

JHARKHAND UNIVERSITY OF TECHNOLOGY
Jharkhand, Ranchi



Syllabus for

BACHELOR OF COMPUTER APPLICATION
(B.C.A) Programme

Course Structure

First Semester

Subject Code	Course Type	Subject Name	Load Allocation			Marks distribution		Total Marks	Credit
			L	T	P	Internal Marks	External Marks		
1CR01	Core	Mathematics-I	4	0	0	30	70	100	4
1CR02	Core	Fundamentals of Computer and IT	4	0	0	30	70	100	4
1CR03	Core	Problem Solving using C/C++	4	0	0	30	70	100	4
1CR04	Core	Digital Electronics	4	0	0	30	70	100	4
1AE01	Ability Enhancement	English	3	0	0	30	70	100	3
1CR01-L	Computer Lab-1	Programming Lab C/C++	0	0	2	25	25	50	2
1AE01-L	Ability Enhancement Lab	Language Lab	0	0	2	25	25	50	2
Semester Total			19	0	4	200	400	600	23

Course Code: 1CR01
Course Name: Mathematics-I

Detailed contents	Contact hours
<p><u>Unit-I</u> Set Introduction, Objectives, Representation of Sets (Roster Method, Set Builder Method), Types of Sets (Null Set, Singleton Set, Finite Set, Infinite Set, Equal Set, Equivalent Set, Disjoint Set, Subset, Proper Subset, Power Set, Universal Set) and Operation with Sets (Union of Set, Intersection of Set, Difference of Set, Symmetric Difference of Set) Universal Sets, Complement of a Set.</p>	12 hours
<p><u>Unit-II</u> Logic Statement, Connectives, Basic Logic Operations (Conjunction, Disjunction, Negation) Logical Equivalence/Equivalent Statements, Tautologies and Contradictions.</p>	10 hours
<p><u>Unit -III</u> Matrices Introduction, Types of Matrix (Row Matrix, Column Matrix, Rectangular Matrix, Square Matrix, Diagonal Matrix, Scalar Matrix, Unit Matrix, Null Matrix, Comparable Matrix, Equal Matrix), Scalar Multiplication, Negative of Matrix, Addition of Matrix, Difference of two Matrix, Multiplication of Matrices, Transpose of a Matrix.</p>	12 hours
<p><u>Unit-IV</u> Progressions Introduction, Arithmetic Progression, Sum of Finite number of quantities in A.P, Arithmetic Means, Geometric Progression, Geometric Mean.</p>	10 hours

Text Books:

1. Discrete Mathematics and Its Applications by Kenneth H. Rosen, Mc Graw Hill, 6th Edition.
2. College Mathematics, Schaum's Series, TMH.

Reference Books:

1. Elementary Mathematics, Dr. RD Sharma
 2. Comprehensive Mathematics, Parmanand Gupta
 3. Elements of Mathematics, ML Bhargava
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Course Code: 1CR02

Course Name: Fundamentals of Computer and IT

Detailed Contents	Contact hours
<p>Unit-I Human Computer Interface Concepts of Hardware and Software; Data and Information. Functional Units of Computer System: CPU, registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors. Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter. Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks. Data Representation: Bit, Byte, Binary, Decimal, Hexadecimal, and Octal Systems, Conversions and Binary Arithmetic (Addition/ Subtraction/ Multiplication) Applications of IT.</p>	12
<p>Unit-II Concept of Computing, Types of Languages: Machine, assembly and Highlevel Language; Operating system as user interface, utility programs. Word processing: Editing features, formatting features, saving, printing, table handling, page settings, spell-checking, macros, mail-merge, equation editors.</p>	10
<p>Unit-III Spreadsheet: Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs. Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows.</p>	10
<p>Unit-IV Electronic Payment System: Secure Electronic Transaction, Types of Payment System: Digital Cash, Electronic Cheque, Smart Card, Credit/Debit Card E-Money, Bit Coins and Crypto currency, Electronic Fund Transfer (EFT), Unified Payment Interface (UPI), Immediate Payment System (IMPS), Digital Signature and Certification Authority. Introduction to Bluetooth, Cloud Computing, Big Data, Data Mining, Mobile Computing and Embedded Systems and Internet of Things (IoT)</p>	12

Text Books:

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education
2. Computer Fundamentals, A. Goel, 2010, Pearson Education.
3. Fundamentals of Computers, P. K. Sinha & P. Sinha, 2007, BPB Publishers.

