Shree Govind Guru University

CURRICULAM AND CREDIT FRAMEWORK FOR BCA 3rd

SEMESTER PROGRAMMES

AS PER THE NEP 2020

Shri Govind Guru University
Course Structure under NEP-2020
BCA – Semester-III

Subject		Code	Subject Title	Theory	Practical	Credits	Marking Scheme		
							Internal	External	Total
Discipline Specific Course Core (Major)	Major-5		Object Oriented Programming using C++	3	1	4	50	50	100
	Major-6		Relational Database Management System-I	3	1	4	50	50	100
	Major-7		Networking	4	0	4	50	50	100
Multidisciplinary	MDC-3		Statistical Computing	4	0	4	50	50	100
Ability Enhancement Course	AEC-3		English	2	0	2	25	25	50
Skill Enhancement Course	SEC-3		E-Commerce-I	2	0	2	25	25	50
Value-Added Course	VAC-3		Indian Knowledge System-II	2	0	2	25	25	50
			Total			**22**			

BACHELOR OF COMPUTER APPLICATIONS (B.C.A.) SEMESTER – 3									
TITLE OF THE COURSE: Object Oriented Programming using C++									
Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks	
1		MAJOR-5	3+1	45	30	50	50	100	

Course Content		
Unit	Description	Lectures
1.	• Introduction to Object Oriented Programming • Procedure Oriented and Object Oriented • Difference Between C and C++ • C++ Output/ Input • Keywords in C++ • New style of header file specification • Comments in C++ • Variables in C++ • Reference Variables in C++ • The bool Data type • Importance of function prototyping in C++ • Function Overloading • Default Arguments • Inline Function • Scope Resolution Operator	11+7
2.	• Structures in C • Structure in C++ • Access Specifier • Classes • Objects in C++ • Characteristics of Access Specifier • Function outside a class • Initialization of variable in C++ • Arrow Operator • 'this' pointer	11+7
3.	• Member Functions and Data Members • Friend Functions • Friend Class • Array of Class Object • Passing Class Objects to Function • Returning Objects from Functions	11+7

	• Nested Classes • Namespaces		4
4.	• Introduction • Dynamic Memory Allocation Using "new" • Dynamic Memory Deallocation • "Set_New_Handler" Function • Constructor • Characteristics of Constructor • Types of Constructor • Destructor • Characteristics of Destructor • Introduction of Inheritance • 'Protected' Access specifier • Inheritance using different access specifier • Initialization of Base class members through derived class object • Different forms of Inheritance • Function Overriding • Virtual Functions and Inheritance • Introduction • Pointers to derived class • Rules for virtual function • Internals of Virtual Functions • Pure virtual function • Virtual Base class • Virtual destructor • Abstract class • Limitations of virtual Function		12+9
	Total Lectures		**45+30**

Reference Books
1. Object Oriented Programming with C++ BySubhash KU, Pearson
2. Object-Oriented Programming with C++ (Second Edition) By PoornachandraSarang, PHI Object
3. Oriented Programming using C++ By Joyce FarrellCengage Learning

PRACTICAL

	Introduction to OOP, Classes & Objects
1	Write a program to calculate the area of circle, rectangle and square using function overloading.
2	Write a program to demonstrate the use of default arguments in functionoverloading.
3	Write a program to demonstrate the use of returning a referencevariable.

4	Create a class student which stores the detail about roll no, name, marks of 5 subjects, i.e. science, Mathematics, English, C, C++. The class must have the following:
	    ➢ Get function to accept value of the data members.
	    ➢ Display function to display values of data members.
	    ➢ Total function to add marks of all 5 subjects and store it in the data members named total.

5	Create a function power() to raise a number m to power n. the function takes a double value for m and int value for n, and returns the result correctly. Use the default value of 2 for n to make the function calculate squares when this argument is omitted. Write a main that gets the values of m and n from the user to test the function.
6	Write a basic program which shows the use of scope resolutionoperator.
7	Write a C++ program to swap the value of private data members from 2 different classes.
8	Write a program to illustrate the use of this pointer.
9	An election is contested by five candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case a number is read outside the range of 1 to 5, the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballots.
10	Write a program to call member functions of class in the main function using pointer to object and pointer to member function.

Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–3								
TITLE OF THE COURSE: Relational Database Management System-I								
2		MAJOR-6	4	45	30	50	50	100

Course Content		
Unit	**Description**	**Lectures**

1.	**Introduction to Database system Concepts and Architecture:-**
	– **Database System and Data Models**
	   o Role and Advantage of DBMS
	   o Types of Database
	– **Data Model Basic Building Block**
	   o The Hierarchical Model
	   o The Network Model
	   o The Relational Model
		11+7

2.	**The Relational Database Model**
	– **A logical view of Data**
	   • Tables and Their characteristics
	   • Keys
	   • Integrity Rules
	   • Concept of Functional Dependency
	   • Relational Set Operators
	   • The Data Dictionary and The System Catalog
	– **Relationship within the Relational Database**
	   • The 1 : M Relationship
	   • The 1 : 1 Relationship
	   • The M : N Relationship
		11+7

3.	**The Normalization process**
	   • Conversion to First normal form
	   • Conversion to Second normal form
	   • Conversion to Third normal form
	The Entity Relationship Model
	– Entities
	– Attributes
	– Relationships
	– Connectivity and Cardinality
		11+7

4.	**MS-Access**
	– Creation of tables
	– Defining Constrains
	– Creating Relationships
	– Querying databases (Design View)
	   o Simple queries on single table
	   o Adding calculated/derived fields using expression builder
		12+9

6

| | | o Parameter Queries
o Action Queries(Make Table, Append, Update and Delete)
o Simple Queries on Multiple table(Joins: Inner, Left Outer, Right Outer)
Advanced Queries
    – Summary Queries(Queries using group function: SUM,MAX, MIN, COUNT, AVG)
    – Crosstab Queries
    – Find Duplicates Query Wizard and Find Unmatched | |
| | | **Total Lectures** | **45+30** |

Reference Books

    1.Fundamental of Database Systems- ElmasriNavathe- Pearson Education Asia

    2.Database- Principles, Programming and Performance- Parick O' Neil Elizabeth O'Niel, Harcort Asia PTE Limited

    3.An Introduction to Database Systems- C.J.Date, Addison Wesley, Pearson EducationPress

    4.Database System Concepts- Abraham Silberschat, Henry F. Korth, S.Sudarshan,Tata McGraw Hill.

PRACTICAL

Sr. No.	Program Definition
1.	Create Table as Mention: Table Name: Student 	Field Name	Data type	 |---|---| 	stud_no	Number	 	stud_name	Text	 	gender	Text	 	class	Text	 	address	Text	 	contact_no	Number	 	dob	Date/Time	 1. Define stud_no as Primary key. 2. Ensure that the field heading of stud_no as Student Number, stud_name as Student Name, gender as Gender, class as Semester, address as Address, contact_no as Contact Number, dob as Date of Birth in datasheet view of table using caption property. 3. Name of the Student must be displayed in upper case. 4. Student Name must be less than or equal to 20 characters. 5. Create a drop-down list for class with value: I-semester, II-semester, III-semester, IV-semester, V-semester and VI-semester. 6. Ensure that gender field contains only one of the two values: Male or Female. Display proper error message if any other value is entered.

	Field Name	Data type	
2.	Field Name	Data type	
	Product _no	Number	
	product_name	Text	
	Product_catg	Text	
	Price	Number	
	Quantity	Number	
	mfg_date	Date/Time	
	Disc	Yes/No	
	Discount	Number	

Create Table as mention above :

1. Define product_no as Primary key.
2. Use caption property for heading in datasheet view of the table.
3. Name of the Category must be displayed in upper case.
4. The name of the product must be 15 character long and First letter of the name must be displayed in Upper case.
5. Mfg_date must be display in mm/dd/yy.

  − Queries:
1. Sort the data product name wise (ascending order.).
2. Sort data quantity wise (descending order).
3. Search all the data whose product category is Computer.
4. List out all data whose quantity is less than or equal to 25.
5. List out all the products whose price is greater than 1000.
6. List out all the products which do not include hardware category.

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3. Create the following tables and create appropriate relationship among these tables.

• Customer (cid, name, address, city)
• Product (pid, name, desc, rate)
• Order(cid, pid, oid, odate, qty, amt)

 Create a form for data entry of all the tables.
 Create a macro from which should open the customer table, a beep sound
and msgbox Saying "BYE!!!!"

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4. Create the following tables and create appropriate relationship among these tables.

• Studentmaster(rno, name, age, address, phoneno, city)
• Studentdetail(rno, exam, m1, m2, total , percentage)

Create a form for data entry of student detail.
Create a report having group by rno.
Each rno should display its exam details and calculate the sum of all the students in each exam.

Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–3								
TITLE OF THE COURSE: Basic of Networking								
2		MAJOR-7	4	60	0	50	50	100

Course Content

Unit	Description	Lectures

1.	**Introduction of networking**
	− Networking concepts
	− Data communications
	− Protocols
	Types of Network
	− LAN
	− MAN
	− WAN
	− PAN
	Types of switching
	− Circuit
	− Packet
	− Message
	Transmission Media
	− Guided media
	   o Twisted pair
	   o Coaxial cable
	   o Optical fiber
	− Unguided media
	   o Microwave
	   o Satellite communication
	− Cellular telephones
		15

2.	**Network topologies** − Topologies − Mesh − Star − Tree − Ring − Bus - Hybrid	15
3.	**Network protocols, OSI, TCP/IP model** − OSI model and layer functions − TCP/IP basics − ARP	15

	– IP – RARP – ICMP – UDP – DNS – EMAIL – FTP – WWW – HTTP – TELNET		

4.	**ISDN, Architecture, Channel types, interfaces**
	  – Bluetooth
	  – Infrared communication
	  – Wireless LAN
	  – Internetworking devices
	      o Repeaters
	      o Bridges
	      o Routers
	      o Gateway
	Modes of data transmission
	  – Parallel and Serial communication
	  – Simplex, half duplex and full-duplex communication
		15	

	Total Lectures	**60**	

Reference Books:

1.Data Communications and Networks, 2nd Edition, McGraw Hill

2.Business data communication By Selly Cashman, Cengage publications

3.Data communications and networking By Behrouz Forouzan, McGraw Hill

4.Computer networks By Andrew S. Tanenbaum, Pearson

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BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–3								
TITLE OF THE COURSE: Statistical Computing								
Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
4		MDC-3	4	60	0	50	50	100

Course Content		
Unit	**Description**	**Lectures**
1.	**Measures of Dispersion** • Objectives and essentials of a good measure • Absolute and Relative Measures of Dispersion • Range • Quartile Deviation • Coefficient of Quartile Deviation • Mean Deviation • Coefficient of Mean Deviation • Advantages and disadvantages of M.D. • Standard Deviation • Alternative Method of Standard Deviation • Variance (Excluding Properties of S.D) • Coefficient of Variation • Direct Method • Step-Deviation Method	15
2.	**Probability** • Definitions of Some Important Terms • Equally Likely Events • Mutually Exclusive Events • Exhaustive Events • Dependent Events • Independent Events • Classical approach to probability • Statistical approach to probability • Modern approach to probability • Algebra of sets • Conditional Probability	15
3.	**Mathematical Expectation** • Meaning of discrete random variable, concept of probability function of discrete random variable. • Definition of expected value (mathematical expectation) of random variable and its properties (without proof). • Definition of variance and covariance and their formula. Simple mathematical and applied examples of on it.	15

4.	**Correlation Analysis** • Introduction • Types of Correlation • Methods of Measuring Correlation • Karl Pearson's Product Moment Method • Spearman's Rank Method **Regression Analysis** • Definition • Regression Equation. • Method of Least Squares. • The regression equation of Y on X • The regression equation of X on Y • Regression Coefficient & Its Properties (without proof)		15
		Total Lectures	**60**

Reference Books:

1. Kapoor V. K. : Business Mathematics, Sultan Chand & Sons, New Delhi.
2. Sancheti & Kapoor : Business Mathematics, Sultanchand and Sons, New Delhi.
3. Business Statistics (Third Revised Edition)By Padmalochan Hazarika, Publication: S.Chand
4. Business Mathematics and StatisticsBy N G Das and J K Das, Tata McGraw Hill Education Private Limited

TITLE OF THE COURSE: English

Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
4		AEC 4	2	30	0	25	25	50

Course Content		
Unit	**Description**	**Lectures**
1.	**TEXT Horizon (Macmillian Publication)** • I have Three Visions for India (Dr. A P J Abdul Kalam) • A Living God (Koizumi Ykumo)	10
2.	**Basic Listening and Reading Skills:** • Introduction to Listening • Active Listening v/s Hearing • Becoming an Active Listener • Listening in Difficult Situations: Listening Practice	10
3.	**Reading Skills** • Introduction to Reading, Reading Speed • Benefits of Effective Reading • Techniques of Effective Reading: Skimming, Scanning, • Extensive Reading, Intensive Reading **Vocabulary** 1. To Bite the Bullet 2. A Piece of Cake 3. Let the Cat Out of the Bag 4. Don't Put All Your Eggs in One Basket 5. Once in a Blue Moon 6. At the Drop of a Hat 7. Cry Over Spilt Milk 8. You Can't Judge a Book by its Cover 9. Don't Count Your Chickens Before They Hatch 10. Go the Extra Mile 11. Raining Cats and Dogs 12. Throw in the Towel 13. When in Rome 14. Rome Wasn't Built in a Day 15. In the red 16. Give someone the green light 17. A white lie 18. Green with envy 19. Drop out 20. Day and night 21. Learn by heart 22. Pass with flying colours 23. Like a kid in a candy store 24. To follow in someone's footsteps 25. Better late than never	10

