M.G.S. University, Bikaner

SYLLABUS

SCHEME OF EXAMINATION
AND
COURSES OF STUDY

FACULTY OF COMPUTER
Bachelor in Computer Application (BCA)

B.C.A. PART – I EXAMINATION - 2022
B.C.A. PART – II EXAMINATION - 2023
B.C.A. PART – III EXAMINATION - 2024

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Bachelor in Computer Application
SCHEME OF EXAMINATION

The Number of paper and the maximum marks for each paper together with the minimum marks required for a pass are shown against each subject separately. It will be necessary for a candidate to pass in the theory part as well as practical part of a subject/ paper, separately. Award of Division to Successful candidates at the end of final year examination as per university norms

Admission rule to the course will be as par Government / University policy declared from time to time.

Teaching and Examination scheme for
Bachelor in Computer Application
Part-I

Paper Code	Paper Name	Lect/ week	Tuto/ week	Exam Hours	Max Marks	Min. Pass Marks
Compulsory Papers						
Paper 1	General English			3	100	
Paper 2	General Hindi `			3	100	
Paper 3	Environmental studies			2	100	
Paper 4	Elementary Computer Application Theory			2	100	
Theory Papers						
BCA-101	Mathematics for Computer Science	3	1	3	70	25
BCA-102	Database Management	3	1	3	70	25
BCA-103	Programming in C++	3	1	3	70	25
BCA-104	Computer Networks	3	1	3	70	25
BCA-105	Computer Fundamentals	3	1	3	70	25
BCA-106	Fundamentals of Computer Programming	3	1	3	70	25
Total of Theory Papers					**420**	
Papers Paper						
BCA-107	SQL Lab & Mini Project	3		3	60	22
BCA-108	C++ Lab & Mini Project	3		3	60	22
BCA-109	Computer Fundamentals Lab & Mini Project	3		3	60	22
Total of Practical Papers					**180**	
Grand Total(Theory + Practical)					**600**	

Teaching and Examination scheme for
Bachelor in Computer Application
Part-II

Paper Code	Paper Name	Lec/ week	Tuto/ week	Exam Hours	Max Marks	Min. Pass. Marks
Theory Papers						
BCA-201	Computer Organization	3	1	3	70	25
BCA-202	Operating System	3	1	3	70	25
BCA-203	Java	3	1	3	70	25

BCA-204	Internet Programming	3	1	3	70	25
BCA-205(A)	Cloud Computing	3	1	3	70	25
BCA-205(B)	Data Mining	3	1	3	70	25
BCA-206(A)	Python	3	1	3	70	25
BCA-206(B)	C#	3	1	3	70	25
Total of Theory Papers					**420**	
Practical Papers						
BCA-207	Java Lab & Mini Project	3		3	60	22
BCA-208	Internet Programming Lab & Mini Project	3		3	60	22
BCA-209	Python/C# Lab & Mini Project	3		3	60	22
Total of Practical Papers					**180**	
Grand Total(Theory + Practical)					**600**	

Teaching and Examination scheme for
Bachelor in Computer Application
Part-III

Paper Code	Paper Name	Lec/ week	Tuto/ week	Exam Hours	Max Marks	Min. Pass Marks
Theory Papers						
BCA-301	Software Engineering	3	1	3	70	25
BCA-302	Data Structure	3	1	3	70	25
BCA-303	PHP	3	1	3	70	25
BCA-304(A)	Search Engine Optimization	3	1	3	70	25
BCA-304(B)	Android Programming	3	1	3	70	25
BCA-305(A)	Cyber Security	3	1	3	70	25
BCA-305(B)	Internet of Things	3	1	3	70	25
BCA-306	Project	3	1	3	70	25
Total of Theory					**420**	
Paper Name(Practical)						
BCA-307	Data Structure Lab	3		3	60	22
BCA-308	PHP Lab	3		3	60	22
BCA-309	Android/ SEO Lab	3		3	60	22
		Total of Practical			**180**	
		Grand Total(Theory+ Practical)			**600**	

Note:

1. At least 3 hrs theory and 3 hrs practical slot should be assigned per week for each paper.

Instructions for Paper setters

2. The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

3. Each practical exam is to be conducted by two examiners one External and one Internal. External examiner should be senior lecturer from jurisdiction of MGS University. External Examiner will prepare question paper of Practical Examination. Students have to perform exercise on computer. Exercise must be written in answer books in proper documentation.
4. Marks distribution for Practical of 60 marks is as under-

	Part I & Part II	Part III
Three Exercises of 5 marks each	30 marks	30 Marks
for Part I & II (Logic 04, Execution 04, Documentation 2) for Part III (Logic 04, Execution 04, Documentation 2)		
Viva Voce	10 Marks	15 Marks
Laboratory Exercise File	10 Marks	15 Marks
Mini Project	10 marks	

5. The student has to select one of the topics given in the syllabus for mini project.
6. Marks distribution for Project of 70 marks is as under
   a) Project/Dissertation   40 Marks
   b) Presentation   15 Marks
   c) External Viva Voce   15 Marks   Duration: 3 Hours
   Maximum Marks: 70

   Minimum Marks: 25

BCA-101: Mathematics for Computer Science
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Note: Non-Scientific Calculator is allowed to be used in examination.
Unit-I
Matrices: Basic Definitions, matrix operations- addition, multiplication, transpose, Adjoint and inverse. Determination of a square matrix (up to 3X3 matrix)
Unit-II
Statements (Propositions), Logical Operations, Truth Table, Tautologies, Contradiction, Logical Equivalence, Algebra of Propositions, Conditional and bi-conditional Statement, Argument, Logical Implication, Propositional Functions, Quantifiers, Negation of Quantifiers Statements, Normal.
Unit-III
Integers: Properties of integers, order and inequalities, Absolute value, Mathematical Induction, Division Algorithm, Divisibility, Primes, Greatest Common Divisor(GCD),Euclidean Algorithm, Fundamental Theorem of Arithmetic, congruence Relation.
Unit-IV
Sets: Introduction, Sets and their representations, empty set, Finite & infinite sets, equal sets, subsets, power sets, universal sets, complements of a set. Cartesian products of sets.
Unit-V
Relations: Types of relations, reflective, symmetric, transitive and equivalence relations. Functions: one to one and onto functions, composite functions, inverse of a function, Binary operations, recursively defined functions.

