PUNJABI UNIVERSITY PATIALA

SYLLABUS,
OUTLINE OF PAPERS AND TESTS
FOR

BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)
PART – I (ANNUAL)

FOR 2019, 2020 & 2021 EXAMINATIONS

PUNJABI UNIVERSITY PATIALA

SYLLABUS,
OUTLINE OF PAPERS AND TESTS FOR
B.C.A. PART ONE (ANNUAL)

FOR 2019, 2020 & 2021 Examinations

Paper Code	Title of Paper	Hours per Week	University Examination	Internal Assessment	Max. Marks	Time Allowed
BCA-101	General English (Communication Skills – I)	4	80	20	100	3 Hrs.
BCA-102	Fundamentals of IT	4	80	20	100	3 Hrs.
BCA-103	Mathematical Foundation of Computer Science	4	80	20	100	3 Hrs.
BCA-104	Computer Organisation and Architecture	4	80	20	100	3 Hrs.
BCA-105	Problem Solving Using C	4	80	20	100	3 Hrs.
BCA-106	Database Management System	4	80	20	100	3 Hrs.
BCA-107	Software Lab – I (PC Software)	4	50	-	50	3 Hrs.
BCA-108	Software Lab – II (Programming in C)	4	50	-	50	3 Hrs.
	Total		**580**	**120**	**700**	

Note :

1. The breakup of marks for the practical will be as under

   i. Lab Record 10 Marks

   ii. Viva Voce 10 Marks

   iii. Program Development and Execution 30 Marks

2. The break- up of marks for internal assessment for theory papers will be as under :

   i. One or two tests out of which minimum one best will be considered for assessment. 10 Marks

   ii. Assignments/Quizzes 5 Marks

   iii. Attendance, Class participation and behaviour 5 Marks

BCA-101 GENERAL ENGLISH (COMMUNICATION SKILLS – I)

Common Syllabus Supplied by Department of English, Punjabi University, Patiala.

BCA-102: FUNDANMENTALS OF IT

Maximum Marks : 80 **Max Time: 3 Hrs.**

Min Pass Marks: 35% **Lectures to be delivered: 90 Hours**

A) Instructions for the Paper setter
The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will consist of 5-10 short answer type questions, which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for the Candidates
Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
Use of non-programmable scientific calculator is allowed.

SECTION- A

Computer Fundamentals: Block diagram of a computer, characteristics of computers, generations of computers, classification of computers on the basis of capacity, purpose, and generation.
I/O Devices : Keyboard, Mouse, Scanner, OCR, OMR, MICR, Monitors, Impact and Non-Impact printers, Plotters, Multimedia Projector, Touch screen, Light pen
Memories : RAM, ROM, Cache, Storage Device : Floppy disk, Hard disk, Compact disk, DVD.

SECTION-B

Number System: Non-positional and positional number systems, Base conversion, Bit, byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other.
Binary Arithmetic: Addition, subtraction and multiplication.
Computer Code: Computer words, characters data, weighted and non-weighted code, BCD, EBCDIC, ASCII, grey code.

SECTION - C

Computer languages: Machine language, assembly language, higher level language, 4GL. Introduction to Compiler, Interpreter, Assembler, System Software, Application Software.
Operating system: Functions of an operating system, Batch, multi-programming, time sharing, network operating system, on-line and real time operating system, Distributed operating system, multi-processor, Multi-tasking.
Data Network and Communication: Network types, Transmission Modes, Network topologies,
Internet: Evolution of Internet, Getting connected to internet,
Internet applications: WWW, FTP, TELNET, IRC, Video Conferencing,
Internet Tools: Web Browser, E-mail, Search Engines.

SECTION-D

Information Technology and Society : Applications of Information Technology in Railway, Airline, Banking, Insurance, Inventory Control, Hotel Management, Education, Mobile Phones, Information Kiosks, Weather Forecasting, Scientific Application,
E-Commerce: Meaning, its advantages & limitations, Types of E-Commerce Applications
Multimedia : Concepts, Components and Application. Entertainment Marketing.

REFERENCE BOOKS

1. P.K. Sinha and P. Sinha, Foundations of Computing, First Edition, 2002, BPB.
2. Turban Mclean and Wetbrete, Information Technology and Management, Second Edition, 2001, John Wiley & Sons.
3. Satish Jain, Information Technology, BPB, 1999.
4. Sanders, D.H., Computers Today, McGraw Hill, 2001

BCA-103 MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Maximum Marks : 80 **Maximum Time: 3 Hrs.**
Min Pass Marks: 35% **Lectures to be delivered: 90 Hours**

A) Instructions for the Paper setter:
The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will consist of 5-10 short answer type questions, which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for the Candidates:
Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
Use of non-programmable scientific calculator is allowed.

SECTION -A

Matrices: Types of Matrices, Addition, Subtraction, Multiplication, Transpose, Conjugate and their properties, Symmetric, Skew-symmetric, Hermition, Skew-Hermition, Orthogonal and Unitary matrices, Minor, co-factors, Adjoint, Inverse of matrices, Solution of linear system of equations using matrices. Rank of a matrix, consistency of linear system of equations,
Characteristic equation, eigen values & eigen vectors, Diagonalization of matrices, Cayley Hamilton theorem.
Determinants: Expansion of determinants (upto order 4), solution of linear system of equations using Cramer rule, Properties of Determinants.

