

DEVI AHILYA VISHWAVIDYALAYA, INDORE



FACULTY OF ENGINEERING

SCHEME OF EXAMINATION

I B.Tech Programme (As Per AICTE Guideline and NEP 2020)

(Computer Science and Business Systems)

INSTITUTE OF ENGINEERING & TECHNOLOGY

(www.ietdavv.edu.in)

DEVI AHILYA VISHWAVIDYALAYA, INDORE
INSTITUTE OF ENGINEERING & TECHNOLOGY
SCHEME OF EXAMINATION FOR I B.Tech PROGRAMME

(As per AICTE guideline and NEP 2020)

Semester-I

S. No	Subject code	Subject Name	Type	CI-LI-(TW+SL) (Hours/Semester)	Credits* (Total Hrs/30)
1.	1RBBS1	Discrete Mathematics	BS	30-10-00-80	4
2.	1RBBS2	Introductory Topics in Statistics, Probability and Calculus	BS	20-10-00-60	3
3.	1RBES3	Fundamentals of Computer Science + Lab	ES	20-10-20-70	4
4.	1RBES4	Principles of Electrical Engineering + Lab	ES	20-10-20-70	4
5.	1RBBS5	Physics for Computing Science + Lab	BS	20-10-20-70	4
6.	1RBHS6	Business Communication and Value science I	HS	20-10-00-60	3
TOTAL CREDITS					22

**This is as per the new National Credit Framework, which accounts for 30 hrs. of learning as equivalent to 1 credit. Legend:*

- a) BS-Basic Science, ES-Engineering Science, HS-Humanities and Social Science including Management, PC-Programme Core, IK- Indian Knowledge System
- b) CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture (L), Tutorial (T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- c) LI: Laboratory Instruction (Includes experiments/practical performances /problem based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
- d) TW: Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- e) SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc. (If provided in curriculum structure.)

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering and Technology			I Year B.Tech. (Computer Science and Business Systems) I Sem			
Course Code & Name	Instructions Hours per Semester and Credits					
1RBBS1: Discrete Mathematics	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per Semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	120	4
	30	10	00	80		

Course Learning Objectives:

- To introduce students to ideas and techniques from discrete mathematics that are widely used in Computer Science.
- Provide the fundamentals of formal techniques for solving the problems in mathematical reasoning, combinatorial analysis, discrete structures, algorithmic thinking, and applications and modelling.

Prerequisites: Nil

COURSE CONTENTS

Unit I

Sets: Algebra of sets, computer representation, principle of inclusion- exclusion. Functions: Characteristic function of a set, floor and ceiling functions, hashing function. Relations: Binary Relation, properties, closure of a relation, equivalence and partial order relations, partially ordered set, Hasse Diagram, greatest lower bound and least upper bound, lattice, properties of lattices, distributive lattices, complemented lattices.

CO Mapped: CO1

Unit II

Propositional Logic: Propositional calculus - propositions and connectives, syntax; Semantics - truth assignments and truth tables, validity and satisfiability, tautology; Adequate set of connectives; Equivalence and normal forms; logic in proof, predicates and quantifiers, rules of inferences, Compactness and resolution; Formal reducibility - natural deduction system and axiom system; Soundness and completeness.

CO Mapped: CO2

Unit III

Mathematical Induction: Strong induction, well-ordering, Recursive definitions.

Combinatorics: Basic counting, balls and bins problems, Pigeon-hole principle, sequences and summations, generating functions. Recurrence relations: Formation, methods of solution and application.

CO Mapped: CO3

Unit IV

Graph Theory: Terminology, graph representation-incidence and adjacency matrices, graph isomorphism, connectedness, Euler & Hamiltonian graphs, planar graph, graph coloring, shortest paths algorithms. Trees: Terminology, spanning trees, minimum spanning trees, tree traversals; prefix codes.

CO Mapped: CO4

Unit V

Abstract algebra: Binary operation, groupoid, semi group, monoid, group, subgroup, cyclic group, permutation group, definition and examples of Rings, Integral domain and Fields. Boolean Algebra-Definition, laws of Boolean algebra, Boolean functions, sum of products and product of sum form, normal form, Boolean expression for logic and switching network, Karnaugh Map.

