

## **Ordinance, Scheme & Syllabus for B.C.A. Examination 2019-20 to 2021-22**

<b>Course Title:</b>	<b>Bachelor of Computer Application</b>
<b>Abbreviation:</b>	<b>B.C.A.</b>
<b>Type of Course:</b>	<b>Three Year Degree Course</b>
<b>Pattern;</b>	<b>Yearly</b>
<b>Award of Degree:</b>	<b>Bachelor of Computer Application Degree will be awarded for those successfully complete all the components and declared pass in the who programme after three Years.</b>

### **Scheme of Examination**

**The term end examination papers will be divided into 3 sections:**

Section- A (10x1=10) consists of 10 questions. Each question carries one mark. Attempt all questions.

Section- B (5x3 =15) consists of five questions with internal choice in each unit. Attempt all questions. Each question carries 3 marks. Word limit (300 -500 words)

Section- C (3x 5 = 15) consists of 5 questions one from each unit. Students are required to attempt any 3 questions. Each question carries 5 marks. (Word limit 500 words & more)

There will be no internal marks in Practical. The paper will be of as per the maximum marks allotted in the syllabus.

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 each paper separately by securing 36% marks in both Internal evaluation as well as term-end examination.

### **List of Compulsory Subjects/papers for B.C.A.**

1. General Hindi
2. General English
3. Elementary Computer Applications
4. Environmental Studies

### **List of Subjects**

#### **Group –A**

1. B.C.A.

#### **DISTRIBUTION OF MARKS Compulsory Subjects/papers**

S.No.	Name of the No. of Compulsory Subjects	Duration Hours	Maximum Marks Term-End Exams	
			Max	Min
1	General Hindi	3	100	36
2	General English	3	100	36
3	Elementary Computer Application	2	100	36
4	Environmental Studies	2	100	36

### **Syllabus of Compulsory Subjects for**

## 1 सामान्य हिन्दी

**यह प्रश्न पत्र सभी प्रथम वर्ष के विद्यार्थियों के लिए अनिवार्य है।**

**गद्य भाग इकाई – 1**

अधिकतम अंक 100 मुल्यांकन आंतरिक मुल्यांकन 20 सत्रांत परीक्षा 80 अंक

नोट— इस प्रश्न पत्र के प्राप्तांक सत्रांत परीक्षा के उपरांत क्षेणी की गणना हेतु सम्मिलित नहीं किये जायेंगे। विद्यार्थियों को अनिवार्य पेपर अधिकतम तीन वर्ष में उत्तीर्ण करने होंगे। परीक्षा में सम्मिलित नहीं होने अथवा अनुपस्थित रहने को भी प्रयास माना जायेगा।

**इकाई – 1**

1. भारतवर्ष की उन्नति कैसे हो — भारतेन्दु हरिश्चन्द्र
2. आचरण की सभ्यता — अध्यापक पूर्णसिंह
3. मेघदूत — महावीर प्रसाद द्विवेदी
4. भारतीय संस्कृति की देन — हजारी प्रसाद द्विवेदी
5. गिल्लू — महादेवी वर्मा
6. सवाल की नोक पर — मोहन राकेश
7. निन्दा रस — हरिशंकर परसाई
8. नेता नहीं नागरिक चाहिए — रामधारी सिंह दिनकर
9. हमारा समय और विज्ञान — गुणाकर मुले
10. साफ माथे का समाज — अनुपम मिश्र

**इकाई – 2**

1. कर्मवीर — अयोध्या सिंह उपाध्याय हरिऔध
2. भू-लोक का गौरव — संदेश यहाँ मैं नहीं स्वर्ग का लाया — भारत भारती मैथिलीशरण गुप्त
3. बीती विभावी जागरी । अरुण यह मधुमय देश हमारा — जय शंकर प्रसाद
4. तोड़ती पत्थर — सूर्यकांत त्रिपाठी निराला
5. पथ की पहचान — हरिवंश राय बच्चन
6. प्रेत का बयान — नागार्जुन
7. जब-जब मैंने उसको देखा । धरती उस किसान की — केदारनाथ अग्रवाल
8. गीत फरोश — भवानी प्रसाद मिश्र
9. देश की नस्लें, बात करो, अपने — सरल विशारद

