ರೈ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ
Rai Technology University
(Estd. under Karnataka Act. No. 40 of 2013)

B. TECH CSE

1st Semester detailed syllabus||Batch: 2025-2029

Contents

Curriculum Structure

SL	Code	Level	Subject Name	L	T	P	S	J	Mode	Credit
1	UCC-1	100	Communication Skills	3	0	0	0	0	T	3
2	UCC-2	100	Universal Human Values	3	0	0	0	0	T	3
3	PFC-1	100	Calculus, Vector spaces and Linear Algebra	3	0	0	0	0	T	3
4	PFC-2	100	Applied Physics	3	0	0	0	0	T	3
5	PFC-3	100	Applied Physics Lab	0	0	2	0	0	P	1
6	PCC-1	100	Introduction to Computer Systems	3	0	2	0	0	T+P	4
7	PCC-2	100	Problem Solving through C Programming	3	0	0	0	0	T	3
8	PCC-3	100	Problem Solving through C Programming Lab	0	0	4	0	0	P	2

UCC- University Core Course, **PFC**-Program Foundation Course, **PCC**-Program Core Course, **PEC**-Program Elective Course (Specialization), **MIN**-Minor Course, **MDC**-Multidisciplinary Course, **MINE**- Minor Enhancement Course

![Rai Technology University logo] ರೈ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ
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1.Communication Skills

RAI TECHNOLOGY UNIVERSITY, BANGALORE							CURRICULUM		
Programme	Bachelor of Technology in CSE				Year of Regulation		**2025-26**		
College	College of Engineering				Semester		I		
Department	Computer Science and Engineering			Credit Structure			Marks Distribution		
Course Category	Paper Name		L	T	P	C	CIE	SEE	Total
UCC-1	**Communication Skills**		**3**	**0**	**0**	**3**	**60**	**40**	**100**

Course Objectives	To cultivate a comprehensive understanding of communication skills	**Course Outcomes**	CO1	Demonstrate an understanding of essential aspects of communication skills
	To enhance reading proficiency with a diverse range of written texts with different genres and styles of written communication.		CO2	Exhibit the ability to Read a variety of written text using subskills such as skimming and scanning
	To develop proficiency in grammatical accuracy with specific focus on common grammatical errors and provide targeted exercises for improvement		CO3	Identify and rectify common grammatical errors in English.
	To equip learners with proficient presentation and conversation skills by integrating practical exercises for public speaking and interpersonal communication.		CO4	Show competence in delivering compelling presentations and engage in articulate and effective conversations in English across different contexts
	To provide practical experience in formal writing, including Statement of Purpose (SoP) preparation		CO5	Display advanced formal writing skills in crafting job application letters, CVs, and Statements of Purpose.

SYLLABUS			
No	**Content**	**Hrs**	**COs**
1	**Introduction to Communication Skills** The Seven Cs of Effective Communication, Verbal and Non-Verbal Communication, Technology-enabled Business Communication, Effective Listening Skills, Synonyms and Antonyms, Formal and informal communication in spoken English	9	CO1
2	**Barriers to Effective Communication & Non-verbal Communication and Body Language** Miscommunication; Noise; Types of barriers; Communication across Culture, case Studies and Overcoming measures. Forms of Non-verbal communication; Kinesics; Proxemics; Chronemics and Effective use of body language	9	CO2
3	**Presentation & Listening Skills** 4Ps (Planning, Preparation, Practice, Presentation), Outlining; Effective use of A/V aids and Modes of Delivery, Hearing Vs listening, process of listening, types, Barriers to Listening, Qualities of a Good Listener and Active Vs Passive Listening	9	CO3
4	**Speaking & Writing Skills** Introducing yourself, describing a person, place, situation and event, giving instruction, making inquiries – at a bank, post-office, air-port, hospital, reservation counter and role play, Basics of Writing, Paragraph Writing, Precise Writing, Memos, Advertisements, Paraphrasing and Summarizing.	9	CO4
5	**Report & Letter Writing** Format, Structure and Types, Technical Reports, Internship Reports, Description and Proposal, Job applications with bio data, Job acceptance and joining (e-mail), Interview Skills.	9	CO5
Total Hours		**45**	