CO Mapped: CO5

Course Outcomes (CO):

CO. No.	CO
CO1	Inclusion-exclusion principle helps to compute the number of elements that satisfy at least one of several properties when elements satisfying more than one property are not counted twice. Functions provides a relation between a set of inputs and a set of permissible outputs. Relations will help in establishing a connection between any two objects or things and in creating relational database management systems.
CO2	Propositional Logic can be used in validating arguments and decision making.
CO3	Mathematical induction is a technique to prove algorithm correctness, pigeon hole principle in counting, generating function to manipulate the sequence as a single entity, recurrence relation in analysing and solving problems related to algorithms, signal processing, control systems, and computational complexity.
CO4	Graphs helps to model real problems, study and analysis. Application of trees is in data retrieval, data compression, representing hierarchical relationships, design of networks, etc.
CO5	Algebraic structures provide a framework for constructing systems and analysing their properties. They provide rules, how elements interact and create new

	elements. Boolean algebra has its applications in development of digital electronics, digital logic, computer programming, and mathematical logic.
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Books Recommended:

- [1] Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th ed., Tata McGraw-Hill Edition 2007.
- [2] Kolman, Busby & Ross, Discrete Mathematical Structures, 6th edition, Pearson Education, 2008.
- [3] C.L. Liu, Introduction to Discrete Mathematics, McGraw Hill, 1986.
- [4] N. Herstein, Topics in Algebra, John Wiley and Sons, 1991.
- [5] M. Morris Mano, Digital Logic & Computer Design, Pearson, 2017.
- [6] J.A. Bondy & U.S.R. Murty, Graph Theory with Applications, Macmillan Press, London, 1976.
- [7] L. Zhongwan, Mathematical Logic for Computer Science, World Scientific, Singapore, 1989.
- [8] R. A. Brualdi, Introductory Combinatorics, Pearson, 2019.
- [9] E. Mendelsohn, Introduction to Mathematical Logic, (6th Edition), CRC Press, 2015.

CO-PO-PSO Relationship:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1RBBS1.CO1	3	3	2	2	3							3	2	1
1RBBS1.CO2	3	3	2	2	3							2	3	1
1RBBS1.CO3	3	3	2	2	3							3	2	1
1RBBS1.CO4	3	3	2	2	3							2	3	1
1RBBS1.CO5	3	3	2	2	3							3	2	1

- *CO (Rows) mention Nil / Very Small / Insignificant Contribution to the PO (Column)
- 1: Relevant and Small Significant 2: Medium or Moderate and 3: Strong

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering and Technology			I Year B.Tech. (Computer Science and Business Systems) I Sem			
Course Code & Name	Instructions Hours per Semester and Credits					
1RBBS2: Introductory Topics In Statistics, Probability and Calculus	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per Semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	90	3
	20	10	00	60		

Course Learning Objectives:

- To introduce students to ideas and techniques of Statistical models that are used to identify, analyze, and quantify potential risks through probability theory. It enables engineers to understand the risk associated with particular activities or situations, allowing them to take more effective steps to lessen them.
- To develop the concepts of calculus, useful to create mathematical models in order to arrive into an optimal solution in various disciplines like physics, engineering, economics, and statistics.

Prerequisites: Nil

COURSE CONTENTS

UNIT 1

Introduction to Statistics: Basic objectives. Applications in various branches of science with examples. Collection of Data: Internal and external data, Primary and secondary Data. Descriptive Statistics: Classification and tabulation of univariate data, graphical representation, Frequency curves. Descriptive measures - central tendency and dispersion. Bivariate data. Summarization, marginal and conditional frequency distribution.

CO Mapped: CO1

UNIT 2

Probability: Concept of experiments, sample space, event. Definition of Combinatorial Probability. Conditional Probability, Bayes Theorem. Probability distributions: discrete & continuous distributions, Binomial, Poisson and Geometric distributions, Uniform, Exponential, Normal distributions.