Suggested Readings:

1. Mathematics Volume I By R.D. Sharma (Dhanpat Rai Publication)
2. Mathematics Volume II By R.D. Sharma (Dhanpat Rai Publication)

3. Engineering Mathematics Volume I By S.S. sastry (Prentice-Hall of India)
4. Discrete mathematics Schaum's Series By Seymour LipSchutz, Marc Lipson (Tata McGraw Hill)
5. Discrete mathematics By Vinay Kumar (BPB)
6. Discrete mathematical Structure By Dr. K.C. Jain, Dr. M.L. Rawat.
7. NCERT Mathematics Textbook for class XI and XII

Duration: 3 Hours   Maximum Marks: 70
                                                                            Minimum Marks: 25

BCA-102: Database Management

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consis0ts of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I
Introduction: Characteristics of database approach, Advantages, Database system architecture, Overview of different types of Data Models and data independence, Schemas and instances, Database languages and interfaces; E-R Model : Entities, Attributes, keys, Relationships, Roles, Dependencies, E-R Diagram.

Unit II
Introduction to Relational model, Constraints: Domain ,Key, Entity integrity, Referential integrity; Keys: Primary, Super, Candidate, Foreign; Relational algebra: select, project, union, intersection, cross product, different types of join operations.

Unit III
SQL: Data Types, statements: select, insert, update, delete, create, alter, drop; views, SQL algebraic operations; Stored procedures: Advantages, Variables, creating and calling procedures, if and case statements, loops, Functions, Triggers.

Unit IV
Normalization: Definition, Functional dependencies and inference rules, 1NF, 2NF, 3NF; Transactions processing: Definition, desirable properties of transactions, serial and non-serial schedules, concept of serializability, conflict-serializable schedules.

Unit V
Concurrency Control: Two-phase locking techniques, dealing with Deadlock and starvation, deadlock prevention protocols, basic timestamp ordering algorithm; Overview of database recovery techniques; concept of data warehousing.
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Suggested Readings:
1. Fundamentals of Database Systems,Ramez A. Elmasri, Shamkant Navathe,5th Ed(Pearson)
2. Database System Concepts By Korth, Silberschatz, Sudarshan (Mcgraw Hill)
3. An Introduction to Database Systems By Bipin C. Desai (Galgotia Publication.)
4. SQL, PL/SQL Programming By Ivan Bayross (BPB)
5. Commercial Application Development Using Oracle Developer 2000 By Ivan Bayross (BPB)

Duration: 3 Hours   Maximum Marks: 70
                                                                            Minimum Marks: 25

BCA-103: Programming in C++

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I

Object Oriented System**:** Difference Between Procedural and Object Oriented Languages, Object Oriented Paradigm, Inheritance, Polymorphism, Abstraction, Encapsulation, Benefits and Application of Oops. Introductionto C++: Character Set, Token, Constants, Variables and Data Types, Enumeration Types, Operators, Expressions, Operator Precedence and Associativity, Input, Output, Conditional Statements, Scope of Variables, Type Conversion.

Unit II

Iteration,Break, Continue, goto; Pointers**:** Introduction, implementation advantage and disadvantage**.** Functions **-** Standard and User-Defined Function, Recursive Function, Passing By Value And Reference, Function Overloading Pointer and Function: Function Returning Pointer, Passing pointer as argument, Reference and Functions. Structures and Pointers. Containers.

Unit III

Array**:** introduction, advantage, One, Two and Multidimensional, Passing Array to a Function, Array and Pointers : Pointer to One and Two Dimensional Arrays, Dynamic Arrays, array containers, Array of Pointers, pointers using String Processing.Class: Introduction to Class and Object, Declaring Members and Methods in a class, declaring objects.

Unit IV

Functions and objects, Inline Function, Friend Functions and Its Usage, Abstract Class, Function Overriding. Constructor and Destructor**-** Needs and Its Usage, Types of Constructors, Destructor, Static Data Members and Methods. Inheritance - Need of Inheritance, Types of Inheritance and its implementation.

Unit V

Operator Overloading: Need and Rules of Operator Overloading, Overloading Through Member Function and Friend Function. Compile Time and Run Time Polymorphism- Virtual Function and virtual class. Exception Handling. Templates, Additional features of C++11, C++14 and C++17.

References:
1. Object Oriented Programming With C++ by E. Balagurusamy (Tata Mcgraw Hill)
2. C++ The Complete Reference by Herbert Sehildt (Tata Mcgraw Hill)
3. Object Oriented Programming With C++ by Schaum Series (Tata Mcgraw Hill)
4. C++11 for Programmers (Deitel Developer) by Paul J. Deitel (Author), Harvey M. Deitel, Prentice Hall; 2nd edition
5. Professional C++ by Marc Gregoire, Nicholas A. Solter and Scott J.Kleper (Goodreads Publications)
6. A Tour of C++ by Bjarne Stroustrup, 2018
7. C++17 in Detail by Bartłomiej Filipek

Duration: 3 Hours   Maximum Marks: 70
                                                                                                                      Minimum Marks: 25
BCA-104 Computer Networks

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit - I
Data Communication and Networking: Overview, Network Types, LAN Technologies, Topologies, Models- OSI Model, TCP/IP Stack

Unit - II
Physical Layer: Introduction, Digital Transmission, modes, digital to digital, analog to digital, Analog Transmission, digital to analog, analog to analog, Transmission media, Wireless Transmission, **Switching techniques:** Circuit Switching, Packet switching, Message switching.

Data Link Layer: Introduction, Data Link Control: Line Discipline- Enq/Ack, Poll/Select, **Flow Control** : Stop And Wait, Sliding Window, **Error Control :** ARQ, Stop and Wait ARQ, Sliding Window ARQ.