SECTION -B

Vectors: Type of vectors, Addition of vectors (Triangle law and Parallelogram law), Section formula for vectors. Product of vectors: Scalar Product and Cross Product, physical applications, scalar and vector triple product.
Binomial Theorem: Expansion, General term, Middle term, term independent of variable.

SECTION -C

Probability: Elementary events, Sample space, Compound events, Type of events, Mutually Exclusive, Independent events. Addition Law of probability (for 2 and 3 events), Conditional probability, Multiplication Theorem of probability, Baye's theorem, Random variable and its probability, distribution, mean and variance of random variable. Discrete & continuous probability distribution: Binomial distribution, Poisson distribution and Normal distribution.

SECTION -D

Linear Programming Foundation of the problem, Graphical method to solve LPP of two variables, General Linear Programming problem, Simplex method, Artificial variable techniques, Two phase method, Dual of LPP. Transportation problem, Assignment Problem.

REFERENCE BOOKS:

1. "Higher Engineering Mathematics", B. S. Grewal, Khanna Publishers.
2. "Advanced Engineering Mathematics", E.Kreyszig, Wiley.
3. "Advanced Engineering Mathematics",R. K. Jain & S.R.K. Iyenger, Wiley Eastern.
4. "Engineering Mathematics Vol I & II" S. S. Sastry, PHI.

BCA-104 COMPUTER ORGANISATION AND ARCHITETURE

Maximum Marks : 80 **Maximum Time: 3 Hrs.**

Min Pass Marks: 35% **Lectures to be delivered: 90 Hours**

A) Instructions for the Paper setter

The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will consist of 5-10 short answer type questions, which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for the Candidates

Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.

Use of non-programmable scientific calculator is allowed.

SECTION-A

Digital Logic Circuit: Digital Computer, Logic gates, Boolean Algebra, Map Simplification up to 4 variables, Combinational Circuits, Half adder, Full adder, Flip-Flops: SR, D, JK, T, master slave JK and edge triggered flip flops, Excitation tables, Sequential circuits: Flip flop input equations, State table, Design procedure.

Digital Components: Integrated circuits, Introduction to logic families, Characteristics of IC, Decoder, Encoder, Multiplexer, De-multiplexer.

SECTION-B

Registers, Shift registers, Binary counters, synchronous and asynchronous counters

Register Transfer and Micro-operations: Register Transfer Language, Register Transfer, Bus and Memory Transfer, Arithmetic Micro-operations, Logic micro-operations, Shift micro-operations, Arithmetic Logic and Shift Unit.

Basic Computer Organization and Design: Instruction code, Computer register, Computer instructions, Timing and control, Instruction cycle, Memory reference instructions, Input-Output and Interrupts

SECTION-C

Micro-programmed Control: Control Memory, Address Sequencing, Difference between Hardwired and micro-programmed control

Central Processing Unit: Introduction, General Register organization, Instruction format, Addressing modes, Program Interrupts, Types of interrupts.

RISC and CISC characteristics, Vector processing, Array Processors,

SECTION-D

Input-Output Organization: Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupts, Direct Memory Access, Input-Output Processor, CPU-IOP Communication

Memory Organization: Semiconductor memories, Memory organization and expansion, RAM and ROM Chips, Associative memory, cache memory, virtual memory, memory management hardware

REFERENCE BOOKS:

1. M. M. Mano, "Computer System Architecture", PHI.
2. Jacob Millman and Arvin Grabel, "Micro Electronics", McGraw-Hill Book Co.
3. A. S. Tanenbaum, "StructuredComputer Organization", PHI.
4. A. P. Malvina “Digital Computer Electronics”, TMH.
4. R P Jain, "Modern Digital Electronics", McGraw Hill.
5. J.P. Hayes, “Computer Architecture and Organization”, TMH

BCA-105 PROBLEM SOLVING USING C

Maximum Marks : 80 **Max Time: 3 Hrs.**
Min Pass Marks: 35% **Lectures to be delivered: 90 Hours**

A) Instructions for the Paper setter:
The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will consist of 5-10 short answer type questions, which will cover the entire syllabus uniformly and will carry 20% marks in all.
B) Instructions for the Candidates:
Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
Use of non-programmable scientific calculator is allowed.

SECTION-A

Problem Analysis and its Tools: Problem solving technique and Program Development Life Cycle Problem Definition, Algorithm, Flow Charts, Types of Errors, Testing and Debugging.
Historical development of C Language, Basic Structure of C Program, C Character Set, Identifiers and Keywords, constants, variables, Data types.
Operators and expressions: Arithmetic, Relational, Logical, Assignment, Unary, Conditional and Bitwise operators. Type conversions.
Input and output statements: getchar( ), getch( ), getche( ), putchar( ), printf( ), scanf( ), gets( ), puts( )

SECTION-B

Control statements : Decision making statements: if, if else, else if ladder, switch statements.
Loop control statements: while loop, for loop and do-while loop.
Jump Control statements: break, continue and goto.
Arrays : one dimensional Array, two dimensional arrays.
Strings: Input/ Output of strings, string handling functions, table of strings

SECTION-C

Functions: Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion, Parameter Passing by address & by value. Local and Global variables.
Storage classes: automatic, external, static and register.
Pointers : Pointer data type, Pointer declaration, initialisation, accessing values using pointers. Pointer arithmetic. Pointers and arrays, pointers and functions.

