

Semester I (First year)

111

Mathematics – I

(Common to CSE/IT/CSE (AI& ML)/CSE (DS)/CSE (IoT)

L C
3 3

Course Objectives:

The objective of this course is to familiarize the prospective engineers with techniques in basic calculus and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more a level of mathematics and applications that they would find useful in their disciplines.

Course Outcomes:

The students will able to:

1. Evaluate certain improper integrals apart from some other applications they will have a basic understanding of Beta and Gamma functions.
2. Apply Rolle's theorem which is fundamental application of analysis to Engineering problems.
3. Solve problems related to linear algebra including linear transformations in a Comprehensive manner
4. Find Matrix Eigen values and know diagonalization and orthogonalization.

Course Content:

UNIT – I Text Book-1 15 Periods

Evolutes and Involutives, Evaluation of improper integrals: Integrals without infinite limits of integration, Beta function, Gamma function, Relation between beta and gamma functions (without proof) Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT – II Text Book-1 15 Periods

Rolle's theorem (without proof), Lagrange's mean value theorem (without proof), Taylor's and Maclaurin series, Sequences, Series, Series of positive terms, Convergence tests: Comparison test (limit form) D'Alembert's ratio test, Raabe's test for convergence.

UNIT – III Text Book-2 15 Periods

Vectors: addition and scalar multiplication, linear dependence and independence of vectors. Vector space, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank nullity theorem, composition of linear maps, Matrix associated with a linear map.

UNIT – IV Text Book-2 15 Periods

Characteristic equation, Eigen values and eigenvectors, symmetric, skew-symmetric, and orthogonal Matrices, Eigen basis, Diagonalization; Inner product spaces, Gram-Schmidt orthogonalization.

Learning Resources:**Text Books:**

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 42nd edition.
2. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, Pearson, 2002.
2. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
3. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 2006.

112

Engineering Chemistry
(Common to CSE (AI& ML)/CSE(DS)/CSE(IoT))

L C

3 3

Course Objectives:

1. To develop concepts involved in molecular structure, intermolecular forces and make them understand the chemistry behind electrochemical energy systems.
2. To acquire knowledge on the chemical concepts involved in Water treatment and Corrosion.
3. Student shall know about the major organic reactions and end products like conducting polymers.
4. Learn analytical methods useful in characterization of compounds.

Course outcomes:

After successful completion of the course student shall be able to:

1. Identify stable complexes and suitable electrochemical energy systems for end usage.
2. Apply his knowledge for effective water treatment and corrosion prevention.
3. Identify chemical reactions that are used in the synthesis of molecules and polymers
4. Distinguish the ranges of the electromagnetic spectrum and characterize a given compound using analytical techniques.

Course Content:

UNIT – I

15 Periods

Molecular structure, Intermolecular forces and Energy systems:

Crystal field theory-salient features, energy level diagrams-tetrahedral and octahedral complexes, crystal field stabilization energies and magnetic properties.

Ionic, dipolar, Vander Waal's interaction and Hydrogen bonding, critical Phenomena-Andrew's isotherms of CO₂, derivation of critical constants from Vander Waal's equation.

Electrode potential, electrochemical series, Nernst equation and its applications. Batteries-Primary (Dry cell) and secondary (Lead acid), Lithium battery (Li-MnO₂)-advantages, Fuel cell (H₂-O₂ cell).

UNIT – II

15 Periods

Water Chemistry and Corrosion:

Water Chemistry-WHO standards, Municipal water Treatment-Removal of suspended Impurities-Sedimentation, Co-agulation and Filtration-Disinfection of water by chlorine, Break point chlorination, DE chlorination, Purification by ion-exchange method and reverse osmosis.

Corrosion-Introduction, Electrochemical theory of corrosion, galvanic corrosion, differential aeration corrosion, Factors-temperature, pH, overvoltage. Cathodic protection

by sacrificial anodic method and impressed current method. Electroplating (Cu), Electrolessplating (Ni).

UNIT – III

15 Periods

Organic Reactions and Polymers:

Types of organic Reactions-Substitution (SN_1 and SN_2), Elimination (E_1 and E_2), Addition-Markownikoff's rule and anti-Markownikoff's rule, Cyclisation (Diel's Alder reaction), Synthesis of aspirin.

Polymers-Functionality, Degree of Polymerization, Tacticity-Addition and condensation polymerization, Relationship between Structure and Properties of polymers (Strength, Crystallinity, Elasticity, Plastic Deformation, Glass transition temperature (T_g)), Factors affecting T_g .