Unit - IV
Network Layer: Introduction, Network Addressing, Routing, Internetworking, Tunneling, Packet Fragmentation, Network Layer Protocols, ARP, ICMP, IPv4, IPv6

Unit V
Transport Layer: Introduction, Transmission Control Protocol, User Datagram Protocol
Application Layer: Introduction, Client-Server Model, Application Protocols.
Suggested Readings:
1. Computer Forensics by Marie- Helen Maras
2. Data Communication and Networking By Forozan (Tata McGraw Hill)
3. Data Communication And Computer Networks By Dr. Madhulika Jain, Satish Jain (BPB)
4. William Stallings, "Data and Computer Communications", Pearson Education, 2008.
5. Rajneesh Agrawal and Bharat Bhushan Tiwari, "Data Communication and Computer Networks", Vikas Publishing house Ltd. , 2005.
6. A. S. Tanenbaum, "Computer Networks", Fourth Edition, Pearson Education.
7. A. Leon-Gracia and I. Widjaja, "Communication Networks", Tata McGraw Hill, 2004.

Duration: 3 Hours   Maximum Marks: 70
                                                             Minimum Marks: 25

BCA-105 Computer Fundamentals

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I
Basics: Block Diagram, characteristics, generations of computers, classification of computers; Binary number system, Limitations of Computers, Primary and secondary memory, Input and output devices; Computer languages: Machine language, assembly language, higher level language, 4GL. Introduction to Compiler, Interpreter, Assembler, System Softwares, Application Softwares.

Unit II
Operating System: Features of Windows, Linux, Macintosh, Android. Open source softwares: concept and examples.
Word Processing software: different formats for saving a word document, creating, editing documents and related operations, formatting features and related operations, spelling and grammar checker, headers and footers, creating and managing tables; printing, macros, mail merge, equation editor.

Unit III
Spreadsheet Software: Workbook, worksheets, datatypes, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references.
Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows.

Unit IV
Overview of LaTeX; Google docs- usage and creating a document, Google sheets- usage and creating a sheet, Google slides- usage and creating slides, Google forms- usage and creating a form, Google sites- usage and creating a simple site.

Unit V

Computer Problem Solving: Algorithms, Efficiency and analysis of algorithms, Writing algorithms for simple problems like factorial computation, generation of Fibonacci sequence and checking for prime number; Examples of unsolved problems in Computer Science.

Suggested Readings:

1. P.K Sinha, "Computer Fundamentals", 2004

2. Rajaraman, Fundamentals of Computers, Fourth edition, Prentice Hall India Pvt. Limited, 2006

3. Peter Norton, "Introduction to Computers",4th Edition, TMH Ltd, New Delhi, 2017.

4. R.G. Dromey,"How to solve it by Computers", Pearson Publishers, New Delhi, 2007.

5. Dorothy House, "Microsoft Word, Excel, and PowerPoint: Just for Beginners, 2015

Web resources:

1. https://documentation.libreoffice.org/en/english-documentation/getting-started-guide/

2. https://www.coursera.org/learn/creative-problem-solving

3. http://web.mit.edu/rsi/www/pdfs/new-latex.pdf

4. https://www.latex-project.org/help/books/

5. https://support.google.com/docs/?hl=en#topic=1382883

6. https://en.wikipedia.org/wiki/List_of_unsolved_problems_in_computer_science

7. https://www.claymath.org/millennium-problems

Duration: 3 Hours   Maximum Marks: 70
                                                                       Minimum Marks: 25

BCA-106 Fundamentals of Computer Programming

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I

Algorithm; Generalized Algorithms; Avoiding infinite loops in Algorithms-By Counting, by using sentinel value; Different ways of Representing an Algorithm-As a Program, As a Flowchart, As a Pseudo Code; Need for Planning a program before coding, Program Planning Tools- Flow Charts, Structure Charts, Pseudo codes

Unit II

Programming Techniques: Top down, Bottom up, Modular, Structured, Features, Merits, Demerits and their Comparative study. Importance of use of indentation in programming; structured Programming concepts- Need of careful use of "GoTo Statement"; Sequence Logic, selection logic, logic and iteration Logic, functions

Unit III

Programming Language: Types –Machine, Assembly and High –level Languages; Scripting and Natural Languages; Their relative advantages and Limitations; High Level Programming Language Tools- Compiler, Linker, Interpreter, Intermediate Language Compiler and Interpreter, Editor

Unit IV

Overview of some popular High Level Languages- FORTRAN, COBOL, BASIC, Pascal, C, C++, JAVA, LISP, PROLOG, PYTHON; Characteristics of a Good Programming Language; Selecting a Language out of many available languages for coding an Application; Subprograms.

Unit IV

Testing and Debugging: Difference; Types of Program errors ; Testing a Program; Debugging a program for Syntax Errors; Debugging a program Logic Errors; Concepts of APIs and Libraries.
Program Documentation: Need for Documenting Programs and Software; Forms of Documentation- Comments, System Manual, User Manual; Documentation Standards and Notations

Suggested Readings-

 1. Fundamentals of Programming languages by Ellis Holowits, Springer

 2. Fundamentals of Programming languages by Tolani, Pearson

3. Programming Languages: Principles and paradigms by Maurizio Gabbrielli and Simone Martini, Springer
4. Programming Language Concepts by Ghezzi, Milano, Jazayeri, Wien, John Wiley & Sons

BCA-107 SQL (Mini Project)
➢ Design a database your College Alumni Association
➢ Draw an ER Diagram for a Library Management System
➢ Design a database for   a Hospital Management System
4. Create a table "Users" with username and passwords. Display username with its password strength(weal/average/good). Password strength should be calculated by following criteria-
- For each uppercase letter, lower case letter, number and special symbol, weight = +1
- If password starts with a symbol other than a letter, weight = -1
- Password with length <8, weight = +2, password length >8, weight = -2

BCA-108 C++(Mini Project)
1.   Design your Marks sheet
2.   Design Employees database using structure
3.   Create your own library for Array functions
4.   Design a simple calculator using templates
5.   Program for reading from and writing to a random file.

BCA 109 Computer Fundamentals (Mini Project)
1. Supppose you are the student head of your class. Create a Google form to gather the scholastic information from the students for placements. Your form should also accept CV (pdf file) from students.
2. Build a website of your college using Google sites.
3. Buildyour resume in LaTeX (document preparation system). Hint- You may use www.overleaf.com to create your resume.
4. Build a presentation to show the achivements of your college, to be presented on the annual function of your college.
5. Buildyour resume in Libre Writer and generate the PDF file to be mailed to a company.
6. Build your resume in Microsoft Doc and generate the PDF file to be mailed to a company.
7. Create a spreadsheet to generate the list of students to be admitteed for a highly demanding program. You may take necessary assumptions about the eligibility and you may generate the list on scholastic performance of students at different levels.
8. Build a presentation showing the skills your learned in this course (Computer Fundamentals).

