Hirachand Nemchand College of Commerce, Solapur

(Autonomous College)

NAAC Accredited - 2015
'B' Grade (CGPA - 2.62)

(Affiliated to P.A.H Solapur University, Solapur)

Name of Faculty: Computer Science & Information technology

Choice Based Credit System

Syllabus for

Bachelor of Computer

Application B.C.A

Second Year
Semester III & IV

With
(NEP 2023)

(w.e.from June 2024-25)

Internal Assessment:
The medium of instruction & examination will be only in English.

Details of Internal examination:

Particulars	Marks (2creditpaper)	Marks (4creditPaper)
Attendance	05 Marks	05 Marks
Mid Test	05 Marks	10 Marks
Home Assignments	--	05 Marks
Group Exercise / Seminars/Projects	--	--
Total	10	20

HIRACHAND NEMCHAND COLLEGE OF COMMERCE, SOLAPUR

(Autonomous College)

BCA–Computer Science & Information Technology

BCA PART-II SEMESTER–III & IV

BCA PART-II,SEMESER–III					
Level	**Category**	**Subject Code**	**Subject Name**	**Credit**	**Marks (ESE+ISE)**
5.0	**Major-Mandatory-7**	23BCAMM231	Data Structure Using C	**4**	**100=(60+40)**
	Major-Mandatory-8	23BCAMM232	OOP with C++	**2**	**50=(30+20)**
	Major-Mandatory-9	23BCAMM233	RDBMS Using MySQL	**2**	**50=(30+20)**
	Minor-2	23BCAMN231	Laboratory Course on Major Mandatory	**4**	**100=(60+40)**
	GE-3	23BCAGE231 23BCAGE232	Bootstrap/ Advanced Excel	**2**	**50=(30+20)**
	VSC-3	23BCAVS231	IT Act2000	**2**	**50=(30+20)**
	AEC-3	23BCAAE231	UML	**2**	**50=(30+20)**
	FP-1	23BCAFP231	Mini Project	**2**	**50=(30+20)**
	CC-3	23BCACC231	Indian Constitution	**2**	**50=(30+20)**
			Total Credits	**22**	**Total=550**

BCA PART-II, SEMESER–IV					
Level	**Category**	**Subject Code**	**Subject Name**	**Credit**	**Marks (ESE+ISE)**
5.0	**Major-Mandatory-10**	23BCAMM241	PHP	**4**	**100=(60+40)**
	Major-Mandatory-11	23BCAMM242	Core Java	**2**	**50=(30+20)**
	Major-Mandatory-12	23BCAMM243	Computer Network & Communication	**2**	**50=(30+20)**
	Minor–3	23BCAMN241	Laboratory Course on Major Mandatory 10 & 11	**4**	**100=(60+40)**
	GE-4	23BCAGE241/ 23BCAGE242	AWS/ SAP	**2**	**50=(30+20)**
	SEC-3	23BCASE241	Software Testing	**2**	**50=(30+20)**
	AEC-4	23BCAAE241	Business Analytics	**2**	**50=(30+20)**
	CEP-1	23BCACE241	Digital Marketing	**2**	**50=(30+20)**
	CC-4	23BCACC241	Environmental Studies	**2**	**50=(30+20)**
			Total Credits	**22**	**Total=550**

OE- Open Electives, VSC-Vocational Skill Courses, SEC- Skill Enhancement Courses, AEC-Ability Enhancement Courses, VEC-Value Education Courses, IKS-Indian Knowledge System, OJT-On Job Training, FP- Field Projects, CEP- Community Engagement Projects, CC- Co curricular Courses, RM-Research Methodology, RP-Research Project

NEP Curriculum: w.e.f June2023						
Programme : BCAII (Level5.0)						
Semester:	III	**Assessment & Evaluation Pattern**			**L/W***	**Credits**
Paper Category:	Major Mandatory 7					
Paper Name:	Data Structure Using C	**ESE***	**ISE***	**Total**	4	4
Paper Code:	23BCAMM231	60	40	100		

Course Objectives:

- To decide the choice of data structures and algorithm design methods impacts the performance of solution.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To solve the real world problems by implementing suitable data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.

Learning Outcomes: After the completion of this course, the students could be able to:

- **CO1 Remember (Knowledge):** Define key terms related to data structure, algorithms, implementation and application.
- **CO2 Understand (Comprehension):** Explain the strength and weakness of different data structures.
- **CO3 Apply (Application):** Identifying real world problems & implementation of related data structures.
- **CO4 Analyze (Analysis):** Analyze implementations strategies of different types of algorithms related to solution.
- **CO5 Evaluate (Evaluation):** Assess the solutions, benefits and limitations of different algorithms.

Module1:

- **Introduction**: Definition and types of Data structure. Abstract Data Type (ADT)-ADT for array, ADT for stack, ADT for queue. Algorithm: Definition, characteristics of algorithm, Complexity of algorithm-Space complexity, time complexity, Big-O Notation.
- **Array**: Types of array- one D, two D, multidimensional, Operations of array- insert, delete, traverse, count, display, reverse
- **Stack**: Operations of stack- Create, isEmpty, isFull, push, pop, display, Implementation of stack using array(Static Implementation), Applications of Stack-Conversion of infix expression to postfix expression, Conversion of infix expression to prefix expression, Matching parenthesis in an expression (Checking expression is valid or invalid), Evaluation of postfix expression, Stackin recursion, applications of stack.