Essential Readings

Muralikrishna C., Sunita Mishra "Communication Skills for Engineers" 2nd edition, Pearson, New Delhi 2010

Vyas Manish A., Yogesh L. Patel, "Tasks for the English Classroom", MacMillan, New Delhi, 2012.

Lougheed Lin, "Business Correspondence: A Guide to Everyday Writing', Longman, Pearson Education, Inc,2003

Supplementary Readings
Hargie, Owen. Ed. The Handbook of Communication Skills. Routledge, 2006.
Baron, Naomi S. Writing in the Age of E-mail: The Impact of Ideology versus Technology. Visible language, 1998.
Sasikumar, V., et al. A Course in Listening & Speaking I. 2005. Cambridge University Press India Pvt. Ltd. (under the Foundation Books Imprint), 2010
Useful Online resources
A rendezvous with Simi Garewal: Ratan Tata: https://www.youtube.com/watch?v=ozetTgOHu78&t=510sHere Ratan Tata discusses his personal life, his expectations, his experience as a CEO of Tata and sons.
Tips on communication (TED Talk): The Secrets of Learning a New Languagehttps://youtu.be/o_XVt5rdpFY
The Tharoor Guide To Indian English: https://youtu.be/NsyI9LIXbFM Shashi Tharoor talks of new words like "defenstrate", "brinjol"; talks about Indian English, ethnicity and so on.

2. Universal Human Values

RAI TECHNOLOGY UNIVERSITY, BANGALORE							CURRICULUM	
Programme	Bachelor of Technology in CSE					Year of Regulation	**2025-26**	
College	College of Engineering					Semester	**I**	
Department	Computer Science and Engineering			Credit Structure			Marks Distribution	
Course Category	Paper Name		L	T	P	C	CIE	SEE	Total

Course Category	Paper Name	L	T	P	C	CIE	SEE	Total
UCC-2	**Universal Human Values**	3	0	0	3	60	40	100

Course Objectives		**Course Outcomes**	
	To help students understand the need, content, and process of value education and develop a deeper understanding of happiness and prosperity in life.	CO1	Describe the importance of value education and demonstrate self-exploration as a method for self-development.
	To facilitate the development of a right understanding of the human being through self-exploration and the harmony between 'Self' and 'Body'.	CO2	Analyze the human being as a co-existence of self and body and explain the meaning of Sanyam and Swasthya.
	To inculcate the understanding of harmony in human relationships and promote ethical behavior in family and social contexts.	CO3	Apply the concepts of trust, respect, and other human values to build and maintain healthy family and social relationships.
	To make students aware of the harmony in nature and the interconnectedness among all living and non-living systems in existence.	CO4	Evaluate the harmony in nature and existence and interpret the concept of coexistence in the natural order.
	To develop a holistic perspective towards professional ethics by integrating human values into personal and professional life.	CO5	Demonstrate ethical decision-making skills and apply human values in real-life professional and social situations.

SYLLABUS			
No	Content	Hrs	COs
1	**Course Introduction - Need, Basic Guidelines, Content and Process for Value Education** Understanding the need, basic guidelines, Self Exploration - its content and process; 'Natural Acceptance' and Experiential Validation, Continuous Happiness and Prosperity - Human Aspirations, Right understanding, Relationship and Physical Facilities, Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels	9	CO1
2	**Understanding Harmony in the Human Being - Harmony in Myself** Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha, Understanding the Body as an instrument of 'I', Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.	9	CO2
3	**Understanding Harmony in the Family and Society - Harmony in Human-Human Relationship** Understanding harmony in the Family, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman), meaning of Vishwas; Difference between intention and competence, meaning of Samman, Difference between respect and differentiation; the other salient values in relationship, harmony in the society, Samadhan, Samriddhi, Abhay,	9	CO3

	Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in society - Undivided Society (Akhanda Samaj), Universal Order (Sarvabhauma Vyawastha) - from family to world family.		
4	**Understanding Harmony in the Nature and Existence - Whole existence as Coexistence** Understanding the harmony in the Nature. Interconnectedness and mutual fulfilment among the four orders of nature - recyclability and self-regulation of nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all pervasive Space. Holistic perception of harmony at all levels of existence	9	CO4
5	**Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values** Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in Professional Ethics: (a) Ability to utilize the professional competence for augmenting universal human order, (b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models. Strategy for transition from the present state to Universal Human Order: (a) At the level of individual: as socially and ecologically responsible Professionals. (b) At the level of society: as mutually enriching institutions and organizations.	9	CO5
	Total Hours	45	

Essential & Supplementary Readings

"Human Values and Professional Ethics" Authors: R.R. Gaur, R. Sangal, G.P. Bagaria Publisher: Excel Books

"Professional Ethics and Human Values" Author: M. Govindarajan, S. Natarajan, V.S. Senthilkumar Publisher: PHI Learning

"Ethics in Engineering" Author: Mike W. Martin & Roland Schinzinger Publisher: McGraw-Hill

"Value Education and Professional Ethics" Author: V.S. Gopalan, S. Bhuvana Publisher: Vikas Publishing

"Moral Values and Professional Ethics" Author: A. N. Tripathi Publisher: PHI Learning

3. Calculus, Vector spaces and Linear Algebra

RAI TECHNOLOGY UNIVERSITY, BANGALORE								CURRICULUM	
Programme	Bachelor of Technology in CSE				Year of Regulation			**2025-26**	
College	College of Engineering				Semester			I	
Department	Computer Science and Engineering			Credit Structure			Marks Distribution		
Course Category	Paper Name			L	T	P	C	CIE	SEE	Total
PFC-1	**Calculus, Vector spaces and Linear Algebra**			3	0	0	3	60	40	100

Course Objectives	Analyze Computer science and engineering problems by applying Calculus.	**Course Outcomes**	CO1	Apply the knowledge of calculus to solve problems related to polar curves and learn the notion of partial differentiation to compute rate of change of multivariate functions.
	Familiarize the importance of calculus associated with one variable and multivariable for computer science and engineering.		CO2	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing area and volume.
	Have an insight into solving Integral calculus, vector calculus and vector spaces.		CO3	Understand the applications of vector calculus refer to solenoidal, and irrotational vectors.
	Make use of Linear algebra for solving the system of linear equations and compute eigen values and eigenvectors.		CO4	Make use of matrix theory for solving the system of linear equations and compute eigenvalues and eigenvectors.

SYLLABUS			
No	**Content**	**Hrs**	**COs**
1	**Calculus:** Polar coordinates, Polar curves, Angle between the radius vector and the tangent, Angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Problems.	**9**	**CO1**
2	**Integral Calculus**: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integrals. Problems.	**9**	**CO2**
3	**Vector Calculus**: Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields, Line and surface integrals. Problems.	**9**	**CO3**
4	**Vector Spaces**: Definition and examples, subspace, linear span, linearly independent and dependent sets, Basis and dimension. Problems.	**9**	**CO3**
5	**Linear Algebra**: Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigenvalues and Eigenvectors.	**9**	**CO4**
Total Hours		**45**	