			Total Lectures	**30**

Reference Books:
1. Horizon- Macmillan, India.
2. The business of listening, Become a More Effective Listener by Diana Bonet Romero
3. Oxford Dictionary of English Idioms
4. https://ielts.idp.com/about/news-and-articles/article-use-idioms-ielts-speaking
5. https://www.ieltsadvantage.com/idioms-for-ielts-speaking

BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–3								
TITLE OF THE COURSE: E-Commerce-I								
Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
4		SEC-3	2	30	-	25	25	50

Course Content		
Unit	Description	Lectures
1.	**Introduction to E- Commerce: The revolution is just beginning** o What is E-Commerce? o The difference between E- Commerce and E-Business o Eight Unique Features of E-Commerce Technology o Introduction to Web 2.0 o Types of E-Commerce o E-Commerce Model o E-Market and its types o E-Government Services o Management Challenges and Opportunities.	10

2.	**The Internet and World Wide Web : E-Commerce Infrastructure**
	o The Internet: Technology Background
	   • The Evolution of the Internet 1961 – the Present
	   • The Internet : Key Technology Concepts
	   • Other Internet Protocols and Utility Programs
	o The Internet Today
	   • The Internet Backbone
	   • Internet Exchange Points
	   • Campus Area Networks (CANs)
	   • Internet Service Providers
	   • Internets and Extranets
		10

3.	The Internet and the Web: Features o E-mail o Instant Messaging o Search Engines o Intelligent Agents (Bots) o Online Forums and Chat o Streaming Media o Cookies	10
	Total Lectures	**30**

Reference Books:

1.K.C. Laudon & C.G. Traver, E-commerce, Pearson Education, 2003

2.R. Kalakota&A.B.Whiilston-' Frontiers of Electronic Commerce, Pearson Education- 2006.

3.K.K.Bajaj&D.Nag- E-Commerce, Tata McGraw Hill, New Delhi, Second Edition.

BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–3

TITLE OF THE COURSE: Indian Knowledge System- 2

Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
4		VAC-3	2	30	-	25	25	50

Course Content		
Unit	**Description**	**Lectures**
1.	**GOVERNANCE AND PUBLIC ADMINISTRATION** Introduction to raja dharma, Arthasastra: a historical perspective, Elements of a kauṭilyan state, The king & the amatya, Janapada & durga, Treasury and the State Economy (Kosa), Danda, Mitra, The Administrative Setup, Relevance of Arthasastra, Public Administration in Epics.	10
2.	**NUMBER SYSTEMS AND UNITS OF MEASUREMENT** Number systems in India – Historical evidence, Salient aspects of Indian Mathematics, Bhuta-Saṃkhya system, Kaṭapayadi system, Measurements for time, distance, and weight. Piṅgala and the Binary system.	10
3.	**HEALTH WELLNESS AND PSYCHOLOGY** Introduction to health, Ayurveda: approach to health, Sapta-dhatavaḥ: seven-tissues, Role of agni in health, Ayurveda: definition of health, Psychological aspects of health, Disease management elements, Dinacarya: daily regimen for health & wellness, Importance of sleep, Food intake methods and drugs, Approach to lead a healthy life, Indian approach to psychology, The Tri guṇa system & holistic picture of the individual, The Nature of Consciousness.	10
	Total Lectures	**30**

Reference Books:
1. An Introduction to Indian Knowledge Systems: Concepts and Applications, B Mahadevan, V RBhat, and Nagendra Pavana R N; 2022 (Prentice Hall of India).
2. Indian Knowledge Systems: Vol I and II, Kapil Kapoor and A K Singh; 2005 (D.K. Print WorldLtd).
3. Kanagasabapathi; "Indian Models of Economy, Business and Management", Third Edition,
4. Prentice Hall India Ltd., Delhi.
5. Lotus and Stones; Garuda Prakashan (31 October 2020); Garuda Prakashan Pvt. Ltd.
6. Dwivedi D.N., Essentials of Business Economics, Vikas Publications, Latest Edition.
7. Inida Uninc by Prof. R Vaidyanathan, Westland ltd.Publication
8. Economic Sutras by Prof. Satish Y. Deodhar, IIMA Books series
9. Black Money Tax Heaven by R Vaidyanathan, Westland ltd. Publication.