Module2:

- **Queue**: Operations of queue- Create, isEmpty, isFull, insert, remove, display, Types of Queue-Linear, Circular, Deque (Double Ended Queue) & Priority queue. Implementation of all types of queue using array (Static Implementation), Difference between stack and queue, Applications of Queue
- **Linked List**: Difference between Array and Linked list. Types of linked list:- Linear linked list-Singly (Single) and Doubly (Double)
  Circular linked list- Singly (Single) and Doubly (Double) Operations of linked List Creation, Insertion,Deletion,Traversing,Searching,Display,count,reverse,Implementationofalltypesof linked list, Implementation of stack using linked list (Dynamic stack), Implementation of queue using linked list (Dynamic queue)

Module 3:

- **Tree**: Introduction, Binary Trees, Types of Binary tree- Strictly Binary tree, Complete Binary tree, Extended (2-Tree) Binary tree, Binary expression tree, Binary Search tree, Heap Tree- Min heap tree, Max heap tree, Representation of Binary tree using linked list, Linked list Operations of Binary search tree-Creating and inserting node, Searching node, Counting total nodes, Counting and displaying leaf nodes, Tree Traversal methods- Preorder, Inorder, Postorder, Deletion of Nodes, Implementation of binary search tree, Height balanced tree/Balanced Binary Tree/AVL tree, Application of tree

Module 4:

- **Graph**: Concept & terminologies used in graph, Graph Representation using- Array and linked list, implementation of graph traversals – BFS &DFS, Dijakstra's shortest path algorithm, and application of graph.
- **Sorting**: Introduction and definition of Sorting, Types of Sorting-Bubble sort, Quick sort, Shell sort, Selection sort, Insertion sort, Merge sort, Radix Sort techniques
- **Searching**: Introduction and definition of Searching, Types of searching-Linear (Sequential) Search, Binary Search, Indexed sequential search.

Recommended Books:

- Tanenbaum: Data structures using C and C++
- Data Structures Through C in Depth-S.K. Srivastava

NEP Curriculum: w.e.f June 2023						
Programme: BCAII (Level5.0)						
Semester:	III	**Assessment & Evaluation Pattern**			**L/W***	**Credits**
Paper Category:	Major Mandatory8					
Paper Name:	OOP With C++	**ESE***	**ISE***	**Total**	3	2
Paper Code:	23BCAMM232	30	20	50		

Course Objectives:

The objectives of the course are to have students identify and practice the object-oriented programming concepts and techniques, practice the use of C++ classes and class libraries, arrays, vectors, inheritance and file I/O stream concepts.

Learning Outcomes: After the completion of this course, the student should be able to:

- **CO1 Remember (Knowledge):** Introduces Object Oriented Programming concepts using the C++ language.
- **CO2 Understand (Comprehension):** Understanding the principles of data abstraction, inheritance and polymorphism.
- **CO3 Apply (Application):** Apply the principles of virtual functions and polymorphism.
- **CO4 Analyze (Analysis):** Analyzing the handling formatted I/O and unformatted.
- **CO5 Evaluate (Evaluation):** Evaluate the I/O Introduces file & stream handling.

Module 1:

- **Introduction to OOP, Features of OOP's**
  - Comparison between POP and OOP, Advantages of OOP's, Application of OOP
  - data types, constants, operators, special symbols, control flow statements, Pointer and reference variable
  - Structure of C++ program, Introduction to cin and cout objects
  - Function and its types, Default argument, Parameter passing methods, inline function
  - Static polymorphism (Function overloading)
- **Classes & Objects**
  - Access Specifier (Visibility modes)-public, protected, private
  - Static data members and static member functions
  - Array of object, Pointer to object, Returning objects from functions
  - Passing object as parameter by value, by pointer, by reference
  - Dynamic memory allocation(new, delete)
  - Constructors Concept, characteristics of constructor, Types of constructor
  - Constructor overloading, Constructor with default argument
  - Destructor, characteristics of destructor

Module 2:

- **Inheritance**
  - Defining derived class, Types of Inheritance
  - Virtual base class
  - Behavior of constructors and destructor in inheritance
  - Pointer to base class, Pointer to derived class
  - Introduction of run time polymorphism
  - Virtual functions & Pure virtual function
  - Abstract class, virtual destructors
- **Streams & Classes**
  - Stream classes and File stream classes
  - Formatted and unformatted I/O functions
  - File Manipulations-Opening, closing, reading, writing, Appending
  - File opening modes-Opening files, using open() and constructor
  - Error handling during file manipulations
  - Command line arguments

- **Template**
    - Introduction to function template- overloaded function and user defined template class template
    - Inheritance of class template, overloaded operators and class template containership

Recommended Books:

- OOP in C++–E-balagurusamy
- Mastering C++- K.R. Venugopal
- Structured approach using C++–Behrouz A. Forouzan
- The Complete Reference C++- Fourth Edition. Herbert Schildt

NEP Curriculum:w.e.fJune2023						
Programme: BCAII (Level5.0)						
Semester:	III	**Assessment &Evaluation Pattern**			**L/W***	**Credits**
Paper Category:	Major Mandatory 9					
Paper Name:	RDBMS using MySQL	**ESE***	**ISE***	**Total**	3	2
Paper Code:	23BCAMM233	30	20	50		

Course Objective:

- To learn structured query language (SQL) to an intermediate/advanced level.
- To write data retrieval queries and evaluate the result set.
- To write SQL statements that edit existing data, create data base objects.
- Understand the structure and design of relational databases.
- Understand the importance and major issues of database security and the maintenance of data integrity.

Learning Outcomes : After the completion of this course, the student should be able to:

- **CO1 Remember (Knowledge):** Understand relational database management systems and query languages.
- **CO2 Understand (Comprehension):**Understand principles of database transaction management, database recovery, and security.
- **CO3 Apply (Application):**Apply to manage the processing of queries and it's optimization.
- **CO4 Analyze (Analysis):**Analyze the concepts of file structure and it's storage.
- **CO5 Evaluate (Evaluation)**:Develop, install and configure a data base management system for business application and formulate queries to access the database.