Essential Readings
1. B. S. Grewal: "Higher Engineering Mathematics", Khanna Publishers, 44thEd., 2021
2. E. Kreyszig: "Advanced Engineering Mathematics", John Wiley & Sons, 10thEd., 2018.
3. David M Burton: "Elementary Number Theory" Mc Graw Hill, 7th Ed.,2017.
Supplementary Readings
1. V. Ramana: "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. Srimanta Pal & Subodh C. Bhunia: "Engineering Mathematics" Oxford University Press, 3rd Ed., 2016.
3. 4.   N.P Bali and Manish Goyal: "A Textbook of Engineering Mathematics" Laxmi Publications, 10thEd., 2022.
Other useful resource
1. https://onlinecourses.nptel.ac.in/noc18_ma05/preview
2. https://www.whitman.edu/mathematics/calculus_online/chapter14.html
3. https://nptel.ac.in/courses/103103037/5
4. https://nptel.ac.in/courses/111105051 https://nptel.ac.in/courses/111107108/25

4. Applied Physics

RAI TECHNOLOGY UNIVERSITY, BANGALORE							CURRICULUM		
Programme	Bachelor of Technology in CSE				Year of Regulation		**2025-26**		
College	College of Engineering				Semester		I		
Department	Computer Science and Engineering			Credit Structure			Marks Distribution		
Course Category	Paper Name		L	T	P	C	CIE	SEE	Total
PFC-2	**Applied Physics**		**2**	**1**	**0**	**3**	**60**	**40**	**100**

Course Objectives	To study the essentials of photonics and its application in computer science.	**Course Outcomes**	CO1	Describe the principles of LASERS and Optical fibers and their relevant applications.
	To study the principles of quantum mechanics.		CO2	Discuss the basic principles of Quantum Mechanics and its applications.
	To study Thermodynamics and its applications.		CO3	Introduction to Thermodynamics and Its Applications.
	To study the basics of semiconductors and its applications.		CO4	Summarize the essential properties of Semiconductors and Their Applications
	To study the essentials of physics for computational aspects like design and data analysis.		CO5	Applications of Physics in Computing

SYLLABUS			
No	**Content**	**Hrs**	**COs**
1	**Laser and Optical Fibers:** LASER: Characteristic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action, Population Inversion, Metastable State, Requisites of a laser system, Semiconductor Diode Laser, Applications: Bar code scanner, Laser Printer, Laser Cooling(Qualitative), Numerical Problems. Optical Fiber: Principle and Structure, Propagation of Light, Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA, Modes of Propagation, RI Profile, Classification of Optical Fibers, Attenuation and Fiber Losses, Applications: Fiber Optic networking, Fiber Optic Communication. Numerical Problems	**9**	**CO1**
2	**Quantum Mechanics:** Introduction to quantum mechanics: failure of classical mechanics and origin of quantum mechanics (theory), de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus - Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation, Numerical Problems.	**9**	**CO2**
3	**Thermodynamics and Its Applications** Laws of Thermodynamics: Zeroth Law – Concept of thermal equilibrium and its role in temperature definition. First Law – Conservation of energy, internal energy, heat, and work interactions in thermodynamic processes. Second Law – Concept of entropy, spontaneous processes, and the limitations of energy conversions., Third Law – Absolute zero and the implications on entropy at low temperatures. Carnot Cycle & Efficiency (Derivation). Applications of Thermodynamics: Heat Engines – Working principles, efficiency limitations, and practical implications. Refrigeration – Thermodynamic cycles used in cooling systems.	**9**	**CO3**
4	**Semiconductors and Their Applications:** Types of Semiconductors: Intrinsic Semiconductors – Pure semiconductors like silicon and germanium with electrical properties governed by thermal excitation. Extrinsic	**9**	**CO4**