Reference Books:

1. "Introduction to Computers", Peter Norton
 2. Computers Today, D. H. Sanders, McGraw Hill.
 3. "Computers", Larry long & Nancy long, Twelfth edition, Prentice Hall.
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Course Code: 1CR03
Course Name: Problem Solving using C

Detailed Contents	Contact hours
<p>Unit-I Logic Development: Data Representation, Flowcharts, Problem Analysis, Decision Trees/Tables, Pseudo code and algorithms. Fundamentals: Character set, Identifiers and Key Words, Data types, Constants, Variables, Expressions, Statements, Symbolic Constants.</p> <p>Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, Library functions.</p>	11 Hours
<p>Unit-II Data Input and Output: formatted & unformatted input output.</p> <p>Control Statements: While, Do-while and For statements, Nested loops, If-else, Switch, Break – Continue statements.</p>	10 Hours
<p>Unit-III Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.</p> <p>Arrays: Defining, processing arrays, passing arrays to a function, multi-dimensional arrays.</p> <p>Strings: String declaration, string functions and string manipulation Program Structure Storage Class: Automatic, external and static variables.</p>	11 Hours
<p>Unit-IV Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, unions.</p>	06 Hours
<p>Unit-V Pointers: Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer, Pointers and Arrays File Handling: File Operations, Processing a Data File</p>	06 Hours

Text Books:

1. Programming in ANSI C, E. Balagurusami, Fourth Edition, Tata McGraw Hill.
2. Programming in C, Third Edition, Stephen G Kochan, Pearson.
3. The C Programming Language, Kernighan & Ritchie, Second Edition, PHI Publication.

Reference Books:

1. Object Oriented Programming, Lafore R, Third Edition, Galgotia Publications
2. Let us C, Yashvant P Kanetkar, Seventh Edition, BPB Publications, New Delhi.
3. Programming in C, Byron S. Gottfried, Second Edition, McGraw Hills.
4. Problem Solving and Programming in C, R.S. Salaria, Second Edition

Course Code: 1CR04
Course Name: Digital Electronics

Detailed Contents	Contact hours
<p>Unit-I Introduction to network theorems and AC fundamentals: Ohm's law: Statement, explanation. Kirchhoff's law: Statement & explanation of KCL and KVL. Mesh/loop analysis (up to 2 loops) and node voltage method, Numerical problems. Delta/star and star/Delta transformation: No derivation for Interco version equations, introduction of network, port of network (one port network, two port network), unilateral network, bilateral network, linear network. Need for application of network theorems. (DC Circuits only). Superposition theorem: statement, (only with TWO voltage sources) steps to apply the theorem explanation by considering a simple resistive network and problems. Thevenin's theorem: Statement, (Only with ONE voltage source) Steps to apply the theorem, explanation by considering a simple resistive networking and problems. Norton's theorem: Statement, (Only with ONE voltage source) steps to apply the theorem, explanation by considering a simple resistive network and problems. Maximum power transfer theorem: Statement, explanation of theorem by considering a simple resistive network, expression for maximum power deliver ($P_L(\max) = V_{th}^2/4R_{th}$) (no derivation), graph of V_s vs P_L, numerical problems and applications. Reciprocity theorem, Statement, explanation using resistive network with dc source and numerical problems. AC Fundamentals: Representation of ac sine wave, instantaneous value, peak value, peak to peak value, average value, r.m.s value cycle, time period, frequency. (No derivations, only mention the expressions) Representation of non sinusoidal waves.</p>	12 Hours
<p>Unit-II Semiconductor Devices: Introduction, atomic structure, energy level, energy band diagram in solids, classification of conductors, insulators and semiconductors. Semiconductor, properties, crystal structure of semiconductor, types – intrinsic and extrinsic semiconductor. Intrinsic semiconductor: Crystal structure (Ge & Si), thermal generated charges (electron and holes) carriers the effect temp on their motion. Extrinsic semiconductor: Doping, donor acceptor impurities, n-type, p-type semiconductor, majority and minority carriers, their currents, concept of immobile ions. Semiconductor devices : PN junction diode, formation of pn junction layer, potential barrier, energy level diagram of pn junction, Biasing of pn junction, behavior of pn junction under forward and reverse biasing, break down in pn junction, avalanche and zener break down. Diode characteristics; V-I characteristic, forward and reverse bias, diode parameters, bulk resistance, knee voltage, static and dynamic resistance, PIV. Application of diode; As a rectifier, as logic gate, as a switch, etc. Rectifier, types, Half wave Full wave. Half wave rectifier: Circuit, working, wave forms and expression for ripple factor and efficiency (no derivation),</p>	12 Hours