Module1:

- Definition DBMS, limitation of traditional file system, Advantages of DBMS,Components of DBMS, Database users, Database Structure, Two & Three Level Tier Architecture, RDBMS architecture, Data independence, Data abstraction, Types of Data mode-Relational, Network, Hierarchical, ER Model: entities, attributes & types, Relationships, sets, generalization, specialization, aggregation, ER to Relational mapping, Relational Model: Relation, domain, tupels, degree, cardinality, Relational Algebra Operations: select, project, cartation product, union, set difference, join
- Installing and starting MySQL instance, History and Architecture of MySQL, Components of MySQL-DML,DDL,DCL,DQL,Data types in MySQL-Numeric,String,Complex,Date and Time, Creating databases and show database
- MySQL operators-Arithmetic,Comparison,Logical,like
- MySQL Functions- Aggregate, Math, String, Date and Time, control flow functions and expressions, Type conversion, Formatting, MySQL clause-where, distinct, orderby, groupby, having, rollup.
- Populating tables with data,Retrieving data from tables,Sorting data in a table,Deleting data from table, Updating data in tables, searching data
- Add in gandDroppingcolumns,ModifyingandRenameexistingcolumns
- Renamingtableusingaltertable,Changingatabletype
- Findingoutthetablescreatedbyuser, Displaying atablestructureCreatingatable froma table, Inserting data into a table from another table

Module2:

- Applying data constraints-column level and table level, Types of Data constraints-I/O constraints-Not null, Unique, Primary key, Foreign key, composite Business rule constraints-Check, adding, Modify and drop constraints using alter table command
- MySQLjoin:-Advantages&disadvantagesofJoin,TypesofJoins
- MySQLView:-whyview, Create,Update,Alter andDropview
- Subqueries-use&example
- Stored Procedure:- Structure, use of stored procedure, Supported SQL statements in Procedures,creatingdynamicprocedure,Addingrecordtothetableusingprocedure, procedure with IN, OUT, INOUT parameter, dropping procedure.
- Transaction: MySQL transactions, open and closing transaction, commit, rollback, save point in transaction, table lock
- Trigger:Introduction,typesoftrigger–before,after,insert,update&delete,advantages
- Cursor:-use ofcursor,types ofcursor, opening a cursor, fetching a record fromthe cursor, cursor fetch statement, closing cursor, MySQL import & export- Import CSV File intoMySQL Table,ExportMySQL Table to CSV

RecommendedBooks:

- ComputerNetworking byTannenbaum.
- NetworkSecurityEssentialsbyWilliamStallings
- DorothyE.Denning,"CryptographyandDataSecurity",Addison-Wesley
- DatacommunicationandnetworkingbyWilliamStallings

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	III	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	MinorMandatory2					
PaperName:	LaboratoryCourseon MajorMandatory (7,8 & 9)	**ESE***	**ISE***	**Total**	4	4
PaperCode:	23BCAMN231	60	40	100		

DataStructureusing'C'Array

1) Write a program to implement array with following operations: a) Insert Element b)Delete element fromentered position c) Traverse arrayelement ,Count e) Search element
2) Writeaprogramsthatprintsarrayelements inreverse order.
3) Writeaprogramthatfindsonlyevenelementsinanarray.
4) Writeaprogramthatfindsonlyodd elementsin anarray.
5) Writeaprogramthatfindsadditionofmatrices.
6) Writeaprogramthatfindsmultiplicationofmatrices.

Stack

1) Writeaprogramto implementstack byusing array.(StaticImplementationofstack)
2) Writeaprogram,whichreversesthestring byusing stack.
3) Writeaprogramto checkentered stringispalindromeornotbyusing stack.
4) Writeaprogramto convertdecimalnumberintobinarynumberbyusing stack.
5) Writeaprogramto count totalnumberofvowelspresentinstringbyusing stack.
6) Writeaprogramwhichconvertinfixexpressionintoprefix expression.
7) WriteaprogramwhichconvertinfixexpressionintoPostfixexpression.
8) Writeaprogramwhichcheckenteredexpressionisvalidornot.
9) Writeaprogramfor evaluationofpostfixexpression.
10) Writea programtocalculatefactorialofenterednumberbyusingrecursion.
11) Writea programtocalculate digitsumofenterednumberbyusingrecursion.
12) Writeaprogramto findfacevalueofenterednumber byusing recursion.

Queue

1) Write a program to implement linear queue by using array. (Static Implementation ofqueue)
2) WriteaprogramtoimplementCircular queue.
3) WriteaprogramtoimplementPriorityqueue.
4) WriteaprogramtoimplementIRD(InputRestrictedDeque)
5) WriteaprogramtoimplementORD(OutputRestrictedDeque)

LinkedList

1) Writeaprogramtoimplementsinglylinearlinkedlistwithitsbasicoperations.
2) Writeaprogramtoimplementstackbyusinglinkedlist.(Dynamicimplementation)
3) Writeaprogramtoimplementqueuebyusinglinkedlist. (Dynamicimplementation)
4) Writeaprogramto implementdoublylinearlinkedlistwithitsbasicoperations.
5) Writeaprogramtoimplementsinglycircularlinked listwithitsbasicoperations.
6) Writeaprogramtoimplementdoublycircularlinked listwithitsbasicoperations.

Tree

1) Writea programtoimplementbinarysearchtree withtreetraversalmethods.
2) Write a programto implement BSTwith following operations: I)Insert NodeII)Count Leaf nodes III) Count Non-Leaf nodes IV) Count Total nodes
3) Write a program to implement BST with following operations: I) Insert Node II) Find MaximumnodeIII) Find MinimumNodeIV) SearchnodeV) DisplayonlyoddnodesVI) Displayonlyeven nodes VII) Display leaf nodes VIII) Find levelofnode IX) Find degree of node X) Delete Node

Graph

1) Writeaprogramtorepresentundirected and directed graph byusingAdjacencymatrix.
2) WriteaprogramtorepresentweightedgraphbyusingAdjacencymatrix.
3) Write a program to implement graph by using linked list and perform following operations:1) Insert Vertex(Node)2) DisplayVertices3) SearchVertex4) InsertEdge5) Find adjacent Vertices 6) Display Graph
4) Writeaprogramtoimplementbreadthfirstsearch(BFS) traversalofgraph.
5) Writeaprogramtoimplementdepthfirstsearch (DFS)traversalofgraph.

SortingandSearching

1) Writeaprogramtoimplementsimpleexchangesortmethod.
2) Writeaprogramtoimplementbubblesortmethod.
3) Writeaprogramtoimplementinsertionsortmethod.
4) Writeaprogramtoimplementselectionsortmethod.
5) WriteaprogramtoimplementShellsortmethod.
6) Writeaprogramtoimplementlinearsearchingtechniqueforunsorteddata.
7) Writeaprogramtoimplementlinearsearchingtechniqueforsorteddata.
8) WriteaprogramtoimplementBinarysearchtechnique.