	Semiconductors – Doped semiconductors with controlled conductivity, classified as n-type and p-type. Energy Bands & Band Gap (Derivation), Concept of conduction and valence bands in solids, Band gap energy and its role in distinguishing conductors, semiconductors, and insulators, Mathematical derivation of band gap energy. Carrier Concentration in Semiconductors (Derivation using Fermi Level) Definition of Fermi level and its significance in determining electron and hole concentrations, Derivation of carrier concentration in intrinsic and extrinsic semiconductors, Effects of temperature and doping on carrier dynamics. PN Junction & Diodes: Working Principle & Applications		
5	**Applications of Physics in Computing:** Physics of Animation: Taxonomy of physics based animation methods, Frames, Frames per Second, Size and Scale, Weight and Strength, Motion and Timing in Animations, Constant Force and Acceleration, The Odd rule, Odd-rule Scenarios, Motion Graphs, Examples of Character Animation: Jumping, Parts of Jump, Jump Magnification, Stop Time, Walking: Strides and Steps, Walk Timing. Numerical Problems	**9**	**CO5**
	Total Hours	**45**	

Essential & Supplementary Readings

Atomic and Molecular Spectra: Laser by Raj Kumar.
Laser & Optical Fiber: Engineering Physics Kindle Edition by Dr. Divya Ghyldyal
Introduction to quantum mechanics / David J. Griffiths
Thermodynamics to their applications in engineering practice by Jefferson W. Tester, Michael Modell
Fundamentals of Semiconductors Physics and Materials Properties by Peter Y. Yu, Manuel Cardona
Physics-Based Animation by Kenny Erleben, Jon Sporring, Knud Henriksen, and Henrik Dohlmann.

5.Applied Physics Lab

RAI TECHNOLOGY UNIVERSITY, BANGALORE								CURRICULUM	
Programme	Bachelor of Technology in CSE					Year of Regulation		**2025-26**	
College	College of Engineering					Semester		I	
Department	Computer Science and Engineering			Credit Structure			Marks Distribution		

Course Category	Paper Name	L	T	P	C	CIE	SEE	Total
PFC-3	**Applied Physics Lab**	**0**	**0**	**2**	**1**	**25**	**25**	**50**

Course Objectives	To study the essentials of photonics and its application in computer science.	**Course Outcomes**	CO1	Describe the principles of LASERS and Optical fibers and their relevant applications.
	To study the principles of quantum mechanics.		CO2	Discuss the basic principles of Quantum Mechanics and its applications.
	To study Thermodynamics and its applications.		CO3	Introduction to Thermodynamics and Its Applications.
	To study the basics of semiconductors and its applications.		CO4	Summarize the essential properties of Semiconductors and Their Applications
	To study the essentials of physics for computational aspects like design and data analysis.		CO5	Applications of Physics in Computing

List of Experiments

No	Content
1	**Determination of the Wavelength of Laser Light using Diffraction** Aim: To calculate the wavelength of a given laser source using a diffraction grating.
2	**Study of Diffraction Pattern through a Single Slit** Aim: To observe and analyze the diffraction pattern produced by a single slit using monochromatic light.
3	**Verification of the Double-Slit Interference using a Laser Source** Aim: To demonstrate interference of light and determine the fringe width using Young's Double-Slit experiment.
4	**Study of Diffraction Patterns of Circular Apertures (Halos)** Aim: To observe diffraction halos formed by circular apertures and analyze the patterns formed.
5	**I-V Characteristics of a Light Emitting Diode (LED)** Aim: To study the current-voltage (I-V) characteristics of an LED and determine its threshold voltage.
6	**Measurement of Numerical Aperture of an Optical Fiber (Virtual Lab)** Aim: To calculate the numerical aperture of a given optical fiber and understand its light-capturing ability.
7	**Determination of Planck's Constant using LED Emission (Virtual Lab)** Aim: To determine Planck's constant by measuring the threshold voltage of different colored LEDs.
8	**Determination of the Energy Band Gap of a Semiconductor Diode (Virtual Lab)** Aim: To estimate the energy band gap of a semiconductor material using its temperature-dependent I-V characteristics
9	**Verification of the Focal Length Formula for a Combination of Lenses (Virtual Lab)** Aim: To verify the expression for the focal length of a combination of two lenses placed coaxially

Essential & Supplementary Readings

Atomic and Molecular Spectra: Laser by Raj Kumar.

