciation – Tips for Neutralizing Mother Tongue Influence (MTI)
Practice: Differences between British and American Pronunciation –Listening Comprehension Exercises

ICS Lab:
Instruction: Describing Objects, Situations, Places, People and Events
Practice: Picture Description Activity – Looking at a Picture and Describing Objects, Situations, Places, People and Events (A wide range of Materials / Handouts are to be made available in the lab.)

Exercise: IV
CALL Lab:
Instruction: Techniques for Effective Listening
Practice: Listening for Specific Details - Listening - Gap Fill Exercises - Listening Comprehension Exercises. (It is essential to identify a suitable passage with exercises for practice.)

ICS Lab:
Instruction: How to Tell a Good Story - Story Star- Sequencing-Creativity
Practice: Activity on Telling and Retelling Stories - Collage

Exercise: V
CALL Lab:
Instruction: Identifying the literal and implied meaning
Practice: Listening for Evaluation - Write the Summary – Listening Comprehension Exercises
(It is essential to identify a suitable passage with exercises for practice.)

ICS Lab:
Instruction: Understanding Non-Verbal Communication
Practice: Silent Speech - Dumb Charades Activity

- Post-Assessment Test on 'Express Your View'

Minimum Requirement of infrastructural facilities for ELCS Lab:
1. **Computer Assisted Language Learning (CALL) Lab:**
The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.
System Requirement (Hardware component):
Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:
i) Computers with Suitable Configuration
ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio visual aids with a Public Address System, a T. V. or LCD, a digital stereo – audio & video system and camcorder etc.

Note: English Language Teachers are requested to prepare Materials / Handouts for each Activity for the Use of those Materials in CALL & ICS Labs.

Suggested Software

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

REFERENCE BOOKS:

1) Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge
2) University Press

3) Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.
4) Orient BlackSwan Pvt. Ltd

5) Mishra, Veerendra et al. (2020). English Language Skills: A Practical Approach. Cambridge
6) University Press

7) (2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage
8) Learning India Pvt. Ltd
9) Ur, Penny and Wright, Andrew. 2022. Five Minute Activities – A Resource Book for Language
10) Teachers. Cambridge University Press

B.Tech, ECE

MA201BS: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

I B.Tech – II Sem

L	T	P	C
3	1	0	4

Pre-requisite: Mathematical Knowledge at pre-university level

Course Objectives: To learn

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

Course Outcomes: After completion of the course, the student must be able to

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems.
3. Use the Laplace Transforms techniques for solving Ordinary Differential Equations.
4. Evaluate the Line, Surface and Volume integrals and converting them from one to another

UNIT – I: First Order Ordinary Differential Equations

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates).

Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT – II: Ordinary Differential Equations of Higher Order

Higher order linear differential equations with constant coefficients: Non-Homogeneous terms of the typee^{ax}, $sin\ ax$, $cos\ ax$, polynomials in x, $e^{ax}V(x)$ and $x^k\ V(x)$, Method of variation of parameters.

UNIT – III:Laplace Transforms

Laplace Transforms: Laplace Transform of standard functions, first shifting theorem, Laplace transforms of functions multiplied by 't' and divided by 't' Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions , Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT – IV: Vector Differentiation

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

UNIT – V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

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

2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

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

3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
4. H. K. Dass and Er. RajnishVerma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

B.Tech, ECE

CH102BS: ENGINEERING CHEMISTRY

I B.Tech – II Sem

L	T	P	C
3	0	0	3

Pre-requisite: Pre-university knowledge

Course Objectives:

1) To develop adaptability to new advances in Engineering Chemistry and acquire the essential skills to become a competent engineering professional.
2) To understand the industrial significance of water treatment, fundamental principles of battery chemistry, and the impact of corrosion along with its control methods for structural protection.
3) To impart foundational knowledge of various energy sources and their practical applications in engineering
4) To equip students with an understanding of smart materials, biosensors, and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

Course Outcomes:

1. Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.
2. Students will gain basic knowledge of electrochemical processes and their relevance to corrosion and its control methods.
3. Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs.
4. Students will learn the basic concepts and properties of polymers and other engineering materials.
5. Students will be able to apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.