OOPWithC++

1) Write different programs in'C++' language that showsuse ofarray, pointersvariable, reference variable, cin and cout objects, scope resolution operators, basic operators
2) Writeaprogramthatshowsuseofclassand object.
3) Writeaprogramthatshowsparameterpassingtechniques inC++
4) Writeaprogramthatshowsdefiningmemberfunctioninsideandoutsideofclassbody
5) Writeaprogramthatdemonstrateuseofinlinefunction
6) Writeaprogramtoimplementfunctionoverloading concept
7) Writeaprogramtoimplementparameterizedandcopyconstructor
8) Writeaprogramthatshowsuseofstaticdatamember andstaticmemberfunction.
9) Writeaprogramthatshowsuseofnesting classes.
10) Writeaprogramthatshowspassingandreturningobjectfromfunction.
11) Writeaprogramthatshowsuseofnewanddeleteoperator.
12) Writeaprogramthatshowsexplicittypeconversion
13) Write a programto overload different unaryand binaryoperators byusing friend and member function.
14) Writeaprogramto calculate factorialofgivennumberbyusingrecursion.
15) Write a program for addition, subtraction, multiplicationand divisionoftwo complex numbers by using return by object method.
16) Create 2 distance classes "class A" stores distance in meter and cm and "Class B" storesdistance in feet and inchesand add two distancesby friend functionand displaythe result.
17) Generatetheresult for5studentswithfollowingdata - Name, examno, Theorymarks in 5 subjects, grade. Use array of object concept.
18) Writeaprogramfor constructoroverloading.
19) Writeaprogramtocalculaterootofquadraticequationbyusingdefaultargument constructor.
20) Write a program to demonstrate friendfunction,friend class,member function of a class is friend to another class.
21) Writeaprogramtocountno.ofobjectscreatedbyusingstaticdatamember& member function.
22) Write a programtooverloadunaryoperators(++,--, -).
23) Write a programto overload binaryoperator.(+, -, *, /, %) byusing member function and friend function. Inheritance & Runtime polymorphism
24) Write a program to implement single inheritance 25) Write a program to implement multi-level inheritance
26) Writeaprogramtoimplementmultiple inheritance
27) Writeaprogramtoimplementhierarchicalinheritance
28) Writeaprogramtoimplementhybridinheritance
29) Writeaprogramtoimplementmulti-path inheritance
30) Writeaprogramthatshowsuseofpointertobaseclass

31) Writeaprogramthatshowsuseofpointertoderived class
32) Writea programthatshowsuse ofvirtualfunction.
33) Writeaprogramthatshowsuseofpurevirtualfunction.
34) Writeaprogramthatshowsuseofabstractclass
35) Writea programthatshowsuse ofvirtualdestructor
36) Writeaprogramthatshowsbehaviorofconstructoranddestructorininheritance. Syllabus & Structure of
37) Writeaprogramthatshowsuseofistreamclass.
38) Writeaprogramthatshowsuseofostreamclass.
39) Writeaprogramthatshowsuseofdifferentmanipulators.
40) Writeaprogramtoread,writeandappenddataintofile.
41) Writeaprogramthatcheckstwofilesareidenticalornot.
42) Writea programthatshowsuse ofrandomaccessoffile.
43) Write a program that shows use of command line argument. Exception Handling and template
44) Writeaprogramthatshowsusetry,catchand throw
45) Writeaprogramthatshowsusemultiplecatchblocks.
46) Writea programthatshowsuse ofcustomexception.
47) Write a program that shows use of function template 48) Write a program that shows use of class template

RDBMSusingMYSQL

1. CreatethefollowingDatabases.Salesmen

Customers

CNUM	CNAME	CITY	RATING	SNUM
2001	Harsh	Baroda	100	1001
2002	Gita	Pune	200	1003
2003	Lalit	Mumbai	200	1002
2004	Govind	Delhi	300	1002
2006	Chirag	Surat	100	1001
2008	Prajkta	Delhi	300	1007
2007	Sushma	Mumbai	100	1004

SNUM	SNAME	CITY	COMMISSION
1001	Prashnat	Mumbai	12
1002	Rajesh	Surat	13
1004	Anandi	Mumbai	11
1007	Priya	Delhi	15
1003	Suchita	Pune	10
1005	Nayan	Baroda	14

Orders

ONUM	AMOUNT	ODATE	CNUM	SNUM
3001	18	10/3/2019	2008	1007
3003	767	15/3/2019	2001	1001
3002	1900	10/3/2019	2007	1004
3005	5160	20/4/2019	2003	1002
3006	1098	20/4/2019	2008	1007
3007	1713	10/5/2019	2002	1003
3008	75	10/5/2019	2004	1002
3010	4723	15/6/2019	2006	1001
3011	1309	18/3/2019	2004	1002

- **Solvethefollowingqueriesusingabovedatabasesandwhereclauserange searching and pattern matching.**

1. Producetheorderno,amountand dateofallorders.
2. Giveallthe informationaboutallthecustomerswithsalesmannumber1001.
3. Displaythefollowinginformationintheorderofcity, sname,snumand commission.
4. ListofratingfollowedbythenameofeachcustomerinSurat.
5. Listofsnumofallsalesmenwithorders inordertablewithoutanyduplicates.

- **Solvethefollowingqueriesusingabovedatabasesandgroupbyclause.**

1. Findoutthelargestordersofsalesman1002and1007.
2. CountallordersofOctober3, 1997.
3. Calculatethetotalamountordered.
4. Calculatetheaverageamount ordered.

5. Countthe no.ofsalesmencurrentlyhaving orders.

- **Solve thefollowing queries using above databases and formatted output andorder by clause.**

1. Listallsalesmenwiththeir % ofcommission.
2. Displaythe no.ofordersforeachdayinthe descendingorderofthe no. of.
3. Displayorder number, salesmannoandtheamountofcommissionforthatorder.
4. Findthehighestratingineachcityintheform:Forthecity(city),thehighestratingis(rating)
5. Listallindescendingorderofrating.
6. Calculatethetotalofordersforeachdayand place theresultindescendingorder.