<p>advantages & disadvantages. Bridge wave rectifier: Circuit, working, wave forms and expressions for ripple factor and efficiently (no derivation), advantages & disadvantages. Logic families: Scale of integration, Digital IC's, classifications, DTL, TTL, ECL, MOS, CMOS, Mention of features: speed of operation, powerdissipation, propagation delay, fan-in, fan-out.</p>	
<p>Unit-III Number Systems: Introduction to number systems – positional and non-positional, Base /Radix. Decimal number system-Definition, digits, radix/base, Binary number system – Bit Byte, Conversions: Binary to Decimal and Decimal to Binary. Octal number system Conversion from Octal to Decimal to Octal, Octal to Binary and binary to Octal. Hexadecimal number system –Conversion : Decimal to Hex, Hex to decimal, Hex to Binary, Binary to Hex, Octal to Hex, Hex to Octal, Binary, arithmetic – binary addition, subtraction, multiplication and division (only Integer part). 1's and 2's compliment: 2's complement subtraction. Binary code: BCD numbers, 8421 code, 2421 code- examples and applications. Gray code – Conversions-Gray to binary and Binary to Gray, application of gray code (Mention only). Excess-3 code – self complimenting property and applications. Definition and nature of ASCII code. Introduction to error detection and correction code, parity check. Boolean algebra:-Laws and theorems. AND, OR, NOT Laws, Commutative law, associative law, distributive law, Duality theorem. Demorgan's theorems-Statements, proof using truth tables; Simplification of Boolean expressions using Boolean laws. Definition of product term, sum term, minterm, maxterm, SOP, standard POS and Standard POS. Conversion of Boolean expression to Standard SOP and Standard POS forms. Karnaugh maps-Definition of Karnaugh map, K- map for 2, 3 and 4 variables. Conversion of truth tables into k-map grouping of cells, redundant groups and don't care conditions Karnaugh map technique to solve 3 variable and 4 variable expressions. Simplification of 3 and 4 variable Booleanexpression using K-maps (SOP only)</p>	<p>12 Hours</p>
<p>Unit-IV Logic Gates: AND Gate: Definition, symbol truth table, timing diagram, Pin diagram of IC 7408. OR Gate: Definition, symbol, truth table, timing diagram of IC 7432. NOT Gate: Definition symbol, truth table, timing diagram, Pin diagram of IC 7404. NAND Gate: Definition, symbol, truth table, Pin diagram of IC 7400, NOR Gate: Definition, symbol, truth table, timing diagram, Pin diagram of IC 7402. Exclusive OR Gate: Definition, symbol, truth table, timing diagram. Combinational logic circuits: Definition, applications. Half Adder: Symbol, Logic circuits using XOR and basic gates, Truth table, Full Adder: Symbol, Logic circuits using XOR and basic gates, Truth table, Half Subtractor: Symbol, Logic circuits using XOR and basic gates, Truth table. Full Subtractor: Symbol, Logic circuits using XOR and basic gates, Truth table. Adder –Subtractor; Logic circuit, Pin diagram IC 7483, IC 7486. Parallel Adder: 4 –bit parallel binary adder, BCD adder, IC 7483 NAND –NOR implementation of Adders.</p>	<p>12 Hours</p>
<p>Unit - V Sequential Circuits: Importance of clock in digital circuit and introduction to flip flop. Flip –flop-difference between latch and flip-flop. Qualitative study of level and edge triggering. RS latch /unlocked, symbol and truth table. RS flip- flop using NAND gate, symbol, truth table and timing diagram. D flip –flop – Symbol, truth table, Realization of JK flip –flop using NAND gates, working, and timing diagram. Race around condition, present and clear inputs, pin diagram of IC 74112. T flip flop-Logic symbol,</p>	<p>12 Hours</p>

JK flip flop as a T flip –flop truth table and timing diagram. Master slave flip flop; Logic circuit, truth table and timing diagram, advantage of M/S flip-flop, pin diagram of IC 7473 IC 7476. Registers: Definition, types of registers-Serial in serial out, serial in parallel out, Parallel in serial out, Parallel in parallel our shift register (Block diagram representation for each), truth table, timing diagram and speed comparison.	
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Text Books:

- 1) Thomas L.Floyd ,’’Digital Fundamentals’’, Peason Education Inc, New Delhi, 2003

Reference Books:

- 1) Morris Mano, “Digital Design”, 5Th Edition, Prentice Hall, 2013
 - 2) R.P.Jain, “Modern Digital Electronics”, 3rd Edition, Tata Mc Graw Hill, 2003.
 - 3) Bignell and Donovan, “Digital Electronics”, 5th Edition, Thomson Publication, 2007
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Course Code: 1AE01
Course Name: English