**इकाई – 3**

1. संक्षेपण
2. पल्लवन
3. शब्द युग्म
4. लोकोक्ति
5. शुद्धिकरण — शब्द , वाक्य मुहावरें

**इकाई – 4**

1. अनुवाद — अर्थ और सिद्धान्त, महत्त्व, आदर्श, अनुवाद की विशेषताएं
2. राजस्थानी एवं अंग्रेजी से हिन्दी अनुवाद एक अनुच्छेद

**इकाई – 5**

1. किसी एक विषय पर निबंध
2. पत्र-प्रारूप

**परीक्षकों के लिए निर्देश:-**

1. प्रश्न-पत्र इकाइयों में विभक्त हों।
2. प्रत्येक इकाई से निर्देशानुसार व्याख्यात्मक एवं आलोचनात्मक प्रश्न पूछे जाएंगे।
3. प्रश्न-पत्र वर्तमान में निर्धारित पाठ्यक्रमानुसार हो।

## 2. General English

**Compulsory in 1st year for all streams at undergraduate level**

Max. Marks: 100 Internal Evaluation 20 Marks Term-End Examination 80Marks

**Note.**

1. The marks secured in this paper shall not be counted in awarding the division to a candidate.
2. The candidate has to clear compulsory paper in three years.
3. Non appearing or absent in the examination of compulsory paper will be counted a chance.
4. It is essential to pass in both internal as well as external evaluation separately by securing 36% marks in each.

**The syllables and scheme of examination is as under:**

**A. Grammar**

Determiners  
Tenses and Concord  
Auxiliaries  
Prepositions  
Basic Sentence Patterns

**B. Transformations**

Active to Passive Voice  
Simple to Compound / Complex  
Declarative into Negative/ Interrogative  
Direct to Indirect Speech

**C. Comprehension**

Comprehension of an Unseen Passage  
Comprehension (from the following Texts): Comprehension based Questions of 10 Marks each will be asked from Prose, Short Stories, One Act Play and Poetry [40 Marks]

**Prose**

Digital India  
A.P.J. Abdul Kalam: The Power of Prayer  
Martin Luther King: I have a Dream  
Albert Einstein: The World as I see it

**Short Stories**

Leo Tolstoy: The Three Questions  
Nachiketa

**One Act Play**

Cedric Mount: The Never Never Nest

**Poetry**

R.N. Tagore : Heaven of Freedom  
John Donne : Death be not Proud  
Swami Vivekanand : Kali the Mother

**Required Readings: *Emerald* (Macmillan)**

**D. Written Composition**

Precis Writing  
Paragraph Writing  
Letter Writing(Formal and Informal )  
Report Writing.

***Suggested Readings:***

Murphy, Raymond: *Intermediate English Grammar* ( OUP)  
Huddleton, Rodney: *English Grammar: An Outline* (OUP)  
Greenbaum, Sidney: *The Oxford English Grammar* (OUP)

**3. ELEMENTARY COMPUTER APPLICATIONS**

**Compulsory in 1st year for all streams at undergraduate level**

Max. Marks: 100 Internal Evaluation 20 Marks Term-End Examination 80Marks

**Note.**

1. The marks secured in this paper shall not be counted in awarding the division to a candidate.
2. The candidate has to clear compulsory paper in three years.

3. Non appearing or absent in the examination of compulsory paper will be counted a chance.
4. It is essential to pass in both internal as well as external evaluation separately by securing 36% marks in each.

**The syllables and scheme of examination is as under:**

Introduction to Information Technology, Generation of Computers, Types of computers: Micro, Mini, Mainframe, Super, Architecture of Computer System: CPU, ALU Primary Memory: RAM, ROM, Cache memory, Secondary Memories, Input/Output device, Pointing device.