- **Solvethefollowingqueriesusingabovedatabasesandjoin.**

1. Showthename ofall customerswiththeirsalesman'sname.
2. Listallcustomersandsalesmenwho sharedasamecity.
3. Listallorderswiththenamesoftheircustomerandsalesman.
4. Listallordersbythecustomersnotlocatedinthesamecityastheir salesman.
5. Listallcustomersservicedbysalespeoplewithcommissionabove12%.

- **Solvethefollowingqueriesusingabovedatabasesandjoinandsubquery.**

1. Findallordersattributedtosalesmenin'London'.
2. Listthecommissionofallsalesmenservingcustomersin'London'.
3. Findallcustomerswhosecnum is1000 above thanthesnumof‘Sejal’.
4. Countthe no.ofcustomerswiththe rating above thantheaverage of'Surat'.
5. Listallordersofthecustomer'Chirag'.

- **Solvethefollowingqueriesusingabovedatabasesanddeleteandupdate.**

1. RemoveallordersfromcustomerChiragfromtheorderstable.
2. setthe ratingsofallthe customersofPiyushto400.
3. IncreasetheratingofallcustomersinRomeby100.
4. SalesmanSejalhasleftthecompany.AssignhercustomerstoMiti.
5. SalesmanMitihasresigned.ReassignhernumbertoanewsalesmanGopalwhosecityis Bombay and commission is 10%.

- **Solvethefollowingqueriesusingabovedatabasesandaltertableandtable constraints.**

1. Howtheonumfieldisforcedtobeanunquie?
2. Createanindextopermiteachsalesmantofindouthisordersbydate quickly.
3. Writeacommandtoenforcethateachsalesmanistohaveonlyonecustomerofagivenrating.
4. Writeacommandtoaddtheitem-namecolumntotheordertable.
5. Write a command to create the salesmen table so that the default commission is 10% with noNULLs permitted, snum is the primary key and all names contain alphabetical only.
6. Givethecommandstocreateoursampletables(salesmen,customer,orders)withallthe necessary constraints like primary key, not null , unique, foreign key.

- **Solvethefollowingqueriesusingabovedatabasesandview.**

1. Createaviewcalled big orderswhichstoresallorderslargerthanRs.4000.
2. Createaview Ratecount thatgivesthecountofno.ofcustomersateachrating.
3. Createaviewthatshowsallthecustomerswhohavethehighestratings.
4. Createaviewthatshowsallthenumber ofsalesmenineachcity.
5. Createaviewthatshowstheaverageandtotalordersforeachsalesmenafterhisnameand number.
6. Createacursoremp_cur,fetchrecordfromemp table and check whether sal>10000 thenupdate Grade = ‘A’ else if sal = > 5000 and sal<= 10000 then update Grade = ‘B’
7. Writeaproceduretofindthetablestructureofagivennumber8.Writeaprocedureon software table to calc

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	III	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	GE3					
PaperName:	Bootstrap	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAGE231	30	20	50		

Course Objectives:

- CSSand JavaScriptcomponentsofBootstrap,Work&CustomizeBootstrap installation.
- Designlayoutsadheringtoabaselinegridandfluid grid.
- OptimizeaBootstrapdesignfortargetdevicefeatures
- Createresponsive imagesand graphics

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1Remember(Knowledge):**Learnto utilizeBootstrap'sfilestructureforefficient web development workflows.
- **CO2Understand(Comprehension)**:ExplorethepossibilitiesofextendingBootstrap with custom plug-in and community-driven components.
- **CO 3 Apply (Application):** Implement Bootstrap's layout components, including dropdownmenus,navigationelements,andvariousUIcomponentslikebreadcrumbsand pagination.
- **CO4Analyze(Analysis):**Developtheabilitytotroubleshootcommonissuesand optimize Bootstrap-based designs for a professional finish.
- **CO5Evaluate(Evaluation):**Develop,installandconfigureawebsiteforbusiness application.

Module1:

- BootstrapIntroduction,WhatisBootstrapFramework,WhyBootstrap
- HistoryofBootstrap
- AdvantagesofBootstrapFramework
- WhatisResponsivewebpage
- Howto removeResponsiveness
- MajorFeaturesofBootstrap
- obile-FirstStrategy
- SettingupEnvironment
- ApplyBootstraptoApplications
- BootstrapContainers,GridSystem,FixedLayout,FluidLayout
- ResponsiveLayout,Typography,Tables

Module2:

- Lists,List Groups,Forms,ChecksandRadios,Range
- InputGroups,FloatingLabels,FormValidation,CustomForms
- Buttons,ButtonGroups,Images,Cards,MediaObjects
- Icons,Navs,Navbar
- Accordion,Breadcrumbs,Pagination
- Badges,ProgressBars, Spinners
- Jumbotron,BootstrapHelperClasses
- Modals,Dropdowns,Tabs,Collapse,Tooltips,Popovers,Alerts
- StatefulButtons,Carousel,Typeahead,ScrollSpy, Toasts

RecommendedBooks:

- LearnBootstrap WebDesign:FromSchoolLevelTo Everyone [byAadishree Avinash]
- Bootstrapin24 Hours,SamsTeachYourself[byJenniferKyrnin]

Programme:BCAII(Level5.0)						
Semester:	III	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	GE3					
PaperName:	AdvancedExcel	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAGE232	30	20	50		

Course Objectives:

- Toquipthestudentto withautomationskillsonexcels.
- Toenablethestudenttouseexcelforinformeddecision making.

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1 Remember (Knowledge):** Handle large data generated through business transactions using advanced spreadsheet tools.
- **CO2Understand(Comprehension)**:NavigatetheExcelinterface,enter dataandusebasic formatting tools..
- **CO3Apply(Application):Create**,edit,andformatspreadsheetsusingvarioustools, techniques, functions etc.
- **CO4Analyze(Analysis):**Solvecomplexbusinessproblemsusing various functions.
- **CO5Evaluate(Evaluation):**Createspreadsheetsinvariousreallifebusinessproblems.