Teaching and Examination scheme for
Bachelor in Computer Application
Part-II Exam. – 2022

Duration: 3 Hours
Maximum Marks: 70
Minimum Marks: 25

BCA-201 Computer Organization

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively
Note: Non-Scientific Calculator is allowed to be used in examination.

Unit I
Components of a Computer: Processor, Memory, Input-Output Unit, Difference between Organization and Architecture, Hardware Software Interaction. **Number System:** Concept of Bit and Byte, types and conversion. **Complements:** 1's complement, 2's complement. **Binary Arithmetic:** Addition, overflow, subtraction.

Unit II
Logic gates: Boolean Algebra, Map Simplification. **Combinational circuits**: Half Adder, Full Adder, Decoders, Multiplexers. **Sequential circuits:** Flip Flops- SR, JK, D, T Flip-Flop.

Unit III
Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Mode, Data Transfer and Manipulation, Program Control.

Unit IV
Input Output Organization: Peripheral devices, I/O Interface, Asynchronous Data Transfer, Modes of Data Transfer, Direct Memory Access, I/O Processor.

Unit V
Memory Organization: Types and capacity of Memory, Memory Hierarchy, Cache Memory, Virtual Memory.

Suggested Readings-
1. Computer System Architecture, By M. Morris Mano (Pearson, Prentice Hall)
2. Carter Nicholas, "Computer Architecture", Schaun outline Sevies , Tata McGraw-Hill.
3. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill
4. Digital Computer Electronics By Malvino Leach, Jerald A. Brown(McGraw Hill)

Duration: 3 Hours
Maximum Marks: 70
Minimum Marks: 25

BCA-202 Operating System

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I
Introduction to Operating System, layered Structure, Functions, Types; Process: Concept, Process States, PCB; Threads, System calls; Process Scheduling: types of schedulers, context switch.

Unit II

CPU Scheduling, Pre-Emptive Scheduling, Scheduling Criteria- CPU Utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling Algorithms- FCFS, SJF, Priority Scheduling, Round Robin Scheduling, MLQ Scheduling.

Unit III

Synchronization: Critical Section Problem, Requirements for a solution to the critical section problem; Semaphores. Deadlock: Characterization, Prevention, Avoidance, Banker's Algorithm, Recovery from Deadlock.

Unit IV

Memory Management: Physical and virtual address space, Paging, Overview of Segmentation;Virtual Memory Management: Concept,Page Replacement technique- FIFO. Linux: features of Linux, steps of Installation, Shell and kernel, Directory structure.

Unit V

Linux: Users and groups,file permissions, commands- ls, cat, cd, pwd, chmod, mkdir, rm, rmdir, mv, cp, man, apt, cal, uname, history etc. ; Installing packages; Shell scripts: writing and executing a shell script,shell variables, read and expr, decision making (if else), for and while loops.

Suggested Readings:

1. Operating System Principals By Abraham Silberschatz, Peter Baer Galvin (John Wiley And Sons Inc.)
2. Operating System Concepts And Design By Milan Milen Kovic (Tata Mcgraw Hill)
3. Modern Operating System Andrew S. Tanenbaum, Herbert Bos
4. Linux in easy steps, Mike McGrath, in easy steps limited
5. Unix concepts and apllications , TMH, Sumitabha Das

Duration: 3 Hours   Maximum Marks: 70
                                                                     Minimum Marks: 25

BCA-203 Java

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I

Introduction to java: evolution, features, comparison with C and C++; Java program structure; tokens, keywords, constants, variables, data types, type casting, statements, Operators and Expression; Conditional Statements and Loop Statements.

Unit II

Class: syntax, instance variable, class variables, methods, constructors, overloading of constructors and methods. Arrays, Strings and Vectors.

Unit - III

Inheritance: types of inheritance, use of super, method overriding, final class, abstract class, wrapper classes. Interface, Packages and visibility controls.

Unit - IV

Errors and Exceptions: Types of errors, Exception classes, Exception handling in java, use of try, catch, finally, throw and throws. Taking user input, Command line arguments.
Multithreaded Programming: Creating Threads, Life cycle of thread, Thread priority, Thread synchronization, Inter-thread communication, Implementing the Runable Interface;

Unit - V

Swings : Classes, Working With JFrame Windows, Working With Graphics, Working With Colour, Adding And Removing Controls, Responding To Controls, Labels, Buttons, Checkbox, Checkbox Group, Choice Control, Lists, Text Field, Text Area. Menus, Dialog Box, Handling Events.

References
1. The Complete reference Java Ninth Edition By Herbert Schildt (Tata McGraw Hill)
2. Core Java Volume I--Fundamentals (9th Edition) by Cay S. Horstmann, Gary Cornell, Prentice Hall
3. Java: A Beginner's Guide, Sixth Edition: A Beginner's Guide by Herbert Schildt, McGraw-Hill Osborne Media
4. Programming in JAVA By E. Balagurusamy (TMH)
5. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
6. Horstmann, Cay S. and Gary Cornell, "Core Java 2: Fundamentals Vol. 1", Pearson Education.

Duration: 3 Hours   Maximum Marks: 70
                                                                          Minimum Marks: 25

BCA-204 Internet Programming

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I

Internet Basics: Evolution of Internet, Basic internet terms and applications. ISP, Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol; Mailing List-Subscribing, Unsubscribing.

Unit II

Introduction to World Wide Web and its work, Web Browsers, Search Engine, Downloading, Hyper Text Transfer Protocol (HTTP), URL, Web Servers, FTP, Web publishing- Domain Name Registration, Space on Host Server for Web Site, Maintain and Updating.

Unit III

HTML: Elements of HTML & Syntax, Comments, Headings, Paragraph, Span, Pre Tags, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, div, Use of Forms in Web Pages.