Number System (binary, octal, decimal and hexadecimal) and their conversions, Logic gates,

Languages: machine, assembly and high level languages including 3GL, 4GL,

Concept of Operating System, need and types of operating systems: batch, single user,

Multiprocessing, and time sharing, introduction to Windows.

Internet: Concept, email services, www, web browsers, search engines, simple programs in HTML, type of HTML document, documents structures: element, type and character formatting, tables, frames and forms, Styli sheet

Computer Networking: Type of networks, LAN, MAN and WAN, concept of topology, bridges, routers, gateways, modems, ISDN leased lines, teleconferencing and videoconferencing.

E-Commerce: Concept of e-commerce, benefits and growth of e-commerce, e-commerce categories, e-Governance, EDI, electronic funds transfer on EDI networks Electronic payment system.

*Suggested Books :*

1. Computer Fundamental By P.K. Sinha (BPB Publications)
2. Computer Made Easy For Beginners (in Hindi) By Niranjana Bansal, Jayshri Saraogi
3. IT Tools and Applications By Satish Jain, Shashank Jain, Dr. Madhulika Jain (BPB Publication).
4. Rapidex computer Course, Vikas Gupta, Pustak Mahal.

#### **4. ENVIRONMENTAL STUDIES**

**Compulsory in 1st year for all streams at undergraduate level**

Max. Marks: 100 Internal Evaluation 20 Marks Term-End Examination 80Marks

**Note.**

1. The marks secured in this paper shall not be counted in awarding the division to a candidate.
2. The candidate has to clear compulsory paper in three years.
3. Non appearing or absent in the examination of compulsory paper will be counted a chance.
4. It is essential to pass in both internal as well as external evaluation separately by securing 36% marks in each.

**The syllables and scheme of examination is as under:**

**SCHEME OF EXAMINATION**

1. The term-end paper will be of 80 marks.
2. There will be no practical/Field work, instead student should be aware of ecology of local area; the question related to field work of local area can be asked by paper setter.
3. There will be 80 questions in the paper of multiple choice, each question of 1 mark.
4. There will be no negative marking in the assessment. Core Module syllabus for Environmental Studies for Under Graduate Courses of All Branches of Higher Education

**Unit-1 : The multidisciplinary nature of environmental studies.**

- Definition scope and awareness.
- Need for public awareness.

**Unit-2 : Natural Resources :**

- Renewable and non-renewable resources
- Natural resources and associated problems.
- Forest resources.

- Use and over-exploitation.
- Deforestation.
- Timber exploitation.

#### Mining

- Dams and their effects on forests and tribal people.
- Water resources.
- Use and over utilization of surface and ground water.
- Floods
- Drought
- Conflicts over water
- Dams benefits and problems.
- Mineral resources.
- Use and exploitation.
- Environmental effects of extracting and using mineral resources.
- Food resources.
- World food problems.
- Changes caused by agriculture and overgrazing.
- Effects of modern agriculture.
- Fertilizer, pesticide problems.
- Water logging.
- Salinity

#### **Energy resources :**

- Growing energy needs.
- Renewable and non-renewable energy resources.
- Use of alternate energy resources.

#### **Land resources :**

- Land as a resource.
- Land degradation.
- Man induced land slides.
- Soil erosion & desertification.

Role of an individual in conservation of natural resources. Equitable use of resources for sustainable system.

#### **Unit-3 : Ecosystem:**

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction types, characteristic features, structure and function of the following ecosystems.
- Forest ecosystem.
- Grassland ecosystem
- Desert ecosystem.
- Aquatic ecosystems (ponds, streams lakes, rivers, oceans estuaries).

#### **Unit-4 : Biodiversity and its conservation:**

- Introduction, definition and diversity at genetic, species and ecosystem level.
- Biogeographically classification of India.
- Value of biodiversity, consumptive use productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, national & local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.

- Threats to biodiversity - habitat loss poaching of wild life, man-wild life conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity – In situ and Ex-situ conservation of biodiversity.