CO Mapped: CO2

UNIT 3

Elements of Hypothesis Testing, Level of significance, Test of significance and goodness of fit-Chi-square, t, F distributions. Expected values and moments: mathematical expectation and its properties, Moments (including variance) and their properties.

CO Mapped: CO3

UNIT 4

Basic concepts of Differential calculus: Review of Successive differentiation, Leibnitz theorem, Expansion of functions by Taylor's and Maclaurin's Theorem; Asymptotes; Curvature, Function of Several Variables-Partial Differentiation, Maxima and Minima of Function of Two and More Variables.

CO Mapped: CO4

UNIT 5

Basic concepts of Integral calculus: Beta and Gamma functions; Tracing of curves- Cartesian, polar and parametric curves; Area; Length of Curve; Double and Triple Integration; Change of order of Integration; Area; Volume.

CO Mapped: CO5

Course Outcome (CO):

CO. No.	CO
CO1	Apply statistical techniques to analyze and interpret data effectively across different fields, develop skills to summarize and present data using appropriate graphical representations and statistical measures.
CO2	Learn and apply probability theory to model and analyze uncertain events. Ability to work with various probability distributions and understand their properties and applications in real-world situations.
CO3	Learn and apply hypothesis testing to determine if there is enough evidence in a sample data to draw conclusions about a population, goodness of fit test to determine whether the differences between the sample data and the distribution are statistically significant; Expectations to estimate conditions that may happen in the future; Moments to describe how the probability mass of a random variable is distributed.
CO4	Apply Taylor series in approximating a function, or data, as a series of function in data analysis, cell phones, differential equations, etc., Asymptotes to understand the limits of mathematical models in real-world situations, Curvature in graphic design, to find the normal curvature and ideal level for manufacturing car tire tubes, for designing road curves etc.; Partial Differentiation can be used to study stress, strain, electric and magnetic fields, fluid dynamics, heat conduction, in optimization algorithms like

	gradient descent, Maxima-Minima is used in a variety of situations to determine the maximum or minimum value of a quantity in economics, business, and engineering.
CO5	Apply Beta and Gamma functions to provide an analytical solution to various integrals, Curve sketching in expressing and understanding complex mathematical functions and by sketching the graph of any function, one can find out its area, length of curve, volume etc; Multiple integrals used in calculating areas under curves (useful in physics for distance and velocity), determining the volume of irregular shapes and so on.

Books Recommended:

- [1] Introduction of Probability Models, S.M. Ross, Academic Press, N.Y., 11th ed., 2014.
- [2] Probability and Statistics for Engineers, I. R. Miller, J.E. Freund & R. Johnson, PHI, 8th Ed., 2011.
- [3] Introduction to the Theory of Statistics, A. M. Mood, F.A. Graybill & D.C. Boes, McGraw Hill Education, 3rd Ed., 2017.
- [4] Advanced Engineering Mathematics, Peter V. O'Neil, Thomson Learning 7th Ed., 2012.
- [5] Advanced Engineering Mathematics, M. D. Greenberg, Pearson Education, 2nd Ed., 1998.
- [6] B.S. Grewal, Engineering Mathematics, 39/e, Khanna Publishers, 2006.
- [7] Erwin. Kreyszig, Advanced Engineering Mathematics, 8th edition, John Willy and sons Publications, 1999.
- [8] Ramana B V, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.

CO-PO-PSO Relationship:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1RBBS2.CO1	3	3	2	2	3	3						3	2	1
1RBBS2.CO2	3	3	2	2	3	3						3	3	2
1RBBS2.CO3	3	3	2	2	3	3						3	3	3
1RBBS2.CO4	3	3	2	2	3	-						2	3	3
1RBBS2.CO5	3	3	2	2	3	-						2	2	3

- *CO (Rows) mention Nil / Very Small / Insignificant Contribution to the PO (Column)
- 1: Relevant and Small Significant 2: Medium or Moderate and 3: Strong

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering and Technology			I Year B.Tech. (Computer Science and Business Systems) I Sem			
Course Code & Name	Instructions Hours per Semester and Credits					
1RBES3: Fundamentals of Computer Science + Lab	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per Semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	120	4
	20	10	20	70		

Course Learning Objectives:

- To introduce the fundamental concepts of Computer Science by introducing and practicing the C programming language.
- To get students acquainted with programming language and using it for problem solving. To introduce imperative language; syntax and constructs of ANSI C.