Module1:

- IntroductiontoSpreadsheetsthroughMSExcel
- ConceptofSpreadsheet, WorkingwithspreadsheetusingMSexcel
- FormattingCells,Conceptof cell address,Addingrows,columns,sheets,creatingwell formatted tables, Manipulating in respect of Cells, rows, columns, sheets.
- AutoFill,AddingComments,FreezePanes,usingHyperlinks

Module2:

- WorkingwithFormulasandFunctions:Cellreferencing–Absolute&relative,Paste Special Function
- Function Library: Math & Trigonometry functions : Abs, Sum, Sumif, Sumifs, int, trunc, ceiling, Round, floor, Rand, Product, Quotient, Mod.
- Statistical, database functions: Average, Averagea, Averageif, Averageifs, count, Counta, Countblank, Countif, Countifs, Max, Min.
- LogicalFunctions:IF, AND,OR,NOT Functions
- TextFunctions:Len,Left,Right,Exact,Replace,Find,Upper,Lower,Proper,Trim, Concatenate & T Functions
- Date&TimeFunctions:Date, Today, Weekday, Datevalue, Time,Hour,Networkdays
- FinancialFunctions:Fv,Pmt,Pv,Rate,Nper,Sln,…etc
- LOOKUP & ReferenceFunction: Vlookup,Hlookup • DatabaseFunction: Dget,Dsum, Dmax, Dmin, Dproduct
- **AdvancedFeatures:-**DataValidations,ConditionalFormatting,FormulaAuditing, Sorting & Filtering Data, Advanced Filtering. Text to Columns, Charts & Graphs
- PivotTables, Scenario, Goalseek, Solver,Datatable, subtotals, DataConsolidation
- **MacrosinExcel:-** CreatingaMacro, RunningaMacro,Editinga Macro
- **Data Security & Printing in Excel:-** Data Security – Cell Level, Sheet Level, Book Level, Sharing Workbooks • Printing Spreadsheets, using headers and footers, repeating rows above and columns to left, etc.

RecommendedBooks:

- MicrosoftExcelPracticalFormulae:FromBasicAnalysistoadvancedFormulae

Programme:BCAII(Level5.0)						
Semester:	III	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	AEC 3					
PaperName:	ITAct2000	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAAE231	30	20	50		

Course Objective:

- TheActseekstoprotectalltransactionsdonethroughelectronicmeans.
- E-commercehasreducedpaperworkusedforcommunicationpurposes.Italsogiveslegal protection to communication and the exchange of information through electronic means.
- Itprotectsthedigitalsignaturesthat areused foranysort oflegalauthentication.

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1 Remember (Knowledge):** Get knowledge to know that recognition of electronic records and signatures aims to streamline the electronic delivery of government services and facilitate transactions between businesses and consumers.
- **CO2 Understand (Comprehension)**: Understand that the Act protects various cybercrimes such as hacking, data theft, identity theft, and cyber stalking, prescribing penalties for these offenses to ensure a safe and secure cyber environment.
- **CO3Apply(Application):** Understandapplicationofcyber lawwiththehelpofcase studies.
- **CO4 Analyze (Analysis):** Intellectual property issues in the cyber space and the growthand development of the law.
- **CO5Evaluate(Evaluation):** Understandingtheevaluationofdifferent sectionsunderIT Act.

Module1:

- AdvantagesandDisadvantagesofInternetTechnology
- InformationTechnologyAct2000
- Need,Aims,Objectivesand Applications(Section1)
- Computer(Section2(i))
- ComputerResource(Section2(j))
- ComputerSystem
- E-record(Section2(v))
- Information(Section2 (v))
- E- Governance(Sections4-10A)
- Attribution,AcknowledgementandDispatchofe-record(Section11-13)
- Regulations(Section17-19)

Module2:

- CertifyingAuthority(Sections30-34)
- CyberContraventionsand penalty(Sections43-45)
- OffencesandExtraTerritorialjurisdiction(Sections65-77)
- Intermediarynotliableincertaincases(Sections2(w),79)
- Investigationandprocedureofsearchand seizure(Sections78&80)
- GreyAreasofITAct2000

RecommendedBooks:

- BareActofInformationTechnologyAct2000-UniversalPublishingCo.Pvt.Ltd
- InformationTechnology:Law &Practice-VakulSharma
- Law ofInformationTech-D.P.Mittal
- AGuidetoCyber LawsandITAct200withRulesandNotifications-NandanKamath

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	III	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	VSC 3					
PaperName:	UML	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAVS231	30	20	50		

Course Objective:

- The focus of this course is on design rather than implementation.
- IntroducingtheUnifiedProcessandshowinghow UMLcanbeusedwithintheprocess.
- Presentingacomparisonofthemajor UMLtoolsforindustrial-strengthdevelopment.
- Introductiontodesignpatterns,practicalexperiencewithaselectionofcentralpatterns.

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1Remember(Knowledge):**Identifythepurposeandmethodsofuseofcommon object-oriented design patterns.
- **CO2Understand(Comprehension)**:Representthedatadependenciesofasimple program using UML.
- **CO3Apply(Application):**Createdesigndocumentationoutliningthetestableand complete design of a simple program.
- **CO4Analyze(Analysis):**Analyzingthedesignfor propersoftware development.
- **CO5Evaluate(Evaluation):**Evaluatingthedesignforrobustsystemapplication.

Module1:

- **Object-Oriented Concepts**: Principles of modeling, abstraction, encapsulation, modularity, hierarchy, typing, concurrency, persistence of objects. Purpose of modeling.
- **OOAnalysisand Design:**
  Class Modeling: Object & Class, Links &Associations, Generalization & Inheritance, Association Ends scope, visibility, Multiplicity, Role names, Ordering, bags & sequences, Qualified association, Aggregation, association attributes & association classes, propagation of operations, Abstract class, Metadata, reification, Constraints, derived data, packages, elements of class diagrams, constructing class diagrams.