Unit IV

CSS**:**Introduction to Cascading Style Sheets, Types of Style Sheets (Inline, Internal and External), using Id andClasses, CSS properties: Background Properties, Box Model Properties, Margin, Padding, List Properties, Border Properties

Unit V

Java Script: Introduction to Client Side Scripting, Introduction to Java Script, Comments, Variables in JS, Global Variables, Data types, Operators in JS, Conditions Statements (If, If Else, Switch), Java Script Loops (For Loop, While Loop, Do While Loop), JS Popup Boxes (Alert, Prompt, Confirm), JS Events, JS Arrays, JS Objects.

Suggested Readings:

1. Thomas A. Powell , "HTML: The Complete Reference", Osborne/McGraw-Hill
2. Deitel, Deitel and Nieto : Internet & WWW. How to program, 2nd Edition, Pearson Education Asia.

3. Bayross, "Web Enabled Commercial Applications Development Using HTML, DHTML, Java Script, Perl CGI," Third Edition, BPB Publications.
4. Internet and Web Page Designing By V.K Jain (BPB)
5. Web Enabled Commercial Application Development Using HTML, DHTML, java script, Perl CGI By Ivan Bayross (BPB)

Duration: 3 Hours   Maximum Marks: 70
                                                       Minimum Marks: 25
BCA-205 (A) Cloud Computing
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively
Unit I
Introduction to Client – Server Computing, Peer-to-Peer Computing, Distributed Computing, Collaborative Computing, Cloud Computing
Unit II
Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services – SaaS, IaaS, PaaS, DaaS and VDI etc.

Unit II
Cloud as Web-Based Application, Cloud Service Development: Pros and Cons, Types, Software as a Service, Platform as a Service, Web Services, On-Demand computing Discovering Cloud Services, Development Services and Tools, overview of major Cloud Service providers- Amazon Ec2, Google App Engine, IBM Clouds, Eucalyptus etc.
Unit III
Application of Cloud Computing for Centralizing Email communications, collaborating on Schedules, Calendars, To-Do Lists, Contact Lists. Cloud for the Community, Group Projects and Events; Cloud Computing for the Corporation. Cloud Computing for Schedules and Task Management, Exploring Online Scheduling Applications and Online Planning and Task Management;
Unit IV
Cloud Computing Collaborating on Event Management, Contact Management and Collaborating on Project Management. Cloud Collaborating on Word Processing, Databases, Storing and Sharing Files; Evaluating Web Mail Services, Evaluating Web Conference Tools; Cloud computing and Social Networks, Groupware, Blogs and Wikis.

Unit V
Data privacy and security Issues and other risks in Cloud Computing
Suggested Readings-
1. Cloud Computing Concepts Technology and Architecture by Thomas Erl, Prentice Hall
2. Cloud Computing Principles and Paradigm by Rajkumar Buyya, James Broberg, Andrzej Goscinski, Wiley Publications
3. CloudComputingTheoryAndPractice by Dan C. Marinescu, Morgan Kaufman Publications

Duration: 3 Hours   Maximum Marks: 70
                                                       Minimum Marks: 25

BCA-205(B) Data Mining

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively.
Note: Scientific Calculator is allowed to be used in examination.

Unit I
Data mining Introduction: Definition, Data mining tasks, Data mining as a step of Knowledge discovery process, Applications of Data mining; Data objects and types of attributes, Recalling mean, median ,mode and weighted arithmetic mean.

Unit II
Data quality , overview of data preprocessing. Classification analysis- definition, Overview of various classification techniques; Decision tree induction- working, examples ,specifying attribute test conditions.

Unit III
Evaluating the performance of a classifier- Holdout method, Random subsampling , cross-validation, Bootstrap; Association analysis: support, confidence, association rules ,Frequent Item sets.

Unit IV
Frequent itemset generation - Apriori principle , Apriori algorithm and examples, FP growth algorithm and examples.

Unit V
Cluster analysis: Definition , overview of basic clustering methods, Density based methods-DBSCAN.

Suggested Readings:
1. Data Mining: Concepts and Techniques, 3rd edition, Jiawei Han and Micheline Kamber
2. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Pearson Education.
3. Data Mining: A Tutorial Based Primer, Richard Roiger, Michael Geatz, Pearson Education 2003.
4. Introduction to Data Mining with Case Studies, G.K. Gupta, PHI 2006
5. Insight into Data mining: Theory and Practice, Soman K. P., DiwakarShyam, Ajay V., PHI 2006
6. Data Mining:: Practical Machine Learning Tools and Techniques (Morgan Kaufmann Series in Data Management Systems) by Witten, Frank, Hall

Duration: 3 Hours   Maximum Marks: 70
                                                                     Minimum Marks: 25

BCA-206 (A) Python

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I
Basics: Python Interpreter, writing code in Jupyter Notebook, Indentation, comments, importing a module, binary operators, standard scalar data types, type casting, if-else statements, loops(while, for), pass, range, ternary expressions.

Unit II

Data Structures and Sequences: Tuples, Lists and slicing, Built-in Sequence functions, Dictionary, Sets; List, Set, and Dict Comprehensions. Functions: Namespaces, Scope, and Local Functions; Returning Multiple Values.

Unit III

Functions: Anonymous (Lambda) Functions, Partial Argument Application, Generators. Objects and Methods in Python. NumPy: creating N-dimensional arrays, arithmetic with NumPy arrays, basic indexing and slicing, Psuedorandom number generation.

Unit IV

Pandas: Overview of Series and DataFrames, reading data from csv file, DataFrame operations- working with data using functions like head, tail , info, shape, reshape, columns, isnull, dropna, mean, sum, describe, value_counts, corr, loc, iloc, apply.

Unit V

Matplotlib- plotting basic figures, subplots, line plots, bar plots, histograms, scatter plots. Overview of Scikit-learn, SciPy, networkx. Basic Errors and Exception handling. Basic File Handling. Applications of python.