Prerequisites: Nil

COURSE CONTENTS

Unit I

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

CO Mapped: CO1

Unit II

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.

CO Mapped: CO2

Unit III

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, Initialisation, Recursion, Pre-processor, Standard Library Functions and return types.

CO Mapped: CO3

Unit IV

Pointers, Arrays and Structures: Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialisation of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated. Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral structures, Table lookup, typedef, unions, Bit-fields

CO Mapped: CO4

Unit V

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. Debugging, Macro, User Defined Header, User Defined Library Function, makefile utility.

CO Mapped: CO5

Course Outcomes (CO):

CO. No.	CO
CO1	To learn about algorithm and flowchart as the structured tool for writing or representing the solution of a problem. Also learn about basic constructs of the programming language namely Data type, Variables, operators and expressions.
CO2	To learn about control flow statements and their use in writing code with required execution flow sequence.
CO3	To learn about the declaration and usage of functions to write structured and modularized code. Also explore the standard template library for using the problem solving with available library support.
CO4	To learn concepts and code usage of Array, Pointers and structures. Use these constructs to represent the problem entities into code constructs.
CO5	To learn File Input and Output using the support of the language construct. To apply file handling for writing solutions to problems requiring the disk file handling like DAT file or like database concept.

List of Practical:

1. Algorithm and flowcharts of small problems like GCD
2. Structured code writing with:

3. Small but tricky codes
4. Proper parameter passing
5. Command line Arguments
6. Variable parameter
7. Pointer to functions
8. User defined header
9. Make file utility
10. Multi file program and user defined libraries
11. Interesting substring matching / searching programs
12. Parsing related assignments

Books Recommended:

- [1] The C Programming Language, (Second Edition) B. W. Kernighan and D. M. Ritchi, PHI.
- [2] Programming in C, (Second Edition) B. Gottfried, Schaum Outline Series.
- [3] C: The Complete Reference, (Fourth Edition), Herbert Schildt, McGraw Hill.
- [4] Let Us C, Yashavant Kanetkar, BPB Publications.

CO-PO-PSO Relationship:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1RBES3.CO1	3	3	2	-	-							1	3	2
1RBES3.CO2	3	3	2	-	-							1	3	2
1RBES3.CO3	3	3	3	2	-							1	3	3
1RBES3.CO4	3	3	3	2	2							1	3	2
1RBES3.CO5	3	3	4	3	3							2	3	3

- *CO (Rows) mention Nil / Very Small / Insignificant Contribution to the PO (Column)
- 1: Relevant and Small Significant 2: Medium or Moderate and 3: Strong

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering and Technology			I Year B.Tech. (Computer Science and Business Systems) I Sem			
Course Code & Name	Instructions Hours per Semester and Credits					
1RBES4: Principles of Electrical Engineering + Lab	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per Semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	120	4
	20	10	20	70		

Course Learning Objectives:

- To develop an understanding of the underlying mathematics as a preparation for a specialist study of applications areas like operation of electrical networks in DC and AC (Single and three phase), electrostatics and its mechanism, electromechanical energy conversions, sensors and various measuring instruments etc.
- Numerical approach enables solution of a complex problem with a great number of very simple operations. It is useful to find the solution with use of computers making calculation easy and fast.

Prerequisite(s): Basic knowledge of algebra of complex numbers, determinants, matrices and basic physics.

COURSE CONTENTS

Unit I:

Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Terminology and symbols in order to describe electric networks, voltage source and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchhoff's laws and applications to network solutions using mesh and nodal analysis.

DC Circuits: Current-voltage relations of the electric network by mathematical equations to analyze the network (Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem) Simplifications of networks using series- parallel, Star/Delta transformation. Superposition theorem.