UNIT – I: Water and its treatment

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination. Defluoridation - Nalgonda technique.

Boiler troubles: Scales, Sludges 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 brackish water – Reverse osmosis.

UNIT – II: Electrochemistry and Corrosion:

Introduction- Electrode potential, standard electrode potential, Nernst equation (no derivation),

electrochemical cell - Galvanic cell, cell representation, EMF of cell - Numerical problems. Types of electrodes, reference electrodes - Primary reference electrode - Standard Hydrogen Electrode (SHE),Secondary reference electrode - Calomel electrode.

Corrosion: Introduction- Definition, causes and effects of corrosion – Theories of corrosion, chemical and electrochemical theories of corrosion, Types of corrosion: galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion - Nature of the metal, Nature of the corroding environment. Corrosion control methods - Cathodic protection Methods - Sacrificial anode and impressed current methods.

UNIT – III: Energy sources

Batteries: Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of Zn-air and Lithium ion battery. Fuel Cells – Differences between a battery and a fuel cell, Construction and applications of Direct Methanol Fuel Cell (DMFC).

Fuels: Introduction and characteristics of a good fuel, Calorific value – Units - HCV, LCV- Dulongs formula - Numerical problems.

Fossil fuels: Introduction, Classification, Petroleum - Refining of Crude oil, Cracking - Types of cracking- Moving bed catalytic cracking. LPG and CNG composition and uses.

Synthetic Fuels: Fischer-Tropsch process, Introduction and applications of Hythane and Green Hydrogen.

UNIT – IV: Polymers

Definition - Classification of polymers: Based on origin and tacticity with examples – Types of polymerization - Addition (free radical addition mechanism) and condensation polymerization. Plastics, Elastomers and Fibers: Definition and applications (PVC, Buna-S, Nylon-6,6).Differences between themoplastics and thermo setting plastics.

Conducting polymers: Definition and Classification with examples - Mechanism of conduction in transpoly-acetylene and applications of conducting polymers.

Biodegradable polymers: Poly lactic acid and its applications.

UNIT – V: Advanced Functional Materials:

Smart materials: Introduction, Classification with examples - Shape Memory Alloys – Nitinol, Piezoelectric materials – quartz and their engineering applications.

Biosensor - Definition, Amperometric Glucose monitor sensor.

Interpretative spectroscopic applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution Monitoring- CO sensor (Passive Infrared detection).

TEXT BOOKS:

1) *Engineering Chemistry* by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010.

2) *Engineering Chemistry* by Rama Devi, Dr. P. Aparna and Rath, Cengage learning, 2025.

REFERENCE BOOKS:

1. *Engineering Chemistry:* by Thirumala Chary Laxminarayana & Shashikala, Pearson Publications (2020)
2. *Engineering Chemistry* by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi 2011.
3. *Engineering Chemistry* by Shikha Agarwal, Cambridge University Press, Delhi 2015.
4. *Engineering Analysis of Smart Material Systems* by Donald J. Leo, Wiley, 2007.
5. *Challenges and Opportunities in Green Hydrogen* by Editors: Paramvir Singh, Avinash Kumar Agarwal, Anupma Thakur, R.K Sinha.

Useful Links

1. E-Content- https://doi.org/10.1142/13094 | October 2023

2. E-books: https://archive.org/details/EngineeringChemistryByShashiChawla/page/n11/mode/2u

B.Tech, ECE **SIET Hyderabad**

Python Programming

I B.Tech – II Sem

L	T	P	C
3	0	0	3

Pre-requisite: PPS, JAVA

Course Objectives:

1.Understand the fundamentals and syntax of Python programming.

2.Develop applications using control structures, functions, and modules.

3.Learn data structures such as lists, tuples, dictionaries, and sets.

4.Gain practical experience with file handling, exceptions, and object-oriented concepts.

5.Develop and debug Python programs for real-time applications.

Course Outcomes:

CO1: Understand basic syntax, keywords, and control structures in Python.