Conducting polymers: Introduction, Examples, General applications, Mechanism of conduction in polyacetylene.

UNIT – IV

15 Periods

Spectroscopic techniques and its applications:

Beer-Lambert's law, limitations, colorimetric determination of Fe(III)

UV-VIS spectroscopy – electronic transitions, shifts-blue and red, Block diagram - brief introduction of components, Applications – purity and differentiation of conjugated and non-conjugated dienes.

IR Spectroscopy–condition to be IR active, vibrational modes of AB_2 , Block diagram-brief introduction of components, IR spectrum of CO_2 and H_2O molecules, General applications. Fluorescence and its applications in medicine.

Learning Resources:

Text Books:

1. Engineering chemistry, P.C. Jain and Monica Jain, 16th edition, Dhanpat Rai Publishing Company.
2. Wiley Engineering chemistry, 2nd edition, Wiley India Private Limited.

Reference Books:

1. University Chemistry, Bruce H. Mahan, 3rd edition, Narosa Publishing House.
2. A text book of Engineering chemistry, Shashi Chawla, 3rd edition, Dhanpat Rai Publishing Company.

Web References:

1. Engineering Chemistry (NPTEL Web Book by B.L. Tembe, Kamaluddin&M.S. Krishnan).
2. <http://www.powerstream.com/BatteryFAQ.html#lec>.
3. <http://freevideolectures.com/Course/3029/Modern-Instrumental-Methods-of-Analysis>.

- 4.1. Description & Narration. (Paragraph writing)
- 4.2. Essay Writing. (Expository Essay)
- 4.3. Note-Making and Note-Taking
- 4.4. Methods of preparing notes.

Learning Resources:

Textbook:

1. Communication Skills, Sanjay Kumar and PushpaLata, Oxford University Press.

Reference Books:

1. Remedial English Grammar. F.T. Wood, macmillan,2007
2. On WritingWell, William Zinsser, Harper Resource Book, 2001
3. Study Writing, Liz Hamp-Lyons and Ben Heasley, Cambridge University Press, 2006
4. .Practical English Usage, Michael Swan, OUP, 1995 Press.

114

Fundamentals of Computer Science
(Common to CSBS/CSE (AI& ML)/CSE(DS)/CSE(IoT))

L C

3 3

Course Objectives:

- To impart adequate knowledge on the need of programming languages and problem solving techniques.
- To develop programming skills using the fundamentals and basics of C Language.
- To enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.
- To teach the issues in file organization and the usage of file systems.

Course outcomes:

After successful completion of the course student shall be able to:

- enhance their analyzing and problem solving skills and use the same for writing programs in C.
- develop programs using the basic elements like control statements, Arrays and Strings.
- develop advanced applications using enumerated data types, function pointers and nested structures and ability to apply code reusability with user defined functions.
- learn the basics of file handling mechanism that is essential for understanding the concepts in database management systems and to understand the uses of preprocessors and various header file directives.

Course Content:

UNIT – I

15 Periods

General problem Solving concepts: Algorithm, and Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops.

Imperative languages: Introduction to imperative language; syntax and constructs of a specific language (ANSI C) Types Operator and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, proper variable naming and Hungarian Notation.

UNIT – II

15 Periods

Control Flow with discussion on structured and unstructured programming: Statements and Blocks, If-else-If, Switch, Loops – while, do, for, break and continue, goto labels, structured and un- structured programming.

Functions and Program Structure with discussion on standard library: Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Pre-processor, Standard Library Functions and return types.

UNIT – III

15 Periods

Pointers and Arrays: Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multidimensional array and Row/column major formats, Initialization of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.

Structures: Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Selfreferral structures, Table look up, typedef, unions, Bit-fields.

UNIT – IV

15 Periods

Input and Output: Standard I/O, Formatted Output–printf, Formatted Input–scanf, Variable length argument list, file access including FILE structure, fopen, stdin, stdout and stderr, Error Handling including exit, perror and error.h, Line I/O, related miscellaneous functions. Unix system Interface: File Descriptor, Low level I/O – read and write, open, create, close and unlink, Random access – lseek, Discussions on Listing Directory, Storage allocator.

Programming Method: Debugging, Macro, User Defined Header, User Defined Library Function, makefile utility.