#### **Unit-5 : Environmental Pollution :**

- Definition, causes, effect and control measures of
- Air pollution.
- Water pollution
- Soil pollution.
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards.
- Solid waste management : Causes, effects and control measures of urban industrial wastes.
- Role of an individual in prevention of pollution.
- Disaster management : Flood, earthquake, cyclone and land slides.

#### **Unit-6 : Social issues and the environment :**

- From unsustainable to sustainable development
- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.
- Settlement and rehabilitation of people, its problem of concerns.
- Environmental ethics-issues and possible solutions. Ozone layer depletion, nuclear accidents.
- Wasteland reclamation.
- Consumerism and waste products.
- Environmental protection Act.
- i. Air ( ) prevention and control of pollution Act
- ii. Wild life protection Act
- iii. Forest conservation Act.
- Issues involved in enforcement of environmental legislation.
- Public awareness.

#### **Unit-7 : Human Population and the Environment :**

- Population growth, variation among nations.
- Population explosion-Family welfare programme.
- Environment and Human health.
- Human rights.
- Value education.
- HIV/AIDS
- Women & child welfare.
- Role of information technology in environment and human health.

#### **Field Work**

- Visit to a local area to document environmental assets-river/forest/grassland/ hill/ mountain.
- Visit to local polluted site- Urban/rural/industrial/agricultural.
- Study of common plants, insects. Birds.
- Study of simple ecosystem-Pond, river, hill slope etc.

#### **Suggested Books:**

- 1 पर्यावरण अध्ययन – वर्मा, गैना, खण्डेलवाल, रावत
- 2 पर्यावरण विज्ञान – पी.सी. त्रिवेदी, गरिमा गुप्ता
- 3 पर्यावरण अध्ययन – सुरेश आमेता, शिप्रा भारद्वाज
- 4 Environmental studies - Pratap Singh, N.S. Rathore, A.N. Mathur
- 5 पर्यावरण अध्ययन – मनोज यादव, अनूपमा यादव।

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## Bachelor in Computer Application Syllabus 2019-2020 to 2021-22

### 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 per Government / University policy declared from time to time.**

### Teaching and Examination scheme for Bachelor in Computer Application Part-I 2019-2020

Paper Code	Paper Name	Exam hours	Int.	Ext.	Max Marks	Min. Pass Marks
<b>Theory Papers</b>						
BCA-101	Mathematics for Computer Science	3	14	56	70	25
BCA-102	Database Management	3	14	56	70	25
BCA-103	Programming in C++	3	14	56	70	25
BCA-104	Computer Networks	3	14	56	70	25
BCA-105	Multimedia & Animations	3	14	56	70	25
BCA-106	Fundamentals of Computer Programming	3	14	56	70	25
	<b>Total of Theory Papers</b>					<b>420</b>
<b>Papers Paper</b>						
BCA-107	SQL Lab & Mini Project	3	-	-	60	22
BCA-108	C++ Lab & Mini Project	3	-	-	60	22
BCA-109	Multimedia Lab & Mini Project	3	-	-	60	22
	<b>Total of Practical Papers</b>					<b>180</b>
	<b>Grand Total(Theory + Practical)</b>					<b>600</b>

**Teaching and Examination scheme for Bachelor in Computer Application  
Part-II 2020-2021**

Paper Code	Paper Name	Exam Hours	Int. Marks	Ext. marks	Max. Marks	Min. Pass. Marks
	<b>Theory Papers</b>					
BCA-201	Computer Organization	3	14	56	70	25
BCA-202	Operating System	3	14	56	70	25
BCA-203	Java	3	14	56	70	25
BCA-204	Internet Programming	3	14	56	70	25
BCA-205(A)	Cloud Computing	3	14	56	70	25
BCA-205(B)	Data Mining	3	14	56	70	25
BCA-206(A)	Python	3	14	56	70	25
BCA-206(B)	C#	3	14	56	70	25
<b>Total of Theory Papers</b>						<b>420</b>
<b>Practical Papers</b>						
BCA-207	Java Lab & Mini Project	3		-	60	22
BCA-208	Internet Programming Lab & Mini Project	3		-	60	22
BCA-209	Python/C# Lab & Mini Project	3		-	60	22
<b>Total of Practical Papers</b>						<b>180</b>
<b>Grand Total(Theory + Practical)</b>						<b>600</b>