CO2: Design Python programs using functions, recursion, and modules.

CO3: Implement data structures such as lists, tuples, sets, and dictionaries.

CO4: Perform file operations and handle exceptions effectively.

CO5: Apply object-oriented programming principles and develop modular code.

CO6: Solve complex real-time problems using Python programming skills.

UNIT – I: Python Basics

Introduction to Python, features, applications, Python interpreter and IDEs, Variables, data types, and operators, Input/output functions, Control structures: if, if-else, nested if, loops (for, while), break and continue

UNIT – II: Functions and Modules

Defining and calling functions, Function arguments and return values, Recursive functions, Lambda functions, Modules and packages, built-in and user-defined modules, Introduction to Python Standard Library

UNIT – III: Data Structures in Python

Lists: operations, list comprehensions, Tuples: accessing, slicing, and unpacking, Sets and its operations, Dictionaries: creation, operations, and methods, Iterating through data structures

UNIT – IV: File Handling, Exception Handling, and Regular Expressions

Reading and writing text/binary files, File methods and context manager, Handling exceptions using try, except, finally, Raising exceptions, Regular expressions: match, search, findall, sub

UNIT – V: Object-Oriented Programming (OOP) in Python& Extended Modules

Classes and objects, Constructors and destructors, Inheritance and polymorphism, Encapsulation and data hiding, Method overloading and overriding, Introduction to decorators and iterators

Numpy, pandas, matplotlib, seaborn, Scikit-learn

TEXT BOOKS:

1.Reema Thareja, “Python Programming: Using Problem Solving Approach,” Oxford University Press.

2.Dr. R. Nageswara Rao, “Core Python Programming,” Dreamtech Press.

3.Allen B. Downey, “Think Python: How to Think Like a Computer Scientist,” O’Reilly

REFERENCE BOOKS:

1.Mark Lutz, “Learning Python,” O’Reilly Media.

2.Wesley J. Chun, “Core Python Applications Programming,” Pearson.

3.Charles Dierbach, “Introduction to Computer Science Using Python,” Wiley.

4.Zed A. Shaw, “Learn Python the Hard Way,” Addison-Wesley

Useful Links

- https://www.w3schools.com/python
- https://onlinecourses.nptel.ac.in/noc22_cs26/preview
- https://www.javatpoint.com/python-tutorial

- https://www.tutorialspoint.com/python
- https://www.programiz.com/python-programming
- https://www.geeksforgeeks.org/python-programming-language/

B.Tech, ECE

DATA STRUCTURES

I B.Tech – II Sem

L	T	P	C
3	0	0	3

Pre-requisite: PPS

Course Objectives: The course aims to

1. Understand fundamental concepts, classifications, and operations of data structures.
2. Implement and analyze searching and sorting algorithms for efficient data processing
3. Learn linear and non-linear data structures and their applications.
4. Apply suitable data structures for problem-solving and algorithm optimization
5. Gain proficiency in advanced concepts like balanced search trees, hashing, and collision resolution.

Course Outcomes: By the end of the course, students will be able to:

1. Select appropriate searching and sorting techniques for given application.
2. Understand Linear data structures operations
3. Perform Various Linked List operations and its types
4. Implement Linear data structures Applications
5. Solve the given Problem using Non Linear data structures
6. Apply the concepts of Graph Traversals and Hashing for efficient Searching.

UNIT – I: Searching and Sorting

INTRODUCTION TO DATA STRUCTURES: Introduction, Classification of DataStructures, Operations on Data Structures

SEARCHING AND SORTING: linear search, jump search, binary search, interpolation search, bubble sort, selection sort, insertion sort, shell sort, Radix sort

UNIT – II: Stacks and Queues

STACKS: Introduction, Array Representation of Stack, Operations on Stack.

APPLICATIONS OF STACKS: Infix-to- Postfix conversion, evaluating Postfix expressions.