Shree Govind Guru University

CURRICULAM AND CREDIT FRAMEWORK FOR BCA 4th

SEMESTER PROGRAMMES

AS PER THE NEP 2020

Shri Govind Guru University
Course Structure under NEP-2020
BCA – Semester-IV

Subject		Code	Subject Title	Theory	Practical	Credits	Marking Scheme		
							Internal	External	Total
Discipline Specific Course Core (Major)	Major-8		Core Java	3	1	4	50	50	100
	Major-9		Relational Database Management Systems – II	3	1	4	50	50	100
	Major-10		System Analysis and Design	4	0	4	50	50	100
	Minor-3		Software Engineering	4	0	4	50	50	100
Ability Enhancement Course	AEC-4		Life Skills	2	0	2	25	25	50
Skill Enhancement Course	SEC-4		E-Commerce-II	2	0	2	25	25	50
Value-Added Course	VAC-4		Environment Studies - II	2	0	2	25	25	50
			Total			**22**			

Course Content		
Unit	**Description**	**Lectures**

1.	• Java Introduction
	  o Creating first java classes
	  o Introduction to Object Oriented Programming Concept
	  o Learning about Java
	  o Features of Java
	  o Analyzing a java application that uses console output
	  o Saving, compiling and running a java application
	• Using data within java programs
	  o Constants
	  o Literals
	  o variables
	  o Keywords
	  o Identifiers
	• Data Types in Java
	• Understanding numeric type conversion
	• Operators in Java
	• Using methods, classes and objects
	  o Creating methods with zero, one and multiple arguments
	  o Class concepts and creating a class
	  o Creating instance methods in a class
	  o Declaring objects and using their methods
	  o Static method
	  o Understanding block and scope
	  o Method overloading
	  o Constructors
	  o Sending arguments to constructors
	  o Constructors overloading
	  o 'this' keyword
	  o Static variable
	  o Working with constants
	• Flow Control Statements o
	  o if and if…..else ,Nesting if… else
	  o Using logical AND and OR operators
	  o switch statement
	Using the conditional AND not operators
	• Looping
	  o while loop
	  o Using the arithmetic operators
		11+7

		o for loop o do…. while loop Nested loops	

2.		• Manipulating characters class
		isUpprCase(), toUpperCase(), isLowerCase(), toLowerCase()
		isDigit(), isLetter(), isLetterOrDigit(), isWhitespace()
		• Manipulating String class
		• Declaring a String Object
		• Comparing String values
		toUpperCase() , toLowerCase() ,length(), indexOf(),
		charAt(), endswith() startWith() ,replace(), toString()
		• Manipulating StringBuffer class
		setLength(), capacity(), append(), insert(),setChartAt(), charAt()
		• Arrays
		   o Declaring and initializing an array
		   o Using subscripts with an array
		   o Passing array to methods
		   o Creating arrays of strings
		   o Using two-dimensional and multidimensional arrays
		   o Arrays class binarySearch(), equals(), fill(), sort() methods
		      of Array Class.
			11+7

3.		• Excepting Handing
		   o Learning about exceptions
		   o Understanding the limitations of traditional error handling
		   o Trying code and catching exceptions
		   o Throwing and catching multiple exceptions
		   o 'finally' block
		   o Understanding the advantages of exception handling
		   o Checked and unchecked exception
		   o Creating own exceptions (custom exception)
		• Inheritance
		   o Concept of inheritance
		   o Extending classes
		   o Method overriding
		   o Constructor calling during inheritance
		   o Super class constructor that require arguments (using 'super'
		      keyword) Accessing super class methods (using 'super'
		      keyword)
		• Method which cannot be override
		   o 'final' method
		   o 'final' super class
		Static method
			11+7

| 4. | • Interfaces and Abstract Classes
    o   Defining Abstract class
    o   Using Abstract class
    o   Defining Interfaces
    o   Implementing Interfaces
    o   Multiple inheritance using Interfaces
• Packages
    o   Define a Package
    o   Creating a Package
    o   Class and package
    o   Import statement
    o   Importing a Package
    o   Access Protection (Access modifiers)
• Applets
    o   Introduction
    o   Lifecycle of an Applet
    o   Comparing Applets and Application
    o   Creating Applets
    o   Parameters passing in applet | 12+9 |
| | **Total Lectures** | **75** |