SECTION-D

Structures and Unions : Using structures and unions, use of structures in arrays and arrays in structures. Comparison of structure and Union.
Files in C : Opening a file, closing a file, File I/O functions, Text files and Binary files.

Text Books:

1. E. Balagurusway, “Programming in C”, Tata McGrwal Hill.

Reference Books:

1. Kernighan & Ritchie, "Programming in C"
2. Byron Gotfried, : "Programming with C", Publisher, Schaum’s outline series, TMH Edition.
3. Ram Kumar and Rekesh Aggarwal, : "Programing in ANSIC", TMH Ed.
4. Brain W. Kernigham and Dennis M. Richie, : "The C Programming Language", PHI.
5. H. H. Tanz & T. B. D Orazio, : “C Programming for Engineers & Computer Science”, McGraw Hill International Editions.

BCA-106: Database Management System
Maximum Marks: 80 **Max Time: 3 Hrs.**
Min Pass Marks: 35% **Lectures to be delivered: 90**

A) Instructions for the Paper setter:
The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will consist of 5-10 short answer type questions, which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for the Candidates:
Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
Use of non-programmable scientific calculator is allowed.

SECTION-A

Traditional file processing system : Characteristics, limitations, Database : Definition, composition.
Database Management system : Definition, Characteristics, advantages over traditional file processing system, Implication of Database approach, User of database, DBA and its responsibilities, Database schema, instance.
DBMS architecture, data independence, mapping between different levels.
Database languages : DDL, DML, DCL.
Database utilities, Data Models, Keys : Super, candidate, primary, unique, foreign.

SECTION-B

Entity relationship model : concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, converting ER diagrams to tables.
Overview of Network and Hierarchical model.
Relational Data model : concepts, constraints. Relational algebra : Basic operations, additional operations.

SECTION-C

Database design : Functional dependency, decomposition, problems, arising out of bad database design, normalization, multi-valued dependency. Database design process, database protection, database integrity, database concurrency : Problems arising out of concurrency, methods of handling concurrency. Data recovery, database security : Authentication, authorization, methods of implementing security.

SECTION-D

MS-ACCESS **:** Introduction to MS-ACCESS, working with databases and tables, queries in Access, Applying integrity constraints, Introduction to forms, sorting and filtering, controls, Reports and Macro : creating reports, using Macros.

Text Books:

1. Elmisry Nawathy, “DBMS” Pearson India Limited.

Reference Books:

1. C. J. Date, “An Introduction to Data Base Systems”, Narosa Publishers.
2. Jeffrey D. Ullman, “Principles of Database Systems”, Galgotia Publications..
3. D. Kroenke., “Database Processing”, Galgotia Publications.
4. Henry F. Korth, “Database System Concepts”, McGraw Hill.
5. Naveen Prakash, “Introduction to Database Management”, TMH.

BCA-107: SOFTWARE LAB – I (PC SOFTWARE)

Maximum Marks: 50 **Maximum Time: 3 Hrs.**
Minimum Pass Marks: 35% **Lectures to be delivered: 90 Hours**

DOS: Booting Process, Autoexec.bat, Config.sys, Internal And External Commands, Hard disk Partitions

Word Processing : MS Word :- Introduction to Word Processing, Interface, Toolbars, Ruler, Menus, Keyboard Shortcut, Editing a Document, Previewing documents, Printing documents, Formatting Documents, Checking the grammar and spelling, Formatting via find and replace, Using the Thesaurus, Using Auto Correct, Auto Complete and Auto Text, word count, Hyphenating, Mail merge, mailing Labels Wizards and Templates, Handling Graphics, tables and charts, Converting a word document into various formats.

Worksheets : MS EXCEL : Creating worksheet, entering data into worksheet, heading information, data, text, dates, alphanumeric, values, saving & quitting worksheet, Opening and moving around in an existing worksheet, Toolbars and Menus, keyboard shortcuts, Working with single and multiple workbook, Working with formulas & cell referencing, Formatting of worksheet.

MS-PowerPoint : Creating slides, Applying transitions and sound effects, setting up slide shows, Animation.

MS-ACCESS : Introduction to MS-ACCESS, working with databases and tables, queries in Access. Applying integrity constraints.
Introduction to forms, sorting and filtering, controls.
Reports and Macro : creating reports, using Macros.

BCA-108 SOFTWARE LAB – II (PROBLEM SOLVING USING C)

Maximum Marks: 50 **Maximum Time: 3 Hrs.**
Minimum Pass Marks: 35% **Lectures to be delivered: 90 Hours**

This laboratory course will comprise of exercises to supplement what is learnt under paper BCA-105: (Problem Solving Using C)