QUEUES: Introduction, Array representation of Queue, Operations on a Queue, Circular Queue, Operations on a Circular Queue, Double Ended Queue, Operations on Double Ended Queue

UNIT – III: Linked Lists

LINKED LISTS: Introduction, Singly Linked List: Representation of a Singly Linked List, Operations on a Single Linked List (Create, insert, delete, reverse, traverse and count), and Operations on a Double linked list (Create, insert, delete, reverse, traverse and count), Circular Linked Lists.

APPLICATIONS OF LINKED LISTS: Implementation of Stack using Linked List, Implementation of Queue

using linked list

UNIT – IV: Trees

TREES: Definition, Basic Terminologies, Binary Trees: Properties, Types, Representation of a Binary Tree using Array and Linked List and Tree Traversals: Pre order, In order and Post order, HEAPS: Binary Heap. SEARCH TREES: Binary Search Trees: Definition, Operations: Insertion, searching, find Minimum, find Maximum and Deletion, BALANCED SEARCH TREES: AVL Trees: Definition, Rotations, Operations – Insertion, deletion and Searching, B Trees, B+ Trees

UNIT – V: Graphs and Hashing

GRAPHS: Definition, Basic Terminologies and Representation, Graph Traversals- Breadth First Search (BFS) and Depth First Search (DFS).

HASHING: Hash table representation, hash functions, collision resolution Techniques: separate chaining, open addressing-linear probing, quadratic probing, double hashing, and rehashing.

TEXT BOOKS:

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

2. Data Structure using C– Reema Thareja, 3rd Edition, Oxford University Press.

REFERENCE BOOKS:

1. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

2. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan , Fundamentals of Data Structure in C, 2nd Edition, University Press, India

3. Samanta Debasis , Classic Data Structures, 2nd Edition, Prentice Hall of India

Useful Links

- https://onlinecourses.swayam2.ac.in/cec24_cs17/preview
- https://onlinecourses.swayam2.ac.in/cec21_cs02
- https://www.geeksforgeeks.org/data-structures/
- https://www.programiz.com/dsa

B.Tech, ECE

NETWORK ANALYSIS AND SYNTHESIS

I B.Tech – II Sem

L	T	P	C
3	0	0	3

Pre-requisite: Basic Electrical Engineering

Course Objectives:

1. To understand the basic concepts on RLC circuits
2. To know the behavior of the steady state and transient states in RLC circuits
3. To understand the two port network parameters
4. Learn the design concepts of various filters and attenuators

Course Outcomes:

1. Gain the knowledge on basic RLC circuits behaviour
2. Analyse the Steady state and transient analysis of RLC Circuits.
3. Characterization of two port network parameters.
4. Analyse the Design aspect of various filters and attenuators

UNIT – I: Network Topology

Basic cutset and tie set matrices for planar networks, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

UNIT – II: Transient and Steady state analysis

RC, RL and RLC Circuits, Sinusoidal, Step and Square responses. RC Circuits as integrator and differentiators. 2nd order series and parallel RLC Circuits, Root locus, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves.

UNIT – III: Two port network parameters

Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros. Standard T,π , L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network

UNIT – IV: Filters & Attenuators

Filters: Classification of Filters, Filter Networks, Constant-K Filters-Low pass, high pass, Band pass, band-stop filters, M-derived Filters- T and π filters- Low pass, high pass

Attenuators: Types – T, π , L, Bridge T and lattice ,Asymmetrical Attenuators T, π , L Equalizers-Types- Series, Shunt, Constant resistance, bridge T attenuation, bridge T phase, Lattice attenuation, lattice Phase equalizers

UNIT – V: Network Synthesis

Driving point impedance and admittance, transfer impedance and admittance, network functions of Ladder and non ladder networks, Poles, Zeros analysis of network functions, Hurwitz polynomials, Positive Real Functions, synthesis of LC, RC and RL Functions by foster and causer methods

TEXT BOOKS:

1. Van Valkenburg -Network Analysis, 3rd Ed., Pearson, 216
2. JD Ryder - Networks, Lines and Fields, 2nd Ed., PHI, 1999

REFERENCE BOOKS:

1. J. Edminister and M. Nahvi - Electric Circuits, Schaum's Outlines, Mc Graw Hills Education, 1999
2. A. Sudhakar and Shyammohan S Palli - Networks & Circuits, 4th Ed., Tata McGraw- Hill Publications
3. William Hayt and Jack E. Kimmerley - Engineering Circuit Analysis, 6th Ed., William Hayt and Jack E. Kimmerley, McGraw Hill Company

B.Tech, ECE **SIET Hyderabad**

Python Programming Lab

I B.Tech – II Sem

L	T	P	C
0	0	2	1

Pre-requisite: PPS, JAVA

Course Objectives:

1. Understand the fundamentals and syntax of Python programming.
2. Develop applications using control structures, functions, and modules.
3. Learn data structures such as lists, tuples, dictionaries, and sets.
4. Gain practical experience with file handling, exceptions, and object-oriented concepts.
5. Develop and debug Python programs for real-time applications.

Course Outcomes:

CO1: Understand basic syntax, keywords, and control structures in Python.
CO2: Design Python programs using functions, recursion, and modules.
CO3: Implement data structures such as lists, tuples, sets, and dictionaries.
CO4: Perform file operations and handle exceptions effectively
CO5: Apply object-oriented programming principles and develop modular code.
CO6: Solve complex real-time problems using Python programming skills.

Week-1

1. Calculate the total and average of marks scored in five subjects.
2. Determine if a year is a leap year.
3. Accept a string and count vowels, consonants, digits, and special characters.
4. Accept a number and determine if it is prime.
5. Create a calculator using functions.
6. Simulate ATM transactions (withdrawal, balance check).
7. Generate Fibonacci series up to N terms using recursion.
8. Convert temperature from Celsius to Fahrenheit and vice versa.

Week-2

1. Accept a string and reverse it using a function.
2. Display multiplication tables from 1 to N using nested loops.
3. Accept a string and count the frequency of each character.
4. Perform matrix addition and multiplication.
5. Find the factorial of a number using recursion.

Week-3

1. Store and display student details using dictionaries.
2. Validate a user-defined password policy.
3. Accept a sentence and count the number of words.
4. Create a login authentication system.
5. Create a contact book using dictionary and functions.
6. Write a program to simulate a library management system.
7. Accept a list of numbers and remove duplicates.

Week-4

1. Implement a simple voting system.
2. Accept a list and sort it in ascending and descending order.
3. Accept N names and display them in alphabetical order.
4. Accept N email addresses and validate them using regex.
5. Implement a pattern printing program.
6. Read a text file and count the number of lines and words.
7. Convert binary number to decimal and vice versa.
8. Create a mini-billing system.

Week-5

1. Accept a list of tuples and sort them based on the second element.
2. Implement a marks analysis system for N students.
3. Develop a simple calculator using lambda expressions.
4. Create a quiz application using dictionaries.
5. Create a dictionary with product details and implement search.
6. Accept date input and validate it using regex.
7. Implement a string compression and decompression tool.
8. Accept file name and display contents in reverse order.
9. Track attendance of students using sets.

Week-6

1. Accept two matrices and perform transpose.
2. Merge two sorted lists into a single sorted list.
3. Develop a mini hospital appointment booking system.
4. Accept a file and replace all spaces with underscores.
5. Simulate a digital clock.
6. Create a bank account class with deposit, withdraw, and balance.
7. Accept a number and check if it is an Armstrong number.

8. Create a basic weather report display using dictionaries.
9. Create a bus ticket booking application.
10. Simulate a parking system using OOP.

Week-7

1. Develop a mini email sender simulator (mock only).
2. Manage employee records using file handling.
3. Find common elements in two lists using set operations.
4. Create a menu-driven grocery store billing application.
5. Convert a paragraph to title case.
6. Accept a mobile number and validate its format using regex.
7. Create a dictionary of employees and find the one with max salary.
8. Implement stack and queue using lists.
9. Read and write CSV files.
10. Accept coordinates and calculate distance between two points.
11. Simulate a random OTP generator.
12. Create a grade calculator with dynamic marks entry.