CO Mapped: CO1

Unit II:

AC Circuits: Concept of work, power, energy, and conversion of energy, AC waveform definitions, form factor, peak factor, study of R-L, R-C, RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance,

admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (λ - Δ & λ - λ).

CO Mapped: CO2

Unit III:

Electrostatics and Electro-Mechanics: Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors, Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion.

CO Mapped: CO3

Unit IV:

Measurements and Sensors: Introduction to measuring devices/sensors and transducers (Piezoelectric and thermo-couple) related to electrical signals, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-phase power). Electrical Wiring and Illumination system: Basic layout of the distribution system, Types of Wiring System & Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices & system.

CO Mapped: CO4

Unit V:

Principle of batteries, types, construction and application, Magnetic material and B-H Curve, Basic concept of indicating and integrating instruments.

CO Mapped: CO5

Course Outcomes (CO):

CO. No.	CO
CO1	Analyze the basic components of electrical circuits and apply Kirchoff's law in DC electrical circuits and networks.
CO2	Analyze the AC circuits and apply in 1-phase and 3-phase electrical circuits.
CO3	Analyze the magnetic circuits, transformers and electromagnetic devices.
CO4	Describe the measuring devices, electrical quantities, requirement of distribution system.
CO5	Describe the storing devices, integrating instruments

List of Practical:

1. Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits
2. Verification of Superposition network theorem.
3. Verification of Thevenin and Norton network theorem.
4. Verification of Maximum power transfer theorem.
5. Determination of resistance temperature coefficient
6. Simulation of R-L-C series circuits for $X_L > X_C$, $X_L < X_C$
7. Verification of relation in between voltage and current in three phase balanced star and delta connected loads.
8. Demonstration of measurement of electrical quantities in DC and AC systems.

Books Recommended:

- [1] Electric Machinery, (Sixth Edition) A. E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, Tata McGraw Hill.
- [2] A Textbook of Electrical Technology, (vol. I), B. L. Theraja, Chand and Company Ltd., New Delhi.
- [3] Basic Electrical Engineering, V. K. Mehta, S. Chand and Company Ltd., New Delhi.
- [4] Theory and problems of Basic Electrical Engineering, (Second Edition), J. Nagrath and Kothari, Prentice Hall of India Pvt. Ltd.
- [5] Basic of Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press.
- [6] T. K. Nagsarkar and M. S. Sukhija, Basic of Electrical Engineering, Oxford University Press, 2011.
- [7] Introduction to Electrodynamics, D. J. Griffiths, (Fourth Edition), Cambridge University Press.
- [8] Engineering Circuit Analysis, William H. Hayt & Jack E. Kemmerly, McGraw-Hill Book Company Inc.
- [9] Fundamentals of Electrical and Electronics Engineering, Smarjith Ghosh, Prentice Hall (India) Pvt. Ltd.

CO-PO-PSO Relationship:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1RBES4.CO1	3	2	1	-	-	-	-					1	1	3
1RBES4.CO2	1	-	2	-	-	2	-					2	2	3
1RBES4.CO3	2	-	-	-	-	-	1					1	1	3
1RBES4.CO4	1	-	2	-	-	-	-					2	2	3
1RBES4.CO5	1	2	3	3	-	-	-					1	1	3

- *CO (Rows) mention Nil / Very Small / Insignificant Contribution to the PO (Column)
- 1: Relevant and Small Significant 2: Medium or Moderate and 3: Strong

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering and Technology			I Year B.Tech. (Computer Science and Business Systems) I Sem			
Course Code & Name	Instructions Hours per Semester and Credits					
1RBBS5: Physics for Computing Science + Lab	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per Semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	120	4
	20	10	20	70		

Course Learning Objectives:

- To introduce the basics concepts of physics and make a bridge between basics and their application.
- To introduce the concept of the modern science like Laser, Optical fire, X-rays and quantum physics.
- To introduce fundamental physics like wave optics, interference, diffraction polarization, and semiconductor physics.

Prerequisites: Basic knowledge of Optics, Crystal Structure and Semiconductors.