Suggested Readings:

1. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Ipython, by Wes McKinney, O'Reilly Media, 2017
2. Python All-in-One for Dummies, by John Shovic and Alan Simpson, John Wiley & Sons, Inc., 2019
3. Programming in Python 3: A Complete Introduction to the Python Language, Mark Summerfield, Pearson.
4. Swaroop, C. H. (2003). A Byte of Python. Python Tutorial.
5. Introduction to Computation and Programming Using Python. By John V. Guttag, MIT Press.
6. Learning Python , Mark Lutz, David Ascher, O'Reilly
7. T. Budd, Exploring Python, TMH, 1st Ed, 2011

Web Resources:

8. https://www.learnpython.org/
9. https://nptel.ac.in/courses/106/106/106106212/
10. http://greenteapress.com/thinkpython/thinkpython.pdf
11. **Python tutorial: https://docs.python.org/3/tutorial/index.html**

Duration: 3 Hours

Maximum Marks: 70
Minimum Marks: 25

BCA-206 (B) C#

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit - I

What is C#, C++ vs C#, Java vs C#, History, Features, Environment, Program Structure, basic syntax, Variables, Constants, Data Types, Type Conversion, Operators, Keywords, Control Statement, if-else, switch, For Loop, While Loop, Do-While Loop, Break, Continue, Goto, Comments, Arrays, Multidimensional Array, Jagged Arrays

Unit - II

Object Class, Object and Class, attributes, Constructor, Destructor, this, static, static class, static constructor, Struct, Enum

Unit - III

Inheritance, Aggregation, Polymorphism, Member Overloading, Method Overriding, Sealed, Abstract, Interface, partial class

Unit - IV

Namespace, Strings, Exception Handling, File IO, Serialization, Collections, List<T>, Stack<T>, Queue<T>, LinkedList<T>, generics, nullable type

Unit - V

Properties, indexers, Delegates and events, Reflection, Multithreading

Suggested Readings-
- Beginning C# Object Oriented Programming by Syed Shanu (C# Corner)
- Beginning C# 6 Programming with Visual Studio 2015 by Benjamin Perkins, Jacob Vibe Hammer, Jon D. Reid (Wrox)
- C# 6.0 in a Nutshell: The Definitive Reference 6th Edition by Joseph Albahari and Ben Albahari
- Pro C# 5.0 and the .NET 4.5 Framework (Expert's Voice in .NET) 6th Edition by Andrew Troelsen
- Programming C# for Beginners (Mahesh Chand)

BCA-207 Java (Mini Project)
1. Design Digital clock using applet
2. Design Calculator using AWT with basic functionality on +,-,*,/ and =.
3. Design Indian Flag using Applet.
4. Design analog clock using applet
5. Design program to display fibonacci series in AWT Frame.

BCA- 208 Internet Programming (Mini Project)
1. Create a form in html to registration for membership on website(only HTML).
2. Change the look of the form created in question 1 by using CSS.
3. Implement validation in the form created in question 1 by using javascript.
4. Design your marksheet by using table tag.
5. Design 5 basic page website of your college.

BCA-209 Python (Mini Project)
1. Build a Python Website Blocker. When we surf the internet, many unwanted websites keep showing up. You can build a program that blocks certain websites from opening. This program is beneficial for students who want to study without any social media distractions.

2. Build a Random Password Generator. Creating a strong password and remembering it is a tedious task. You can build a program that intakes some words from the user and then generates a random password using those words. The user can remember the password with the help of the words he gave as an input.
3. Build a Contact Book. This is an excellent python project idea for beginners. Everyone uses a contact book to save contact details, including name, address, phone number, and even email address. This is a command-line project where you will design a contact book application that users can use to save and find contact details. The application should also allow users to update contact information, delete contacts, and list saved contacts. The SQLite database is the ideal platform for saving contacts.
4. Simulate a simple lottery game that involves four players using Python. At the end of game, amount left with each player should be displayed. You may take appropriate assumptions.

5. Build an email Slicer. This is a convenient program that has a lot of use in the future. The program helps get you the username and domain name from an email address. You can even customize the application and send a message to the host with this information.

BCA-209 C# (Mini Project)

1. Write a program in C# Sharp to count a total number of alphabets, digits and special characters in a string.

2. Write a program in C# Sharp to count a total number of duplicate elements in an array.

3. Design program to implement Stack in c#.

4. Write a constructor destructor program in which you make 3 constructors. One is for default constructors with default message, next is parameterized constructor which accept a stringvalue and last one is also parameterized constructor which accept two numerical value and shows add of them. Initialize all constructors and shows output.

5. Write a program using Virtual and Override keyword that does the following tasks.

A virtual function Engine() that has basic properties of engine like Power of engine, RPM, no of Cylinder etc. This function

Teaching and Examination scheme for
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Duration: 3 Hours   Maximum Marks: 70
                                                               Minimum Marks: 25

BCA-301 Software Engineering

Instructions for Paper setters

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Note: Scientific Calculator is allowed to be used in examination.

Unit I

Software Engineering: Software, **Software Process**, Process Characteristics, Software Process Model- Linear Sequential Model, Prototyping Model, Spiral Model. **Software Quality**, McCall's Quality Factors. **Software Requirement Analysis and Specification (SRS)**: Need, Characteristics and Components.

Unit II

Cost Estimation: COCOMO Model, **Designing Concepts:** Design Principles, Module level concepts- Cohesion and Coupling, Design notations and specifications, Verification, Metrics.

Unit III

Object Oriented Design: Concepts, Design Notation and Specification, Design methodology, metrics. **Debugging Process:** Information Gathering, Fault Isolation, Fault Confirmation, Documentation, Fixing fault isolation.

Unit IV

Testing: Testing Fundamental, Functional Testing (Black Box), Structural Testing (White Box), Alpha And Beta Testing, Testing Object Oriented Programs, Testing Process: Comparison of Different Testing, Level of Testing. Project management for special classes of software projects: Using CASE tools, CBSE.

Unit – V

UML: An overview of UML- UML notations, UML Class diagrams- association, multiplicity, generalization, aggregation, interfaces.