TEXT BOOKS:

1.Reema Thareja, “Python Programming: Using Problem Solving Approach,” Oxford University Press.

2.Dr. R. Nageswara Rao, “Core Python Programming,” Dreamtech Press.

3.Allen B. Downey, “Think Python: How to Think Like a Computer Scientist,” O’Reilly

REFERENCE BOOKS:

1.Mark Lutz, “Learning Python,” O’Reilly Media.

2.Wesley J. Chun, “Core Python Applications Programming,” Pearson.

3.Charles Dierbach, “Introduction to Computer Science Using Python,” Wiley.

4.Zed A. Shaw, “Learn Python the Hard Way,” Addison-Wesley

Useful Links

- https://www.w3schools.com/python
- https://onlinecourses.nptel.ac.in/noc22_cs26/preview
- https://www.javatpoint.com/python-tutorial
- https://www.tutorialspoint.com/python
- https://www.programiz.com/python-programming
- https://www.geeksforgeeks.org/python-programming-language/

B.Tech, ECE

CH106BS: ENGINEERING CHEMISTRY LAB

I B.Tech – II Sem

L	T	P	C
0	0	2	1

Pre-requisite: Pre-university knowledge

Course Objectives:

1. Students will understand and perform experiments based on core chemical principles relevant to engineering applications.
2. Students will learn to estimate the hardness of water to assess its suitability for drinking purposes.
3. Students will acquire the ability to perform acid-base titrations using instrumental methods such as conductometry, potentiometry, and pH metry.
4. Students will gain hands-on experience in synthesizing polymers like Bakelite and Nylon – 6, 6 in the laboratory.
5. Students will learn to determine the unknown concentration of potassium permanganate ($KMnO_4$) using a calibration curve.

Course Outcomes:

1. Students will develop practical skills through hands-on chemistry experiments relevant to engineering.
2. Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.
3. Students will be able to apply techniques like conductometry, potentiometry, and pH metry to determine concentrations or equivalence points in acid-base reactions.
4. Students will gain experience in synthesizing polymers such as Bakelite and Nylon-6,6.
5. Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).

UNIT – I: Volumetric Analysis:

Estimation of Hardness of water by EDTA Complexometry method.

UNIT – II: Conductometry:

1. Estimation of the concentration of strong acid by Conductometry..
2. Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry

UNIT – III: Potentiometry:

Estimation of concentration of Fe^{+2}ion by Potentiometry using $KMnO_4$.

UNIT – IV: pH Metry:

Determination of an acid concentration using pH meter

UNIT – V: Preparations:

Preparation of Bakelite.

UNIT – VI: Corrosion:

Determination of rate of corrosion of mild steel in the presence and absence of inhibitor

UNIT – VII: Virtual lab experiments:

1. Construction of Fuel cell and it's working
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

B.Tech, ECE

DATA STRUCTURES LAB

I B.Tech – II Sem

L	T	P	C
0	0	2	1

Pre-requisite: Programming for Problem Solving

Course Objectives:

1. Implement basic searching and sorting algorithms..
2. Design linear and non-linear data structures using arrays and linked lists..
3. Solve expression conversion, evaluation, and traversal problems.
4. Apply advanced structures like balanced trees and hashing.
5. Build modular C programs for real-world problem-solving

Course Outcomes:

1. Apply various searching and sorting techniques
2. Implement all operations on different linear data structures
3. Develop all operations on different Non- linear data structures
4. Understand the complexity analysis of linear and nonlinear data structures
5. Implement Various Hashing Techniques
6. Use appropriate data structure for any given problem

List of Experiments:

1. Write a Program to implement
   a) Linear Search b) Jump search c)Binary search d) Interpolation search
2. 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 iv) Shell Sort v) Radix sort