Detailed Contents	Contact hours
Unit1- 1 (Introduction) Theory of Communication, Types and modes of Communication	10 Hours
Unit-II (Language of Communication) Verbal and Non-verbal (Spoken and Written) Personal, Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication	10 Hours
Unit-III (Reading and Understanding) Close Reading Comprehension Summary Paraphrasing Analysis and Interpretation	11 Hours
Unit-IV (Writing Skills) Documenting, Report Writing, Making notes, Letter writing	12 Hours
Unit - V Translation(from Hindi to English and vice-versa) Precis writing /Paraphrasing Literary/Knowledge TextsPaper writing skills	11 Hours

Text Books:

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.

Reference Books:

1. *Language through Literature* (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas
 2. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
 3. *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
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Course Code: 1CR01-L
Course Name: Programming Lab C/C++

Instructions: Develop all programs in C programming language.

Assignments:

1.	WRITE A PROGRAM to display your name. Write another program to print message with inputted name.
2.	WRITE A PROGRAM to add two numbers.
3.	WRITE A PROGRAM to find the square of a given number.
4.	WRITE A PROGRAM to calculate the average of three real numbers.
5.	Write a program to Find ASCII Value of a Character
6.	WRITE A PROGRAM to Find the Size of int, float, double and char
7.	WRITE A PROGRAM to Compute Quotient and Remainder
8.	WRITE A PROGRAM to accept the values of two variables.
9.	WRITE A PROGRAM to find the simple interest, inputs are amount, period in years and rate of interest.
10.	Basic salary of an employee is input through the keyboard. The DA is 25% of the basic salary while the HRA is 15% of the basic salary. Provident Fund is deducted at the rate of 10% of the gross salary (BS+DA+HRA). WRITE A PROGRAM to calculate the net salary
11.	WRITE A PROGRAM to find area of a circle using PI as constant
15.	WRITE A PROGRAM to find the larger of two numbers.
16.	WRITE A PROGRAM to find greater of three numbers using Nested If.
17.	WRITE A PROGRAM to find whether the given number is even or odd.
18.	WRITE A PROGRAM to Generate Multiplication Table Using for loop
19.	WRITE A PROGRAM to Generate Multiplication Table Using while loop
20.	WRITE A PROGRAM to Make a Simple Calculator Using switch...case
21.	WRITE A PROGRAM to find whether the given number is a prime number.
22.	WRITE A PROGRAM using function to find the largest of three numbers
23.	WRITE A PROGRAM using function to print first 20 numbers and its squares.
24.	WRITE A PROGRAM to find the factorial of a given number.
25.	WRITE A PROGRAM to print the sum of two matrices
	WRITE A PROGRAM to Find the Length of a String

26.	
27.	WRITE A PROGRAM to Copy String using strcpy()
28.	WRITE A PROGRAM to compare a string
29.	WRITE A PROGRAM to reverse a string
30.	WRITE A PROGRAM to reverse a string
31.	WRITE A PROGRAM to multiply two numbers using pointers.
32.	WRITE A PROGRAM to display address of variable using pointers
33.	WRITE A PROGRAM to show the memory occupied by Structure and Union
34.	WRITE A PROGRAM to create Student I-Card using a Structure
35.	WRITE A PROGRAM to read data from a file from a file
36.	WRITE A PROGRAM to save Employee details in a file using File Handling

Course Code: 1AE01-L
Course Name: Language Lab

Assignments:

1.	<p>Listening Skills</p> <ul style="list-style-type: none">• The student should be able to listen to a text read aloud in normal speed with focus on intonation.• After listening the student can fill-in-blanks, choose a suitable title, make a summary, supply required information and be able to answer comprehension questions from the passage read aloud.
2.	<p>Speaking Skill</p> <ul style="list-style-type: none">• Reading aloud of dialogues, texts, poems, speeches focusing on intonation. <p>Self-introduction</p> <ul style="list-style-type: none">• Role plays on any two-situations.• Telephonic Conversations.
3.	<p>Personality Development</p> <ul style="list-style-type: none">• Initiation• Physical Appearance• Audience Purpose
4.	<p>Interpersonal Skills</p> <ul style="list-style-type: none">• Appropriate use of non-verbal skills in face to face communication [i.e. Viva –Voce, group –interviews, GDs and seminars.]
5.	<p>Presenting in GD, Seminars and Conferences.</p> <ul style="list-style-type: none">• Leadership Quality• Time Management• Achieving the target