Laser & Optical Fiber: Engineering Physics Kindle Edition by Dr. Divya Ghyldyal

Introduction to quantum mechanics / David J. Griffiths

Thermodynamics to their applications in engineering practice by Jefferson W. Tester, Michael Modell

Fundamentals of Semiconductors Physics and Materials Properties by Peter Y. Yu, Manuel Cardona

Physics-Based Animation by Kenny Erleben, Jon Sporring, Knud Henriksen, and Henrik Dohlmann.

6.Introduction to Computer Systems

RAI TECHNOLOGY UNIVERSITY, BANGALORE								CURRICULUM	
Programme	Bachelor of Technology in CSE					Year of Regulation		**2025-26**	
College	College of Engineering					Semester		**I**	
Department	Computer Science and Engineering			Credit Structure			Marks Distribution		
Course Category	**Paper Name**	L	T	P	C	CIE	SEE	Total	
PCC-1	**Introduction To Computer System**	3	0	2	4	**60(T) 25(P)**	**40(T) 25(P)**	**150**	

Course Objectives	To understand what a computer is and how it works.	**Course Outcomes**	CO1	Understand computer basics and number systems
	To learn about different types of computers and their parts.		CO2	Identify and use various input/output devices.
	To study number systems like binary, decimal, and hexadecimal.		CO3	Explain CPU architecture, memory types, and storage mechanisms
	To know about input and output devices and how data is stored.		CO4	Distinguish between system/application software and understand programming languages
	To learn basic software, programming languages, and operating system commands.		CO5	Operate and manage basic MS-DOS and Windows environments.

SYLLABUS

No	Content	Hrs	COs
1	**Introduction to Computers & Number Systems** What is a computer? Characteristics & Capabilities Basic Components: Hardware & Software (with Block Diagram) Data Concepts: Data vs Information, Data Processing, Storage Types of Computers: Analogue, Digital, Hybrid General vs Special Purpose Micros, Minis, Mainframes Limitations of Microcomputers Generations of Computers Number Systems: Decimal, Binary, Octal, Hexadecimal, 1's and 2's Complements Codes: ASCII, EBCDIC, BCD, Gray Code Logic Gates: Basic: AND, OR, NOT with Truth Tables Universal & Special: NAND, NOR, XOR	9	CO1
2	**Computer Peripherals** Input Devices: Keyboard, Mouse, Scanner, MICR, OMR, Barcode Reader, Smart Cards, Voice Input, Light Pen, Touchscreen Output Devices: Hardcopy Output: Impact Printers (Dot Matrix), Non-impact Printers (Laser, Inkjet), Plotters, Microfilm Softcopy Output: CRT, LCD, LED Displays, Projectors, Speakers	9	CO2
3	**Basic Components & Storage** CPU Components: Microprocessor, Control Unit, ALU, Registers, Buses Memory: RAM (Main Memory), ROM Storage Devices: Primary vs Secondary Data Access Methods: Sequential, Direct, Indexed Sequential Tape Drives, Hard Disks, CD-ROM, Mass Storage Devices	9	CO3
4	**Computer Software & Languages** System Software vs Application Software System Software: Operating Systems, BIOS, Utility Programs, Boot Loaders Operating Systems: Types and Functions Application Software: Packages, Tools, Trends Computer Languages: Types: Machine, Assembly, High-Level Language Processors: Assembler, Compiler, Interpreter, Linker, Loader Basics of Algorithm and Flowchart	9	CO4
5	**MS-DOS & Windows** MS-DOS: History, Versions File System, Booting Process System Files, Directories, Internal & External Commands Creating and Using Batch Files Windows OS: Features and Interface (Icons, Taskbar, Desktop) File Management & Control Panel Using Accessories: Notepad, Paint, Calculator, etc. Basic Operating System Commands (Windows, Linux Introduction to CLI (Command Line Interface) Difference between CLI and GUI Advantages of	9	CO5

	command-line over graphical interfaces Introduction to: Command Prompt (Windows) Terminal (Linux)		
Total Hours		**45**	