COURSE CONTENTS

Unit I

Interference-principle of superposition-Young's experiment: Theory of interference fringes-types of interference- Fresnel's prism-Newton's rings, Diffraction-Two kinds of diffraction-Difference between interference and diffraction - Fraunhofer diffraction at single slit-plane diffraction grating. Temporal and Spatial Coherence.

CO Mapped: CO1

Unit II

Polarization of light: Polarization- Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction. Laser and Fiber optics: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO₂ and Neodymium YAG (Neodymium-doped Yttrium Aluminum Garnet); Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in engineering. Fiber optics and Applications, Types of optical fibers.

CO Mapped: CO2

Unit III

Crystallography: Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, atomic packing factor for SC, BCC, FCC and HCP structures, X-ray diffraction. Semiconductor Physics: Conductor, Semiconductor and Insulator; Origin of Band Theory, Basic concept of Band theory,

CO Mapped: CO3

Unit IV

Thermodynamics: Zero-th law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes. **Basic Idea of Electromagnetisms:** Continuity equation for current densities, Maxwell's equation in vacuum and non- conducting medium.

CO Mapped: CO4

Unit V

Introduction- Planck's quantum theory- Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one-dimensional potential box, Oscillation: Periodic motion-simple harmonic motion-characteristics of simple harmonic motion-vibration of simple spring-mass system. Resonance-definition, damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators.

CO Mapped: CO5

Course Outcome (CO):

CO. No.	CO
CO1	Apply and learn the basic concept of interference and diffraction to measure the wavelength, refractive index, film thickness etc different physical quantities of light as well as the materials.
CO2	Learn the concept of polarization, laser and optical fibre and apply in the modern era applications.
CO3	Understand the basic concept of material and its application in modern engineering.
CO4	Understand the concept of thermodynamics and electromagnetism.

CO5	Learn the concept of the quantised system of the materials and simple harmonic oscillations,
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List of Practical:

1. To Study the Characteristics of a Diode / Zener Diode.
2. To determine the Planck's constant by LED.
3. To Study the Charging & DisCharging of a Capacitor.
4. To Study the Regulated Power Supply using Zener Diode.
5. To Study the Energy Bend Gap of a semiconductor.
6. To determine the Planck's constant by LED.
7. To determine "R" by the Newton's Ring Method.
8. To determine "λ" by the Plane Transmission Grating.
9. To verify Mavls Law using He-Ne LASAR

Books Recommended:

- [1] Concepts of Modern Physics, (Fifth Edition) A Beiser, McGraw Hill International.
- [2] Fundamentals:
- [3] Optics, (Fifth Edition) Ajoy Ghatak, Tata McGraw Hill.
- [4] Sears & Zemansky University Physics, Addison-Wesley.
- [5] Fundamentals of Optics, (Third Edition) Jenkins and White, McGraw-Hill.
- [6] R K Gaur & S L Gupta, Engineering Physics, DhanpatRai& Sons, 2006
- [7] H.K. Malik &A.K.Singh, Engineering Physics, Tata McGraw Hill, 2011
- [8] W. T. Silfast, Laser FundamentalsCambr. Un. Press, 1996.
- [9] H White, Modern Physics: Van Nostrand; 15/e

CO-PO-PSO Relationship:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1RBBS5.CO1	3	3	2	-	-				3			2	2	2
1RBBS5.CO2	3	3	2	-	-							3	3	2
1RBBS5.CO3	3	2	2	-	-				3		3	3	3	2
1RBBS5.CO4	3	1	1	-	-				3		3	3	3	2
1RBBS5.CO5	3	3	1	2	2				3		3	3	3	3

- *CO (Rows) mention Nil / Very Small / Insignificant Contribution to the PO (Column)
- 1: Relevant and Small Significant 2: Medium or Moderate and 3: Strong

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering and Technology			I Year B.Tech. (Computer Science and Business Systems) I Sem			
Course Code & Name	Instructions Hours per Semester and Credits					
1RBHS6: Business Communication and Value science I	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per Semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	90	3
	20	10	00	60		

Course Learning Objectives:

- To equip students with a comprehensive understanding of business communication, its models, and processes, while enhancing their ability to overcome communication barriers, integrate value sciences, and apply ethical principles in professional contexts.
- The course also aims to foster critical thinking, empathy, and practical communication skills for addressing real-world challenges effectively and responsibly.