Suggested Readings:

1. Software Engineering: A Practitioner's Approach by Roger S. Pressman(McGraw Hill)
2. An Integrated Approach to Software Engineering By PankajJalote, (Narosa Publishing House)
3. Object-Oriented SoftwareEngineering: Practical Software Development using UML and Java By Timothy C. Lethbridge, Robert Laganière (McGraw Hill)
4. Object-Oriented Software EngineeringUsing UML, Patterns, and Java By Bernd Bruegge& Allen H. Dutoit(Prentice Hall)

Duration: 3 Hours   Maximum Marks: 70
                                                                        Minimum Marks: 25
BCA-302 Data Structure
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I
Primitive and Composite Data Types, Time and Space Complexity of Algorithms, Stack and Primitive Operation on Stack.Applications- Infix, Postfix, Prefix and Recursion. Queues, Primitive Operations on Queues, Circular Queue, De Queue and Priority Queue.
Unit II
Basic Operation on Linked List, Circular Linked List, Doubly Linked List, Linked Representation of Stack and Queue, Application of Linked List.
Unit III
Trees: Basic Terminology, Binary Trees, Tree Representation as Array and Linked List, Basic Operation on Binary Tree, Traversal of Binary Tree – In Order, Preorder, Post Order, Application of Binary Tree, Threaded Binary Tree, B-Tree and Height Balance Tree.
Unit IV
Sequential Search, Binary Search, Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Comparison of Sorting Methods.
Unit V
Hash Table, Collision Resolution Techniques. Introduction to Graphs, Definition, Terminology, Directed, Undirected, Weighted Graph, Representation of Graphs, Graph Traversal – Depth First and Breadth First, Spanning Trees, Minimum Spanning Trees, Shortest Path Algorithm.

Suggested Readings -
1. Expert Data Strutcture with 'C' By R.B Patel (Khana Book Publishing Co.(P))
2. Data structure By Lipschutz (Tata McGraw Hill)
3. Data Structure By YashvantKanitkar (BPB)
4. An Introduction to Data Structures with Applications, By Jean-Paul tremblay, Paul G.Sarerson (Tata McGraw Hill)
5. Data Structure Using C and C++ By Yedidyahlangsam, Moshe J.Augenstein, Arora M. Tenenbaum (Prentice- Hall India)

Duration: 3 Hours

Maximum Marks: 70
Minimum Marks: 25

BCA-303 PHP

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit - I

PHP: Versions of PHP, Installation of PHP, Php.ini basics. Testing Installation. **Building Blocks of PHP:** Variables, data types, Operators & Expressions, Constants, Switching, Flow, Loops, Code Blocks and Browser Output.

Unit - II

Functions: Meaning, Calling, Defining a function. Return value from user defined function. Saving state with 'static' function. **Arrays:** Creating arrays, Array related functions.**Working with String, Date & Time:** Formatting String with PHP, Using Date and time Functions with PHP.

Unit - III

Forms: Creating simple input Form. Accessing Form input with user defined arrays, HTML and PHP Code on a single page. Redirecting User. Working with File Upload. Uploading & Downloading.

Unit- IV

State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session. **String matching with regular expression:** What is regular expression, Pattern matching in Php, Replacing text, Splitting a string with a Regular Expression. **Email**: Sending Email, Headers, Reviewing SMTP, PHP Mailer, Building Notifications

Unit - V

Connecting to the MYSQL: Selecting a database, Adding data to a table, Displaying returned data on Web pages, Inserting data, Deleting data, Entering and updating data, Executing multiple queries.

Suggested Readings :

  2. Deitel, Deitel and Nieto : Internet & WWW. How to program, 2nd Edition, Pearson Education Asia.
  3. Teach Yourself PHP, MYSQL &Apache ByMeloni, Pearson Education.
  4. Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl & PHP By James Lee, Pearson Education.
  5. PHP: A Beginner's Guide ByVaswani, Vikram Tata Mc-Graw Hill.

  Web Resources:
  1. http://www.mysqltutorial.org/mysql-stored-procedure-tutorial.aspx

Duration: 3 Hours

BCA-304(A) Search Engine Optimization

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit – I
Basics for SEO: What is Domain, Basic Knowledge of World Wide Web, Difference between Portal and Search Engines, What is SEO, Types of SEO Techniques, Black hat techniques, White Hat techniques, How Search Engine works**.**

Unit - II
SEO Research & Analysis: Market Research, Keyword Research and Analysis, Keyword opportunity, Competitors Website Analysis, SWOT Analysis of Website, How to Choose Best Keywords, Tools available for Keyword Research. **Website Design SEO Guidelines:** Content Research, Content Guidelines, Content Optimization, Design & Layout, XML Sitemap / URL List Sitemap.

Unit - III
On-page Optimization: The Page Title, Meta Descriptions & Meta Keywords, Headings, Bold Text, Domain Names & Suggestions, Canonical Tag, Meta Tags, Images and Alt Text, Internal Link Building, The Sitemap, Invisible Text, Server and Hosting Check, Robots Meta Tag, Doorway Pages, 301 Redirects, 404 Error, Duplicate content.

Unit – IV
Off-page Optimization: Page Rank, Link Popularity, Link Building in Detail, Directory Submission, Social Bookmark Submission, Blog Submission, Articles, Links Exchange, Reciprocal Linking, Posting to Forums, Submission to Search Engine, RSS Feeds Submissions, Press Release Submissions, Forum Link Building, Competitor Link Analysis**.**

Unit - V
Analytics: Google Analytics, Installing Google Analytics, How to Study Google Analytics, Interpreting Bars & Figures, How Google Analytics can Help SEO, Advanced Reporting, Webmaster Central & Bing/Yahoo, Open Site Explorer, Website Analysis using various SEO Tools available. **SEO Tools:** Keyword Density Analyzer Tools, Google Tools, Yahoo / Bing Tools, Rich Snippet Text Tools, Comparison Tools, Link Popularity Tools, Search Engines Tools, Site Tools, Miscellaneous Tools. **SEO Reporting:** Google analysis, Tracking and Reporting, Reports Submission, Securing Ranks

Suggested readings -
- The Art of SEO (Theory in Practice) - Eric Enge, Stephen Spencer, Jessie Stricchiola, and Rand Fishkin (O'REILLY)
- Search Engine Optimization All-in-One For Dummies by Bruce Clay
- SEO Step-by-Step by Caimin Jones

Duration: 3 Hours   Maximum Marks: 70
                                                                Minimum Marks: 25

BCA-304(B) Android Programming

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I
Introduction: What is Android?, Android Architecture, Setting Android Environment, Android SDK Manager & required Packages, Using Android Studio, Android Virtual Device(AVD), Creating First Android Application, Package Structure

Unit II
Introduction to Gradle, Running the Application, Views, Layouts and more. Introduction to Views: TextView, EditText View, RadioButton and CheckBox View, Button View, ImageView and ImageButton View, Toast, Notifications.