Learning Resources:

Text Books:

1. The C Programming Language, (Second Edition) B. W. Kernighan and D. M. Ritchi, PHI.

Reference Books:

1. Programming in C, (Second Edition) B. Gottfried, Schaum Outline Series.
2. C: The Complete Reference, (Fourth Edition), Herbert Schildt, McGraw Hill.
3. Let Us C, Yashavant Kanetkar, BPB Publications

Web References:

Course Objectives:

1. To know the methods of determining hardness and chloride ion content of water sample.
2. To learn the redox methods to determine Fe²⁺ ions present in solution.
3. To know principles and methods involved in using instruments like conductivity bridge and potentiometer.
4. To know the molecular properties like surface tension, viscosity.
5. To know synthetic methods for preparation of drugs and polymer.

Course outcomes:

After successful completion of the course student shall be able to:

1. Estimate the Fe(II) content of a given solution and chloride/hardness content of water.
2. Measure conductance of solutions, redox potentials of a cell.
3. Synthesize a small drug molecule and polymer.
4. Measure molecular properties such as surface tension, viscosity and determine physical parameters like saponification value, partition co-efficient and R_f value.

List of Experiments:

1. Estimation of Mohr's salt using KMnO₄.
2. Estimation of Mohr's salt using K₂Cr₂O₇.
3. Determination of chloride ion content of water.
4. Determination of Hardness of water using EDTA method.
5. Determination of Fe(II) strength using K₂Cr₂O₇ potentiometrically.
6. Determination on strength of NaOH using HCl conduct metrically.
7. Preparation of p-bromo acetanilide.
8. Preparation of Phenol Formaldehyde resin.
9. Determination of surface tension.
10. Determination of Viscosity.
11. Determination of Saponification / acid value of oil.
12. Determination of partition co-efficient of I₂ in water. Determination of R_f value using TLC.
13. Verification of Freundlich isotherm using adsorption of acetic acid on activated charcoal.

Course Objectives:

1. To identify speaker's purpose and tone; make inferences and predictions about spoken discourse, discuss and respond to content of a lecture or listening passage orally and/or in writing.
2. To acquaint the students with the Standard English pronunciation, i.e., Received Pronunciation (RP), with the knowledge of stress and intonation.
3. To develop production and process of language useful for social and professional life.
4. To develop in them communication and social graces necessary for functioning. Improve the dynamics of professional presentations.
5. To develop critical reading and comprehension skills at different levels

Course outcomes:

After successful completion of the course student shall be able to:

1. Comprehend relationships between ideas and make inferences and predictions about spoken discourse.
2. Speak English with a reasonable degree of accuracy in pronunciation.
3. Develop appropriate speech dynamics in professional situations.
4. Use effective strategies and social graces to enhance the value of communication.
5. Develop effective communication and presentation skills and using language effectively to face interviews with success.

List of Experiments:

1. Listening Comprehension.
2. Pronunciation, Intonation, Stress and Rhythm.
3. Common Everyday Situations: Conversations and Dialogues.
4. Interviews.
5. Formal Presentations.
6. Reading Comprehension.

Textbook:

1. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press.
2. Practical English Usage. Michael Swan. OUP. 1995 Press.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University.
4. Technical English M. Sambaiah, Wiley Publications, New Delhi.

Course Objectives:

The course will enable the students to

1. Expose the students to standards and conventions followed in preparation of engineering drawings.
2. Make them understand the concepts of orthographic and isometric projections
3. Develop the ability of conveying the engineering information through drawings.
4. Make them understand the relevance of engineering drawing to different engineering domains.
5. Develop the ability of producing engineering drawings using drawing instruments.
6. Enable them to use computer aided drafting packages for the generation of drawings.

Course Outcomes:

Upon completion of this course, students will be able to

1. Prepare engineering drawings as per BIS conventions mentioned in the relevant codes.
2. Produce computer generated drawings using CAD software.
3. Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings.
4. Develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. Convert pictorial and isometric views of simple objects to orthographic views.

(UNIT I to IV shall be taught in conventional drawing method and Unit V shall be taught with the aid of computer).

UNIT – I

General: Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering.

Conic sections: Construction of Ellipse, Parabola, Hyperbola and Rectangular Hyperbola. (General method only)

Curves: Cycloid, Epicycloid, Hypocycloid and Involute; and Scales

UNIT – II

Method of Projections: Principles of projection - First angle and third angle projection of points, Projection of straight lines inclined to both planes. Traces of lines.

Projections of planes: Projections of planes inclined to both the planes, projections on auxiliary planes.

UNIT – III

Projections of Regular Solids: Projections of solids (Prism, Pyramid, Cylinder and Cone) with varying positions.

Sections of Solids: Sections of Prisms, Pyramids, cylinders and Cones. True shapes of sections. (Limited to the cutting plane perpendicular to one of the principal plane).