## Teaching and Examination scheme for Bachelor in Computer Application Part-III 2021-2022

Paper Code	Paper Name	Exam Hours	Int. Marks	Ext. Marks	Max Marks	Min. Pass Marks
		Theory Papers				
BCA-301	Software Engineering	3	14	56	70	25
BCA-302	Data Structure	3	14	56	70	25
BCA-303	PHP	3	14	56	70	25
BCA-304(A)	Search Engine Optimization	3	14	56	70	25
BCA-304(B)	Android Programming	3	14	56	70	25
BCA-305(A)	Cyber Security	3	14	56	70	25
BCA-305(B)	Internet of Things	3	14	56	70	25
BCA-306	Project	3	14	56	70	25
Total of Theory				420		
Paper Name(Practical)						
BCA-307	Data Structure Lab	3	-	-	60	22
BCA-308	PHP Lab	3	-	-	60	22
BCA-309	Android/ SEO Lab	3	-	-	60	22
Total of Practical					180	
Grand Total(Theory+ Practical) 600					600	

**Note:**

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

**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

	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	5 Marks	15 Marks
Mini Project	5 marks	

The student has to select one of the topics given in the syllabus for mini project.

Marks distribution for Project of 70 marks is as under

- Project/Dissertation 40 Marks
- Presentation 15 Marks
- External Viva Voce 15 Marks

## **B.C.A. PART-I 2019-20**

### **Elective (Optional) Subjects**

#### **BCA-101: Mathematics for Computer Science**

##### **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

#### **BCA-102: Database Management**

##### **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.

#### **Suggested Readings:**

1. Fundamentals of Database Systems, Ramez A. Elmasri, Shamkant Navathe, 5<sup>th</sup> 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)

## **BCA-103: Programming in C++**

#### **Unit I**

Object Oriented System: Difference Between Procedural and Object Oriented Languages, Object Oriented Paradigm, Inheritance, Polymorphism, Abstraction, Encapsulation, Benefits and Application of OOPS. Introduction to 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.

#### **Unit III**

Array: introduction, advantage, One, Two and Multidimensional, Passing Array to a Function, Array and Pointers : Pointer to One and Two Dimensional Arrays, Array of Pointers. Dynamic Arrays, 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.

#### **References:**

1. Object Oriented Programming With C++ By E. Balagurusamy (Tata Mcgraw Hill)
2. C++ The Complete Reference By Herbert Schildt (Tata Mcgraw Hill)
3. Object Oriented Programming With C++ By Schaum Series (Tata Mcgraw Hill)

## **BCA-104 Computer Networks**

#### **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.

#### **Unit - III**

**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. William Stallings, "Data and Computer Communications", Pearson Education, 2008.
4. A. S. Tanenbaum, "Computer Networks", Fourth Edition, Pearson Education.

## **BCA-105 Multimedia & Animations**

#### **Unit I**

Basics: Pixels, resolution of display unit; definition of multimedia, delivering multimedia; Text: Fonts & Faces, Using Text in Multimedia; Images:bitmaps, vector drawing, 3D drawing, file formats ; Sounds: digital audio and file formats , Videos: working of video, analog and digital video, file formats; multimedia applications.

#### **Unit II**

Concept of lossy and lossless compression, concept of translating, scaling and rotating an object in 2D and 3D; Color Models :RGB, CMY, HSV; Overview of concepts: Clipping, orthographic and parallel projection, lighting , transparency, texturing, rendering .

#### **Unit III**

Animations : Principles of animations , Animation techniques, Animation file formats. Concept of 2D and 3D animation, Animation tools.

#### **Unit IV**

Blender: GUI Interface, Selecting, rotating and Translating Objects, Using Snap to move objects precisely, Creating mesh primitives and extrusions, Subdividing meshes, Creating a simple creature, Joining mesh objects and stitching vertices ,Organizing a scene with layers, groups, and hierarchies.