No	List Of Experiments
1	Identify and label internal components of a computer system (CPU, RAM, motherboard parts, etc.).
2	Compare different types of memory: ROM, RAM, DDR1–DDR5, EPROM, EEPROM.
3	Install and configure system software (a printer or Wi-Fi driver)
4	Install MS Office and verify functionality of Word, Excel, and PowerPoint.
5	Install and run a basic C program using a C compiler (e.g., Turbo C++, Code-Blocks).
6	Install a Linux OS (Ubuntu, Kali, or Fedora) on a system or virtual machine.
7	Install Windows 10/11 using a bootable USB/DVD.
8	Set up environment variables (e.g., path for Java or C compiler) in Windows.
9	Identify networking devices: modem, router, L2/L3 switch, and LAN cable
10	Prepare a LAN cable using T568B colour code and test it.
11	Execute basic Linux terminal commands: create folder/file, manage users, set permissions, use Vim editor.

12	Perform advanced tasks in MS Office:
	    a. Word – formatting, tables, images
	    b. Excel – formulas (SUM, IF, VLOOKUP etc.)
	    c. PowerPoint – transitions/animations
	    d. Access – simple database with form and query

Essential Readings

1.Discovering Computers: Digital Technology, Data, and Devices" by Misty E. Vermaat, Cengage Learning, 2021 Edition

2. Introduction to Computers and Information Technology" by Emergent Learning, Cengage Learning, Latest

3. P.K. Sinha, Computer Fundamentals, BPB Publications, 6th Edition

Supplementary Readings

1. V. Rajaraman, Introduction to Information Technology, PHI, 2nd Edition

2. Chetan Shrivastava, Fundamentals of Information Technology, Kalyani Publishers

3. Suresh K. Basandra, Computers Today, Galgotia Publications

Other useful resource

1.NPTEL: https://nptel.ac.in/

2. TutorialsPoint: https://www.tutorialspoint.com/computer_fundamentals

7. Problem Solving through C Programming

RAI TECHNOLOGY UNIVERSITY, BANGALORE								CURRICULUM	
Programme	Bachelor of Technology in CSE					Year of Regulation		**2025-26**	
College	College of Engineering					Semester		I	
Department	Computer Science and Engineering		Credit Structure				Marks Distribution		

Course Category	Paper Name	L	T	P	C	CIE	SEE	Total
PCC-2	**Problem Solving through C Programming**	**3**	**0**	**0**	**3**	**60**	**40**	**100**

Course Objectives		Course Outcomes	
	Understand the basic concepts of **problem-solving** using algorithms, flowcharts, and pseudocode	CO1	Explain fundamental problem-solving techniques using algorithms, flowcharts, and pseudocode.
	Learn the **fundamentals of programming** and the role of the C language in software development	CO2	Demonstrate understanding of programming concepts and describe the significance of the C language in software development.
Course Objectives	Familiarize with the **structure of a C program** and the process of compilation and execution.	CO3	Identify and construct the structure of a C program, including the steps of compilation and execution.
	Learn to declare and use **constants, variables, and various data types** in C.	CO4	Declare and use constants, variables, and different data types effectively in C programs.
	Apply **operators and expressions** to perform arithmetic and logical computations in C programs.	CO5	Apply operators and expressions to perform arithmetic and logical operations in C programming solutions.