Reference Book:

    1.JAVA for Beginners by Joyce Farrell, Cengage Learning
    2.Object Oriented Programming in java by Dr. G.T.Thampi , Dreamtech
    3.JAVA Programming by Hari Mohan Pandey, Pearson

BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–4								
TITLE OF THE COURSE: Relational Database Management System-II								
Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
4		MAJOR 9	4	45	30	50	50	100

Course Content		
Unit	Description	Lectures
1.	**Introduction to SQL** o Data Definition Commands o Data Types o Creating Table Structures o SQL Constraints o Data Manipulation Commands o Adding Table Rows o Saving Table Changes o Listing Table Rows o Updating Table Rows o Restoring Table Contents o Deleting Table Row o Select Query o With Conditional Restrictions o Arithmetic Operators o Logical Operators o Special Operators o Advanced Data Definition Commands o Changing a Column's Data Type o Changing a Column's Data Characteristic o Adding a column o Dropping a column o Advanced Data Update o Copying Parts of Table o Adding Primary and Foreign Key Designations o Deleting Table From The Database o Aggregate Functions	11+7
2.	**Business Intelligence and Data Warehouse** o The need for data analysis o Business Intelligence o Business Intelligence Architecture o Decision Support Data o Operational Data Vs. Decision Support Data o Decision Support Database Requirements o The Data Warehouse	11+7 6

		o Online Analytical Processing o Multidimensional Data Analysis Techniques o Advanced Database Support o Easy-To-Use End-User Interface o Client/Server Architecture o Data Mining	
3.	**Distributed Database Management System** o Distributed Database Management Systems o Evolution of DDBMS o Distributed Processing and Distributed Database o DDBMS Advantages and Disadvantages o Characteristics of DDBMS o Components of DDBMS o Levels of Data and Process Distribution o Single-Site Processing, Single-Site Data(SPSD) o Multiple-Site Processing, Single-Site Data(MPSD) o Multiple-Site Processing, Multiple-Site Data(MPSD) o Distributed Database Transparency Features o Distributed Transparency o Transaction Transparency o Distributed Requests and Distributed Transactions o Distributed Concurrency Control o Two-Phase Commit Protocol o Performance Transparency and Query Optimization	11+7
4.	**Advanced SQL** o Set Operators o Union o Union All o Intersect o Minus o SQL Join o Cross Join o Natural Join o Join Using Clause o Join On Clause o Outer Join	12+9
		Total Lectures	**45+30**

Reference Books
1.Introduction to Database Management Systems by ISRD Group, Tata McGraw-Hill
2.An Introduction to Database Systems, by C. J. Date, A. Kannan & S. Swamynathan, Pearson

BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–4								
TITLE OF THE COURSE: Information and System Analysis and Design								
Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
4		MAJOR 10	4	60	0	50	50	100

Course Content		
Unit	**Description**	**Lectures**
1.	**Introduction System Analysis and Design** Software Development Models o Waterfall Model o The Incremental Model o The Spiral Model Overview Feasibility Study o Operational Feasibility o Technical Feasibility o Economic Feasibility o Schedule Feasibility Requirement Modeling / Fact-finding techniques o Interview o Document review Data and Process Modeling o Data Flow Diagram: Concepts, Symbols, Rules, Construction of DFD o for any Case Study o Data Dictionary: Concepts, Rules, Construction of Data Dictionary o for any Case Study	15
2.	**Object Oriented Analysis & Design Structures Object-Oriented Modeling:** Object-Oriented Modeling: o Analysis Model o Architecture Model o Component Design Model Object-Oriented Approach: o Object-Oriented Analysis o Object-Oriented Design The Constituents of OOAD: o Objects and Classes o Links and Association o Generalization and Specialization o Aggregation and Composition Pillars of Object-Oriented Analysis and Design o Abstraction o Encapsulation o Inheritance	15

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		o Polymorphism o Coupling o Cohesion o Components o Interfaces The Language of OOAD – Unified Modeling Language: o UML Diagrams	