#### **Unit V**

Blender: Assigning glossy and reflective materials to objects, Creating bump maps, Creating sky and ambient light, Understanding ambient occlusion, Adding motion blur and depth of field, Editing animation in the Graph Editor, Building and animating a simple character.

#### **Suggested Readings:**

1. Multimedia making it work , TMH, Tay Vaughan.
2. Multimedia: Computing, Communications Applications, Pearson,Ralf Steinmetz and KlaraNaharstedt,
3. Multimedia Handbook, TMH, Keyes.
4. K. Multimedia System Design, PHI, Andleigh and K. Thakkar.
5. Computer Graphics by D Hearn and P M Baker, Printice Hall of India (Indian Edition).

#### **Web Resources:**

1. <https://www.cs.duke.edu/brd/Teaching/Previous/Animation/animation.html>
2. [http://zikky.lecturer.pens.ac.id/Produksi 3D untuk Designer/Beginning Blender-book.pdf](http://zikky.lecturer.pens.ac.id/Produksi%203D%20untuk%20Designer/Beginning%20Blender-book.pdf)
3. <http://www.blenderhd.com/wp-content/uploads/2015/08/BeginnersGuideToBlender.pdf>
4. [https://people.sc.fsu.edu/~gerlebacher/gd/blender/blender/blender\\_noob\\_to\\_pro.pdf](https://people.sc.fsu.edu/~gerlebacher/gd/blender/blender/blender_noob_to_pro.pdf)

## **BCA-106 FUNDAMENTALS OF COMPUTER PROGRAMMING**

### **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

### **BCA-107 SQL (Mini Project)**

1. Design a database your College Alumni Association
2. Draw an ER Diagram for a Library Management System
3. 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 Home Electricity Bill
2. Design books database using structure
3. Program for Sparse Matrix
4. Design a simple calculator
5. Program for reading from and writing to a random file.

### **BCA 109 Multimedia (Mini Project)**

1. Create and animate a simple rolling glass ball on the floor using Blender.
2. Create 3D logo for your college using Blender.
3. Create a simple character in Blender put it the walking motion.
4. Create a character and animate its swelling up with pride as it receives some praise.
5. Create and animate a fight between two characters(big vs small, etc) in Blender.

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## **Teaching and Examination scheme for Bachelor in Computer Application Part-II Exam. –2020-2021**

### **BCA-201 Computer Organization**

#### **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 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.

#### **Unit III**

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

#### **Suggested Readings-**

1. Computer System Architecture, By M. Morris Mano (Pearson, Prentice Hall)
2. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill
3. Digital Computer Electronics By Malvino Leach, Jerald A. Brown (McGraw Hill)

### **BCA-202 Operating System**

#### **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 Principles 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 applications , TMH, Sumitabha Das

## **BCA-203 Java**

### **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 Runnable Interface;

### **Unit - V**

**Applet:** Applet Life Cycle, Applet Tag, Adding Applet to HTML File; Passing Parameters to Applets, Getting Input From User. **AWT :** AWT Classes, Working With Frame 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. Java: A Beginner's Guide, Sixth Edition: A Beginner's Guide by Herbert Schildt, McGraw-Hill Osborne Media
3. Programming in JAVA By E. Balagurusamy (TMH)
4. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)

## **BCA-204 Internet Programming**

### **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 and Classes, 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. Internet and Web Page Designing By V.K Jain (BPB)

### **BCA-205 (A) Cloud Computing**

#### **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 III**

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 IV**

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 V**

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 VI**

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. Cloud Computing Theory and Practice by Dan C. Marinescu, Morgan Kaufman Publications.

### **BCA-205(B) Data Mining**

#### **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

## **BCA-206 (A) Python**

### **Unit I**

Overview of Programming : Structure of a Python Program, Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

### **Unit II**

Creating Python Programs : Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue), Defining Functions, default arguments, Errors and Exceptions.

### **Unit III**

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Simultaneous assignment, The while statement, Implementing 2-D matrices.

### **Unit IV**

Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists .

**Unit V:** Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries.

Overview of stacks and queues. Overview of packages: networkx, matplotlib. pyplot, numpy.

### **Suggested Readings:**

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Introduction to computation and programming python, by John Guttag, MIT Press. Learning Python, Lutz and Ascher, O'Reilly publications

## **BCA-206 (B) C#**

### **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. Design a Dice Rolling Simulator. When the program runs, it will randomly choose a number between 1 and 6. The program will print what that number is. It should then ask you if you'd like to roll again. For this project, you'll need to set the min and max number that your dice can produce. For the average die, that means a minimum of 1 and a maximum of 6. You'll also want a function that randomly grabs a number within that range and prints it.
2. Build Anagram finding program. Write a program that reads from a word-list file (a file of words) and tries to find all the anagrams of that word. Your goal is to find the largest list of words that are anagrams of each other from a provided word-list.
3. Generate Pascal's triangle. Write a program that asks for the height of Pascal's triangle from the

user, then generate the Pascal's triangle.

4. Create a hangman game (without the graphics of the hangman itself). Hangman is a popular word game. In this game, the player is given some number of blanks representing the name of a movie or an actor and he/she has to guess the name using at most K number of chances.

5. Write a program in Python to encode and decode strings using a Caesar cipher. Caesar (rotation) cipher is one of the simplest, plain-text ciphers, known since at least the time of Julius Caesar. It takes in a plain-text string, and translates it into a new string based on a rotation of the alphabet being used. The basis is a “rotation”, a re-sequencing of an alphabet.

#### **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 string value 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 should be overridden in child class according to function.

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# Teaching and Examination scheme for Bachelor in Computer Application Part-III Exam. – 2020-21

## BCA-301 Software Engineering

### 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)

## BCA-302 Data Structure

### 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 Structure with 'C' By R.B Patel (Khana Book Publishing Co.(P))
2. Data structure By Lipschutz (Tata McGraw Hill)
3. Data Structure By Yashvant Kanitkar (BPB).

## BCA-303 PHP

### 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 :**

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

**Web Resources:**

1. <http://www.mysqltutorial.org/mysql-stored-procedure-tutorial.aspx>

## BCA-304(A) Search Engine Optimization

### 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

## **BCA-304(B) Android Programming**

#### **Unit -I**

java ( Exception handling & Packages & interfaces & JVM & jar file extension & Multi threading. Database(DML&DDL) , What is Android & Setting up development environment & various editors.

#### **Unit -II**

Application Structure ( AndroidManifest.xml , uses-permission & uses-sdk , Resources & R.java , Assets & Layouts & Drawable Resources , Activities and Activity lifecycle.

#### **Unit -III**

Eclipse editor :(Menu , Option menu , Context menu , Sub menu , menu from xml , menu by code). SQLite Programming , SQLiteOpenHelper , SQLiteDatabasese.

#### **Unit -IV**

Adapters and Widgtes ( Adapters:- a. ArrayAdapter b. BaseAdapters , ListView and ListActivity , Custom listview , GridView using adapters , Gallery using adapters).

#### **Unit -V**

Notifications ( Broadcast Receivers , Services and notifications , Toast , Alarms). Advanced o Live Folders ( Using sdcards , XML Parsing , JSON Parsing , Maps, GPS, Location based Services, Accessing Phone services :(Call, SMS, MMS)).

#### **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

## **BCA-305 (A) Cyber Security**

### **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

## **BCA-305 (B) Internet of Things**

### **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 Storm

### **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 Madiseti , Arshdeep Bahga
3. Rethinking of Internet of Things by Francis daCosta, Apress
4. 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.

**1. 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

- Team Structure Development Schedule

- Programming language and Development Tools

IX). Requirement Specification

X). Design

- Detailed DFD’s and Structure Diagram

- Data structure, Database and File Specification

XI). Project Legacy

- Current Status of project

- Remaining Areas of concern

- Technical and Managerial Lessons Learnt

- Future Recommendations

XII). Nomenclature and Abbreviations.

XIII). Bibliography

XIV). Source Code.

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