Prerequisites: Nil

COURSE CONTENTS

Unit I

Introduction to Business Communication: Definition, Meaning, and Components, Importance of Business Communication in Organizational Success, Stages of Communication Process. Types of Business Communication: One-way vs. Two-way Communication, Verbal and Non-verbal Communication, Formal, Informal, Upward, Downward, Lateral Communication, Intrapersonal, Interpersonal, Mass Communication, Grapevine Communication: Gossip Wheel and Other Forms.

CO Mapped: CO1

Unit II

Transmission Models: Shannon and Weaver Model of communication, Berlo's SMCR Model, Transactional Models: Barlund Model of communication, Interactional Models: Schramm's Model of communication.

CO Mapped: CO2

Unit III

Social Barriers: Cultural, Language, Gender, and Interpersonal Barriers, Medium-related Barriers, Physical Barriers: Design Barriers, Speaker Volume/Pitch Issues, Receiver's Physical Abilities, Psychological Barriers: Attitude, Perception, Emotion, and Personality-related Barriers.

CO Mapped: CO3

Unit IV

Introduction to Value Sciences: Definition, Importance, and Applications, Role of Value Sciences in Business Communication, Tools and Techniques in Value Sciences, Frameworks and Practical Applications, Components of Value Sciences, Significance in Ethical Communication.

CO Mapped: CO4

Unit V

Introduction to Business Ethics: Definition, Key Aspects, and Importance, Core Principles of Business Ethics, Framework for Ethical Decision-Making, Steps and Approaches, Application of Business Ethics in Communication, Ethical Dilemmas and Case Studies.

Supplementary Module: Self-Work and Grammar Refresher

Self-Work through Immersion: Interview individuals like maids, watchmen, drivers, or labours. Reflect on their values and motivations.

Grammar Refresher: Parts of Speech, Tenses Develop empathy and appreciation for diverse value systems. Strengthen grammar skills to enhance professional communication.

CO Mapped: CO5

Course Outcomes (CO):

CO. No.	CO
CO1	To understand the significance of business communication, analyze its role in professional contexts, and differentiate between its various types and forms.
CO2	To explain key communication models, evaluate their relevance in modern business, and apply them to practical scenarios.
CO3	To identify barriers to communication in organizational settings and develop effective strategies to overcome them.
CO4	To articulate the role of values in business communication and apply value sciences frameworks to real-world situations.

CO5	To develop ethical decision-making frameworks and address ethical challenges in professional communication.
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Books Recommended:

- [1] Rizvi and Ashraf, “Effective Technical Communication”, 1st edition, Mc Graw – Hill, India 2017.
- [2] Locker, Kitty O., and Stephen Kyo Kaczmarek. “Business Communication: Building Critical Skills”, 6th edition, McGraw-Hill / Irwin Publishers, 2014.
- [3] Subroto Bagchi, “The Professional”, 1st edition, Penguin Publishers,2009.
- [4] Alan Mc’Carthy and O’Dell, English vocabulary in use
- [5] APAART: Speak Well 1 (English language and communication)
- [6] APAART: Speak Well 2 (Soft Skills)

CO-PO-PSO Relationship:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
1RBHS6.CO1	2	1	-	-	-	-	-	-	-	3		2	2	2
1RBHS6.CO2	2	3	2	1	-	-	-	-	-	3		3	3	2
1RBHS6.CO3	-	3	2	2	-	-	-	2	-	2		3	3	2
1RBHS6.CO4	-	-	1	-	-	2	-	3	1	2		3	3	2
1RBHS6.CO5	-	-	2	-	-	1	-	3	2	3		3	3	3

- *CO (Rows) mention Nil / Very Small / Insignificant Contribution to the PO (Column)
- 1: Relevant and Small Significant 2: Medium or Moderate and 3: Strong