Module2:

- Principlesofmodeling,UML─Overview
- AConceptualModelofUML
- RoleofUMLinOO Design
- **UML─BuildingBlocks:**Things,Relationships,
- **Use Case modeling:** Actors, Use Cases, relationships - betweenactors,betweenuse cases and between actor and use case, elements of use case diagram, constructing use case diagrams.
- Interaction Modeling: Elements of sequence diagram and communication diagram, constructing sequence diagram and communication diagram
- **ActivityModeling:**Elementsofactivitydiagram,constructingactivitydiagram

RecommendedBooks:

- The Unified Modeling Language Reference Manual(Addison-Wesley Object Technology Series)
- UMLDistilled: ABriefGuidetotheStandard ObjectModeling Language(Paperback)

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	III	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	FP1					
PaperName:	MiniProject	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAFP231	30	20	50		

Course Objective:

- The project work facilitates the students to develop and prove Technical, Professionaland Ethical skills and knowledge gained during graduation program by applying them from problem identification, analyzing the problem and designing solutions.

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1 Remember (Knowledge):** To know various techniques tobe implementedfor theselected problem and related technical skills through feasibility analysis.
- **CO2 Understand (Comprehension)**: To design solutions for real-time problemsthat will positively impact society and environment.
- **CO3Apply(Application):** Identifyandanalyzethe solutionindetailto define itsscope with problem specific data.
- **CO4Analyze(Analysis):** Develop &evaluatethesystemagainstSRS.
- **CO5Evaluate(Evaluation):** Evaluatethesystemfor actualimplementation.

Guidelines:

Module1:Project TopicSelection andAllocation:

- ProjecttopicselectionProcesstobedefinedandfollowed:
  - Projectorientationcanbe givenonstartofsemester
  - Students can certainly take ideas from anywhere, but be sure that they should evolvethem in the unique way to suit their project requirements.
- Topicscanbefinalizedwithrespecttofollowingcriterion:
  - **Topic Selection**: The topics selected should be on current requirement of society/industries (Product based, Application based or Research based) or should work towards removing currently existing systems.
  - **TechnologyUsed**: Useoflatest technologyormoderntoolscan be encouraged.
  - Projectworkmustbecarriedout bythegroupofat least2 students
  - Guide allocationshould be done and studentshave to submit weeklyprogressreportto the internal guide
  - Internal guide has to keep track of the progress of the project and also has to maintain attendance report. This progress report can be used for awarding term work marks.

Module2:ProjectReport Format:

Aprojectreportshouldpreferablycontainatleastfollowing details:

- Abstract
- Introductiono LiteratureSurvey/Existingsystem
- LimitationExistingsystemor research gap
- ProblemStatementand Objective

- ProposedSystem
  - Analysis/Framework/Algorithm
  - Designdetails
  - Methodology(your approachtosolvetheproblem)ProposedSystem
- ExperimentalSetup
  - DetailsofDatabaseordetailsaboutinputtosystemsorselecteddata
  - PerformanceEvaluationParameters(forValidation)
  - SoftwareandHardwareSetup

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	III	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	CC3					
PaperName:	IndianConstitution	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCACC231	30	20	50		

Course Objective:

- To understand theprovisionsoftheconstitutionofIndia.
- Tomakestudentsawareaboutfundamentalrightsandduties.
- TolearnthestructureandfunctionsoftheIndian judiciary.
- Tounderstandtheconstitutionalamendmentprocedure.

CourseLearningOutcomes:

- Promotion ofactive citizenship, legal awareness, and critical thinking about constitutional issues.
- AcquirebasicknowledgeoftheconstitutionofIndia.
- Understandtheroleofparliamentinlawmakingandconstitutionalamendment.
- Tocreateawarenessaboutfundamentalrightsandfundamentalduties.

Unit 1:IntroductiontoIndianconstitution

- **Preamble-**IntroductiontoIndianconstitution(Components),
- **FundamentalRights** -overview offundamentalrights,
- **DirectivePrinciples**-IntroductiontoDirectivePrinciples.
- **UnionExecutive**- PowersandFunctionsofthePresidentandPrime Minister.

Unit2:Judiciary &ConstitutionalAmendments

- **JudiciaryStructure** -SupremeCourtofIndia,HighCourtsandSubordinateCourts.
- **Constitutional Amendments** - Process, significance and impact of important constitutional amendments.
- **EmergencyProvisions**- PowersandImplicationsofemergencyprovisions.

RecommendedBooks:

- N.H.Jhabvala -ConstitutionofIndia-C.Jamnadas&Co.,2017Edition
- T.K.Tope :ConstitutionofIndia
- G.Austin,HistoryDemocraticConstitution:TheIndianExperience(2000)Oxford.
- D.D.Basu,ShorterConstitutionofIndia(1996),PrenticeHallofIndia,Delhi.
- ConstituentAssemblyDebatesVol. 1to12(1989)
- H.M.Seervai, ConstitutionofIndiaVol. 1-3(1992)Tripathi,Bombay.
- M.P.Singh(ed) V.N.Shukla, ConstitutionalLawofIndia(2000) Oxford
- G.Austin, IndianConstitution:CornerStoneofa Nation.(1972)

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	IV	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	MajorMandatory10					
PaperName:	PHP	**ESE***	**ISE***	**Total**	4	4
PaperCode:	23BCAMM241	60	40	100		

Course Objectives:

- TounderstandfunctionalityofeachcomponentofPHPandMySql framework
- Tolearnandcreatedynamic website
- Tounderstandwebserverinstallationprocessanditsimportanceindynamicwebsite development

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1 Remember (Knowledge):** To understand differentframeworks and relatedlexical structure details of PHP.
- **CO2 Understand (Comprehension)**: Understand different components in web technology and to know about web servers.
- **CO3Apply(Application):**DevelopaninteractiveWebpagesusing HTML/XHTML, JavaScript, CSS, PHP.
- **CO4 Analyze (Analysis):** Constructwebsitesfor userinteractions using JavaScriptand JQuery, CSS, PHP, DBMS.
- **CO5Evaluate(Evaluation):**EvaluateWebapplicationsdevelopedusing PHP.