Unit III
Introduction to Layouts/ViewGroups: Linear Layout, Relative Layout, Tabular Layout, Hierarchical Layout Arrangements, Adapter and Adapter View, Using ListView and GridView, SQLite Database.

Unit IV
Spinner in Android, Working with Spinners, Margin and Padding, Working with EditText and TextView, RadioGroup, RadioButton and CheckBox, AutoCompleteTextView in Android, Android Core and Projects.

Unit V
Location Based Services: Sending Email, Sending SMS, Phone Calls
Activity in Android, Intents in Android, Introduction to Fragments, Working with Fragments

Suggested Readings:
- Android Programming for Beginners by John Horton Publisher: Packt Publishing
- Learn Java for Android Development (2nd edition) by Jeff Friesen Publisher: Apress
- Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.
- Beginning Android Programming with Android Studio, Fourth Edition by Jerome F. DiMarzio Publisher: John Wiley & Sons
- Android Programming: The Big Nerd Ranch Guide by Kristin Marsicano , Chris Stewart , Bill Phillips Publisher: Big Nerd Ranch Guides

Duration: 3 Hours   Maximum Marks: 70
                                                                Minimum Marks: 25

BCA-305 (A) Cyber Security
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively
Unit I

Cyber Security: definition, cybercrime and information security, cybercriminals, classification of cybercrime, cybercrime Era. Cyber offences: categories of cybercrime, how criminals plan the attack, cyberstalking, cybercafe and cybercrime, botnets and cybercrime, Cloud Computing and cybercrime.

Unit II
Tools and methods used in cybercrime: phishing and Identity theft; methods of phishing, spear phishing, types of phishing scams, phishing toolkits, and spy phishing, Personally Identifiable Information, types and techniques of ID theft, password cracking, keyloggers and spywares, backdoors, steganography, DoS and DoS attacks, SQL Injection, Buffer Overflow.

Unit III
Cybercrime on mobile and wireless devices: Security challenges posed by mobile devices, attacks on wireless networks, credit card frauds mobile and wireless era. Authentication security service, attacks on mobile phones; mobile phone theft, mobile virus, mishing, vishing, smishing, hacking Bluetooth.

Unit IV
Cybercrime and Cyber Security: Cyber Law, The Indian IT Act, Digital Signatures and IT Act, Cyber security and organizational implications, Cyber crisis management, Anti-Cybercrime Strategies, Cybercrime and Cyberterrorism. cybercrime and Indian ITA 2000.
Unit V
Computer forensics: introduction, computer forensics and digital evidence, digital forensics life cycle, computer forensics and steganography, Relevance of the OSI 7 Layer model to computer forensics, Anti forensics.

Suggested Readings:
1. Cyber Security by Nina Godbole & sunit Belapure
2. Computer Forensics by Marie- Helen Maras

Duration: 3 Hours   Maximum Marks: 70
                                                                          Minimum Marks: 25
BCA-305 (B) Internet of Things
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I
Introduction: Definition Characteristics, Architecture, Logical Design, protocols. Types of IOTs. M2M and IOT: Difference, SDN and NFV for IOT.
Unit II
IOT System Management: Need, SNMP, Requirements. IOT platform design methodology. IOT logical design
Unit III
IOT Devices: Building blocks, exemplary device: Raspberry PI Interfaces. Other IOT devices. Introduction to WAMP, Django, SkyNet

Unit IV

Introduction to Apache Hadoop, Map reduce programming model, Hadoop Yarn, Apache Oozie, Apache Spark, Apache Strom

Unit V

Tools for IOT: Chef, Puppet, NETCONF-YANG, IOT code generator
Suggested Readings:
1. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
3. From Machine-to-Machine to the Internet of Things : Introduction to a New Age of Intelligence by Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle, Academic Press, 2014
4. Rethinking of Internet of Things by Francis daCosta, Apress
5. Adrian McEwen, "Designing the Internet of Things", Wiley Publishers, 2013

BCA-306 PROJECT(based on a Case Study)
Practical Training and Project Work:

1. Project Work may be done individually or in groups(maximum three) in case of bigger projects. However if project is done in group each student must be given a responsibility for a distinct module and care should be taken to monitor the individual student.
2. Project Work can be carried out in the college or outside with prior permission of college.
3. The Student must submit a synopsis of the project report to the college for approval. The Project guide can accept the project or suggest modification for resubmission. Only on acceptance of draft project report the student should make the final copies.
4. **The project report should be hand written.**

Submission Copy:
The Student should submit spiral bound copy of the project report.
Format of the Project:
(a) Paper:
    The Report shall be typed on White Paper of A4 size.
(b) Final Submission:
    The Report to be submitted must be original.
(c) Typing:
    Font:- Times New Roman
    Heading:- 16 pt., Bold
    Subheading:- 14 pt, Bold
    Content:- 12 pt.
    Line Spacing:- 1.5 line.
    Typing Side :-One Side
    Font Color:- Black.
(d) Margins:
    The typing must be done in the following margin:
    Left : 0.75"
    Right: 0.75"
    Top: 1"
    Bottom: 1"
    Left Gutter: 0.5"

(e) Binding:
The report shall be Spiral Bound.

(f) Title Cover:
The Title cover should contain the following details:
Top: Project Title in block capitals of 16pt.
Centre: Name of project developer's and Guide name.
Bottom: Name of the university, Year of submission all in block capitals of 14pt letters on separate lines with proper spacing and centering.

(g) Blank sheets:
At the beginning and end of the report, two white blank papers should be provided, one for the Purpose of Binding and other to be left blank.

(h) **Content:**
   I).   Acknowledgement
   II). Institute/College/Organization certificate where the project is being developed.
   III). Table of contents
   IV). A brief overview of project
   V).   Profiles of problem assigned
   VI). Study of Existing System
   VII). System Requirement
   VIII). Project plan
      o   Team Structure
      o   Development Schedule
      o   Programming language and Development Tools
   IX). Requirement Specification
   X).   Design
      o   Detailed DFD's and Structure Diagram
      o   Data structure, Database and File Specification
   X).   Project Legacy
      o   Current Status of project
      o   Remaining Areas of concern
      o   Technical and Managerial Lessons Learnt
      o   Future Recommendations
   XI). Nomenclature and Abbreviations.
   XII). Bibliography
   XIII). Source Code.