3.		**Use Case Diagram, Class Diagram and Object Diagram:-**
		o Scope of Use-Case Diagram
		o Benefits of Use-Case Diagram
		 Elements of Use-Case Diagram:
		o Actors
		o Use-Cases
		o Relationship between Actor and Use Case
		o Relationship between Use-Cases
		o Relationship between Actors
		o Guidelines for design of Use-Case Diagram
		o Draw the Use-Case diagram for any Case study
		Class Diagram:
		o Analysis and Design version of Class Diagram
		o Elements of Class Diagram
		o Guidelines for design of Class Diagram
		Object Diagram
		o Elements of Object Diagram:
		        □□Objects
		        □□Links
		o Guidelines for design of Object Diagram
		o Draw the Class and Object Diagram for any Case Study
			15

4.		**Sequence Diagram, Activity Diagram &State Chart Diagram.**
		Sequence Diagram:
		o Introduction
		o Elements of Sequence Diagram:
		        □□Life Lines
		        □□Messages
		        □□Activation
		        □□Guards
		        □□Combined Fragments
		o Guidelines for design of Sequence Diagram
		o Draw the Sequence Diagram for any case study
		Activity Diagram:
		o Introduction
		o Elements of Activity Diagram:
		o Initial State
		o Final State
		o Action / Activity
		o Transitions
		o Decision
		o Synchronization, Fork and Join
		o Swimlanes
		o Object and Object Flow
		o Guidelines for design of Sequence Diagram
		o Draw the Sequence Diagram for any case study
			15

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	State Chart Diagram:	
	o Introduction	
	o Elements of State Chart Diagram:	
	o Initial State	
	o Final State	
	o Transitions	
	o Guidelines for design of State Chart Diagram	
	o Draw the State Chart Diagram for any case study	
	Total Lectures	**60**

Reference Books:

1. Magnifying Object-Oriented Analysis and Design by Arpita Gopal and Netra Patil, PHI
2. System Analysis and Design Methods by Gary B. Shelly, Thomas J. Cashman, Harry J. Rosenblatt, Cengage Learling

BACHELOR OF COMPUTER APPLICATIONS (B.C.A.) SEMESTER–4								
TITLE OF THE COURSE: Introduction to Software Engineering								
Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
4		MINOR-3	4	60	0	50	50	100

Course Content		
Unit	Description	Lectures
1.	Introduction: Definition, need, software engineering methods, Tools, and procedures, Software Process: Software Engineering layers, SEI-CMM, process framework, Development Lifecycle models: Waterfall, spiral, iterative, enhancement and phased development, RAD model, Component based development model, Prototyping model. Overview, various phases, analysis, design, development and implementation. Software project planning :Overview, objectives, scope, resources	15
2.	Cost Estimation Techniques: Metrics for software productivity and quality Productivity metrics: direct and indirect methods, size and function oriented metrics, Decomposition techniques: LOC and FP estimation, Effort Estimation: Overview, COCOMO, putnam, esterling models, automated Estimation tools. Configuration and Administration; virtual hosting	15
3.	Software Project Scheduling: Task definition and parallelism, effort distribution, scheduling , Methods: PERT and CPM, Software project plan outline Software prototyping : Overview, steps, methods, tools, specification, guidelines. Requirement analysis methods: introduction, methods Object oriented, data flow and data structure oriented, comparisons, application results, automated tools , Software design Methods: iterative, top-down, bottom up Design representations: flow charts, pseudo code, HIPO and techniques, Modular design: Overview, module coupling and cohesion, various types of coupling, merits and demerits, other approaches to programming.	15
4.	Software implementation: Issues, concept of programming support environment, Risk Management Software testing Overview Various tests and methods: top-down, bottom-up, Debugging: definition, techniques and strategies, exhaustive testing, classification, cyclomatic complexity, Overview, integration of hardware and software components	15
	Total Lectures	60

Reference Books:

1. Pressman, Roger (2010) *Software Engineering: A Practitioner's Approach*, McGraw Hill , New York, NY.
2. Sommerville, Ian (2011) *Software Engineering*, Addison-Wesley , Boston, MA.

Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks

BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–4

TITLE OF THE COURSE: LIFE SKILLS

Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
4		AEC-3	2	30	0	25	25	50

CourseContent		
Unit	**Description**	**Lectures**
1.	**RESUME SKILLS** Introduction of résumé and its importance, Difference between a CV, résumé and biodata, Essential components of a good résumé, Common errors while preparing a résumé, Prepare a good résumé considering all essential components.	10
2.	**INTERVIEW SKILLS** **Preparation and Presentation** Meaning and types of interviews (F2F, telephonic, video, etc.), Dress code, background research, do's and don'ts, Situation, task, action, and response (STAR concept) for facing an interview, Interview procedure (opening, listening skills, and closure), Important questions generally asked at a job interview (open- and close-ended questions). **Simulation & Common Errors:** Observation of exemplary interviews, Comment critically on simulated interviews, Discuss the common errors that candidates generally make at an interview, Demonstrate an ideal interview.	10
3.	**GROUP DISCUSSION SKILLS & CAREER OPPORTUNITIES** **Group Discussion Skills**: Meaning and Methods of Group Discussion, Procedure of Group Discussion, Simulation & Common Errors in Group Discussion. **Career Opportunities**: Knowing yourself — Personal characteristics, Knowledge about the world of work, requirements of jobs, including self-employment, Sources of career information, Preparing for a career based on potential and availability of opportunities.	10
	Total Lectures	**30**

Reference Books:
1. SCERT. Life Skills Education-Guidebook for Teachers (SCERT)
2. Sengararvelu,G. (2011) .Education in Emerging Indian Society, Neel Kamal Publication Pvt Ltd.
3. Shiv Khera, "You Can Win" , Macmillan Books, New York.

4. Barun K. Mitra, "Personality Development & Soft Skills", Oxford Publishers, Third impression.
5. ICT Academy of Kerala, "Life Skills for Engineers", McGraw Hill Education (India) Private Ltd.
6. Kalyana, "Soft Skill for Managers"; First Edition; Wiley Publishing Ltd.

Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–4								
TITLE OF THE COURSE: E-Commerce-II								
4		SEC 4	2	30	0	25	25	50

	CourseContent	
Unit	**Description**	**Lectures**
1.	**Online Security and Payment System** The E-Commerce Security Environment o Scope of the problem o What is good E-commerce security? o Dimensions of E-commerce security? o The tensions between security and other values	10
2.	Security Threats in the E-Commerce Environment o Malicious code o Unwanted programs o Phishing and Identity theft o Hacking and Cyber vandalism o Credit Card Fraud/Theft o Spoofing and Spam Web Sites o Sniffing o Insider attacks o Poorly designed server and client software Technology solution o Protecting Internet communications o Encryption(excluding: limitation of encryption solutions)	10
3.	Marketing on the Internet: o Advertising on the Internet – o Charting the On-Line Marketing Process o E-Commerce Catalogs or Directories – Information Filtering o Consumer Data Interface: Emerging Tools.	10
	Total Lectures	**30**

Reference Books:

1.K.C. Laudon & C.G. Traver, E-commerce, Pearson Education, 2003

2.R. Kalakota&A.B.Whiilston-' Frontiers of Electronic Commerce, Pearson Education- 2006.

3.K.K.Bajaj&D.Nag- E-Commerce, Tata McGraw Hill, New Delhi, Second Edition.

Sr. No.	Course Code	Course Category	Course Credit	Teaching Hours	Practical Hours	Internal Exam Marks	External Exam Marks	Total Marks
BACHELOROFCOMPUTERAPPLICATIONS(B.C.A.)SEMESTER–4								
TITLE OF THE COURSE: ENVIRONMENTAL STUDIES – 2								
4		VAC 4	2	30	0	25	25	50

Course Content		
Unit	**Description**	**Lectures**
1.	**Water**: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state), Dams-benefits and problems, **Energy Resources**: Environmental impacts of energy generation, use of alternative and nonconventional energy sources, growing energy needs.	10
2.	Definition, causes, effects, and control measures of: air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, and nuclear pollution. Solid waste management: causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution.	10
3.	Definition, causes, effects, and control measures of: air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, and nuclear pollution. Solid waste management: causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution.	10
	Total Lectures	**30**

Reference Books:
1. Agarwal, K.C., 2001, Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha, E., The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India(R).
3. Brunner, R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
4. Clark, R.S., Marine Pollution, Clanderson Press Oxford (TB).
5. Cunningham, W.P., Cooper, T.H., Gorhani, E.& Hepworth, M.T., 2001, EnvironmentalEncyclopedia, Jaico Publ. House, Mumbai, 1196p.
6. De, A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R).
8. Jadhav, H.& Bhosale, V.M., 1995, Environmental Protection and Laws, Himalaya Pub. House,Delhi.
9. Mahapatra, R., Jeevan, S.S., Das, S. (Eds) (2017). Environment Reader for Universities, Centrefor Science and Environment, New Delhi.
10. Miller, T.G., Jr. Environmental Science, Wadsworth Publishing Co. (TB).