Development of surfaces: Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

UNIT – IV

Isometric Projections: Principles of Isometric Projection-Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids.

Orthographic Projections: Conversion of pictorial views into Orthographic views and Vice-versa. (Treatment is limited to simple castings).

Perspective Projections: Introduction to Perspective Projection.

UNIT – V

Over view of Computer Aided drafting (AutoCAD): Introduction, starting and customizing AutoCAD screen, usage of different menus, toolbars (drawing, editing, dimension, text, object properties.etc), tabs (Object, snap, grid, polar, ortho, otrack.etc.) and command prompt. Setting units, limits, layers and viewports (Isometric, Top, Front, back, etc.). 2D drawings of various mechanical and structural components, electrical and electronic circuits. Orthographic and Isometric views of mechanical castings and simple structures.

Learning Resources:

Text Book:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House.

Reference Books:

1. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
2. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
3. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
4. (Corresponding set of) CAD Software Theory and User Manuals

154	Fundamentals of Computer Science Lab (Common to CSBS/CSE (AI& ML)/CSE(DS)/CSE(IoT))	L	P	C
		0	3	1.5

Course Objectives:

The objectives of the course are, to make the student understand:

1. Basic problem solving process using Flow Charts and algorithms.
2. Basic concepts of control structures in C.
3. Concepts of arrays, functions, pointers and Dynamic memory allocation in C.
4. Concepts of structures, unions, files and command line arguments in C.

Course Outcomes:

After successful completion of the course, the students are able to

1. Develop algorithms and flow charts for simple problems.
2. Use suitable control structures for developing code in C.
3. Design modular programs using the concepts of functions and recursion.
4. Develop code for complex applications using structures, pointers and file handling features.

List of Exercises / Activities:

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]

1. Algorithm and flowcharts of small problems like GCD
2. Structured code writing with:
 - a. Small but tricky codes
 - b. Proper parameter passing
 - c. Command line Arguments
 - d. Variable parameter
 - e. Pointer to functions
 - f. User defined header
 - g. Make file utility
 - h. Multi file program and user defined libraries
 - i. Interesting substring matching / searching programs
 - j. Parsing related assignments

Note: A minimum of 10(Ten) experiments have to be Performed and recorded by the candidate to attain eligibility for Semester End Practical Examination.

MC 1

Constitution of India
(Common to CSE (AI& ML)/CSE(DS)/CSE(IoT))

L	P	C
2	0	0

Course Objective:

To provide basic information about Indian Constitution.

Course Outcomes:

After completion of the course, the students will be able to:

1. Understand the significance of many provisions of the Constitution as well as to gain insight into their back ground. They will also understand number of fundamental rights subject to limitations in the light of leading cases.
2. Study guidelines for the State as well as for the Citizens to be followed by the State in the matter of administration as well as in making the laws. It also includes fundamental duties of the Indian Citizens in Part IV A (Article 51A).
3. Understand administration of a State, the doctrine of Separation of Powers.
4. Know how the State is administered at the State level and also the powers and functions of High Court.
5. Understand special provisions relating to Women empowerment and also children. For the stability and security of the Nation, Emergency Provision are Justified.
6. Understand election commission as an independent body with enormous powers and functions to be followed both at the Union and State level. Amendments are necessary, only major few amendments have been included.

Course Content:

UNIT – I

10 Periods

Preamble to the Constitution of India Domicile and Citizenship. Fundamental rights under Part III, Leading Cases. Relevance of Directive Principles of State Policy under Part-IV, IV-A Fundamental duties.

UNIT – II

10 Periods

Union Executive - President, Vice-President, Prime Minister, Union Legislature - Parliament and Union Judiciary - Supreme Court of India. State Executive - Governors, Chief Minister, State Legislature and High Court.

UNIT – III

10 Periods

Special Constitutional Provisions for Scheduled Casters and Tribes, Women and Children and Backward Classes, Emergency Provisions.

UNIT – IV

10 Periods

Electoral process, Centre State Relations (Amendment Procedure, 42nd, 44th, 74th, 76th, 86th and 91st Constitutional amendments).

Learning Resources:

Text Book:

1. Durga Das Basu, Introduction to the Constitution of India" (student edition) Prentice - Hall EEE,19th/20th Edition, 2001.

Reference Books:

1. M.V. Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.*B.Tech.(EC)/R-18/2018-2019* Printed through web on 30-04-2019 14:19:43 *Page 1/2*
2. Brij Kishore Sharma, "Introduction to the Constitution of India", PHI, Learning Pvt.Ltd., NewDelhi,2011.