3. Write a Program that implement stack (its operations) using Arrays
4. Write a Program that uses Stack to
   a) Convert the infix expression to postfix expression
   b) Evaluate the postfix expression
5. Write a Program that implements the following with its operations using Arrays
   a) Queue b) Circular Queue c) Double Ended Queue
6. Write a Program that uses functions to perform the following operations on singly linked list :
   a) Creation b) Insertion c) Deletion d) Traversal
7. Write a Program that uses functions to perform the following operations on doubly linked

list :

a) Creation b) Insertion c) Deletion d) Traversal

8. Write a Program that uses functions to perform the following operations on Circular linked list :

a) Creation b) Insertion c) Deletion d) Traversal

9. Write a Program that implements the following with its operations using Linked List

a) Stack b) Queue

10. Write a Program to implement the Binary tree traversal methods
11. Write a Program to implement the following with its operations

a) Binary Search tree b) AVL tree

12. Write a Program to implement the graph traversal methods

Write a Program to implement Separate Chaining, Linear Probing collision resolution techniques

TEXT BOOKS:

1. *Fundamentals of Data Structures in C*, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press
6. *Data Structures using C* – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

REFERENCE BOOKS:

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

Useful Links

- https://onlinecourses.swayam2.ac.in/cec24_cs17/preview
- https://onlinecourses.swayam2.ac.in/cec21_cs02
- https://www.geeksforgeeks.org/data-structures/
- https://www.programiz.com/dsa

B.Tech, ECE

ELECTRICAL ENGINEERING LAB

I B.Tech – II Sem

L	T	P	C
0	0	2	1

Pre-requisite: Introduction to Electrical Engineering

Course Objectives:

1. To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
2. To study the transient response of various R, L and C circuits using different excitations.
3. To determine the performance of different types of DC, AC machines and Transformers.

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

1. Verify the basic Electrical circuits through different experiments.
2. Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
3. Analyze the transient responses of R, L and C circuits for different input conditions.

PART – A (compulsory)

1. Verification of KVL and KCL
2. Verification of Thevenin's and Norton's theorem
3. Transient Response of Series RL and RC circuits for DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RLC series and Parallel AC circuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three-phase Induction Motor.

PART – B (Any Two)

1. Verification of Superposition theorem.
2. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
3. Measurement of Active and Reactive Power in a balanced Three-phase circuit
4. No-Load Characteristics of a Three-phase Alternator

B.Tech, ECE

ENGINEERING WORKSHOP

I B.Tech – II Sem

L	T	P	C
0	0	2	1

Pre-requisite: Practical Skills

Course Objectives:

1. To introduce students to basic manufacturing processes and workshop practices.
2. To provide hands-on training in carpentry, fitting, welding, sheet metal, and machining
3. To develop skills in using hand tools and measuring instruments.
4. To enhance safety awareness and proper handling of workshop equipment.
5. To build a foundational understanding of industrial production and fabrication.

Course Outcomes: At the end of the course, the student will be able to:

1. Understand the basic manufacturing processes and operations.
2. Use hand tools and equipment safely and efficiently.
3. Perform basic operations in carpentry, fitting, welding, sheet metal work, and machining
4. Read and interpret workshop drawings
5. Develop teamwork, time management, and quality awareness in a workshop environment

1. TRADES FOR EXERCISES:
At least two exercises from each trade:
i. Carpentry: T- Lap Joint, Dovetail Joint, Mortise and Tenon Joint
ii. Fitting: V- Fit, Dovetail Fit and Semi- circular fit
iii. Tin Smithy: Square Tin, Rectangular Tray and Conical Funnel
iv. Foundry: Preparation of Green Sand Mould using Single Piece and Split Pattern
v. Welding Practice: Arc Welding and Gas Welding
vi. House wiring: Parallel and Series, Two-way Switch and Tube Light
vii. Black Smithy: Round to Square, Fan Hook and S- Hook

2. TRADES FOR DEMONSTRATION AND EXPOSURE:

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

TEXT BOOKS:

1. Workshop Practice, B. L. Juneja, Cengage Learning India, 1st edition, 2015.
2. Workshop Practice Manual, K. Venkata Reddy, BS Publication,6th Edition, Rpt.2025.

REFERENCE BOOKS:

1. Workshop Manual, K. Venugopal, Anuradha Publications, 2012th edition, 2012.