SYLLABUS			
No	Content	Hrs	COs
1	**Introduction to C Programming:** Problem-solving concepts: Understanding the Problem, Breaking the Problem into Steps (Algorithm) ,Flowcharts and Pseudocode . Introduction to Programming & C Language: What is programming?, Why C language?, History and features of C, Basic Structure of a C Program: Compilation and execution steps, Constants, Variables, and Data Types, Operators and Expressions.	9	**CO1**
2	**Control Flow:** Input/Output Functions, Conditional Branching: if, if-else, nested if, switch. Loops: for, while, do-while. Loop control statements: break, continue.	9	**CO2**
3	**Arrays and Strings:** One-Dimensional Arrays, Two-Dimensional Arrays, Character Arrays and Strings, Basic Searching and Sorting Algorithms: Linear Search, Binary Search, Bubble sort, Selection sort.	9	**CO3**
4	**Functions and Recursion:** Functions in C: Defining, calling, returning values, Function arguments: call by value. Scope and Lifetime of Variables: Local, global, static, Recursion.	9	**CO4**
5	**Structures, Pointers and Preprocessor:** Structures and Unions: Declaration, initialization, Accessing structure members, Difference between structures and unions. Pointers: Pointer variables and addresses. Preprocessor Directives: #define, #include, macros.	9	**CO5**
Total Hours		**45**	

Essential Readings

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGraw-Hill.
2. Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language.
3. Schaum's Outline of Programming with C, Byron S. Gottfried.

8. Problem Solving through C Programming Lab

RAI TECHNOLOGY UNIVERSITY, BANGALORE								CURRICULUM	
Programme	Bachelor of Technology in CSE					Year of Regulation		**2025-26**	
College	College of Engineering					Semester		**I**	
Department	Computer Science and Engineering		Credit Structure				Marks Distribution		
Course Category	Paper Name	L	T	P	C	CIE	SEE	Total	
PCC-3	**Problem Solving through C Programming Lab**	0	0	4	2	50	50	100	

Course Objectives	Understand the basic concepts of **problem-solving** using algorithms, flowcharts, and pseudocode	**Course Outcomes**	CO1	Explain fundamental problem-solving techniques using algorithms, flowcharts, and pseudocode.
	Learn the **fundamentals of programming** and the role of the C language in software development		CO2	Demonstrate understanding of programming concepts and describe the significance of the C language in software development.
	Familiarize with the **structure of a C program** and the process of compilation and execution.		CO3	Identify and construct the structure of a C program, including the steps of compilation and execution.
	Learn to declare and use **constants, variables, and various data types** in C.		CO4	Declare and use constants, variables, and different data types effectively in C programs.
	Apply **operators and expressions** to perform arithmetic and logical computations in C programs.		CO5	Apply operators and expressions to perform arithmetic and logical operations in C programming solutions.

List of Experiments

No	Content
1	Write a C program to declare variables of different data types (int, float, char, double) and print their values using printf().
2	Write a C program to perform basic arithmetic operations (+, −, *, /, %) on two integers provided by the user and display the result.
3	Write a C program that uses a switch statement to create a simple calculator. The user inputs two numbers and an operator, and the program displays the result accordingly.
4	Write a C program to find the factorial of a positive integer .
5	Write a C program to reverse a given integer and check whether given number is palindrome or not.
6	Write a C program to search for an element in a one-dimensional array using the linear search technique.
7	Write a C program to search for an element in a sorted one-dimensional array using the binary search algorithm.
8	Write a C program to sort an array of N integers in ascending order using the bubble sort algorithm.
9	Write a C program to sort an array of N integers in ascending order using the selection sort algorithm.
10	Write a C program to: i)Calculate the length of a string (without using strlen) ii) Copy one string into another iii) Reverse a string.
11	Write a C program to check whether a number is prime or not. Implement the logic using a user-defined function.
12	Write a C program to read N real numbers from the user and calculate their sum, mean, and standard deviation using appropriate formulas.
13	Write a C program to swap the values of two variables using pointers and a function.
14	Write a C program to define a structure for a student (containing name, roll number, marks), read data for a student, and display it.

Essential Readings

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGraw-Hill.

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