Module1:

- Introductiontowebapplications,ClientSideVsServerSideScripting
- WebServers:LocalServersandRemoteServers,InstallingWebservers,Internet Information Server(IIS),Personal Web Server(PWS)
- PHPFramework, BasicPHP syntax
- Datatypes in PHP, Variables, Constants, operators and Expressions • Controlstatements– if, switch case, for, while • Arrays: Initialization of an array, Iterating through an array, Array Functions, Functions: Defining and Calling Functions, Passing by Value and passing by references, Inbuilt Functions

String &Forms:

- String: String functions, patterns, basic regular expressions. • Working With Forms:Formscontrolsproperties,methodsandevents,Retrievingformdatawith$_POST, $_GET and $_REQUEST arrays, Validating retrieved data, Super global variables, Super global array, Combine HTML and PHP code, Using hidden fields, Redirecting the user, File upload and scripts, Validation-Server side validation

Module2:

Database Connection:

- MySQL Architecture, MySQL Server Start and Stop, Data Types in MySQL, Working with PHP-MySQL Environment, Connecting to the MYSQL, Defining a Database, Creating Tables, Selecting a database, Adding data to atable, Displaying returned dataon Webpages, Finding the number ofrows,Inserting, deleting and updating Data, Executing multiple queries, Checking data errors

Module3:

State Management:

- Cookies: Setting time in a cookie with PHP, Deleting a cookie, Creatingsession cookie, Working withthe querystring •Session: Starting a session, Registering Sessionvariables, working with session variables, destroying session, passing session Ids, encoding and decoding session variables

Module 4:

ExceptionHandling :

- Meaningofexception,typesofexceptions,system.Exceptionclass,Try,catch,final, Multiple catch classes, catching all exception,
- nestingtryblock,throwingandrethrowingexceptions,commonlyused exceptions

ReferenceBooks:

- PHP:TheCompleteReference-StevenHolzner.
- ProfessionalPHP5-EdLecky-Thompson,HeowEide-Goodman,StevenD. Nowicki
- ProgrammingPHP-Rasmuslerdorf,KevinTatroe.

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	IV	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	MajorMandatory11					
PaperName:	Core Java	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAMM242	30	20	50		

Course Objectives:

- Tointroducetheobject-orientedprogramming concepts
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- Tointroducetheimplementationofpackagesandinterfaces
- Tointroducethe conceptsofexceptionhandlingandmultithreading
- TointroducethedesignofGraphicalUserInterfaceusing appletsand swing controls.

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1 Remember (Knowledge):** Understand how object-oriented concepts are incorporated into the Java programming language.
- **CO2 Understand (Comprehension):**Understanding the concepts of Multithreading and Exception handling to develop efficient and error free codes**.**
- **CO3Apply(Application**Developreusableprogramsusingtheconceptsofinheritance, polymorphism, interfaces and packages.
- **CO4Analyze(Analysis):**Developtheabilitytosolvereal-worldproblemsthroughmultithreaded programming using Java.
- **CO5Evaluate(Evaluation):**DesigneventdrivenGUIandwebrelatedapplications which mimic the real word scenarios.

Module1:

- **Introduction**: Introduction to java, java buzzword, data types, dynamic initialization, scope and life time, operators, control statements, arrays, type conversion and casting, finals & blank finals. **Classes and Objects**: Concepts, methods, constructors, usage of static, access control, this key word, garbage collection, overloading, parameterpassing mechanisms, nested classes and inner classes.
- **Inheritance**: Basic concepts, access specifiers, usage of super key word, method overriding, final methods and classes, abstract classes, dynamic method dispatch.
- **Interfaces**: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface and extending interfaces.
- **Exception Handling**: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes.

Module2:

- **Multithreading**: Concepts of Multithreading, differences between process and thread, thread life cycle, Thread class, Runnable interface, creating multiple threads, Synchronization, thread priorities, inter thread communication, deadlocks.
- **I/OStreams**:Streams,Bytestreams,Characterstreams,Fileclass, FileStreams
- **Event Programming**: AWT Components, windows, canvas, panel, File Dialog boxes, Layout Managers, Layout Manager, Menu, Menu bar, Adapter classes / Listeners
- **Applets**: ConceptsofApplets, life cycle ofanapplet, creating applets, passing parameters to applets, accessing remote applet, Color class and Graphics Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events.

ReferenceBooks:

- Java2 forprofessionaldevelopers[byMichaelMorgen]
- CoreJava Vol1 andVol2 [byCay.S.Horstmann,GrayCornell]
- JavaThecompleteReference[byHerbertSchildt]

NEPCurriculum:w.e.fJune2023
Programme:BCAII(Level5.0)

Semester:	III	Assessmentand EvaluationPattern			L/W*	Credits
PaperCategory:	Major-Mandatory-12					
PaperName:	ComputerNetworks& Communication	ESE*	ISE*	Total	3	2
PaperCode:	23BCAMM243	30	20	50		

Course Objective:

- Todevelopanunderstandingofcomputernetworkingbasics.
- Todevelopanunderstandingofdifferentcomponentsofcomputernetworks,various protocols, modern technologies and their applications.
- EnumeratethelayersoftheOSImodeland TCP/IP.Explainthefunction(s)ofeach layer.
- Toidentifythedifferenttypesoflayersand protocols.

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1Remember(Knowledge):** Usevariousrouting mechanisms forfindingshortestpath in the network.
- **CO2 Understand (Comprehension)**: Identify the different types of network devices and Multiple Access Protocols.
- **CO3Apply(Application):** Explainthe functionsoffered bysessionandpresentation layer and their Implementation.
- **CO4Analyze(Analysis):** Explain&Designthevariousreferencemodelsandnetworks.
- **CO5Evaluate(Evaluation):** Evaluatetheuseofvariousapplicationlayerprotocols: HTTP, DNS, and SMTP,FTP etc.

Module1:Introduction toOSI Layers

- **Physical layer:-** Signals-Analog & Digital Signals, Period, Frequency, Phase, Amplitude, Bandwidth, Bit Rate, Bit Length, Fourier analysis. Transmission Media-Guided Media-Magnetic Media, Twisted Pair, Coaxial Cable, Fiber Optic Cable, Unguided Media-Wireless Radio Waves, Microwaves, Infrared, Satellite Communication
  Analog Transmission-Modem, Modulation and types-Amplitude, Frequency, Phase Transmission Mode-Parallel, Serial, Synchronous Transmission, Asynchronous Transmission. Switching and types- Circuit, Message, Packet
- **Data linklayer:** -Data link layer Design issues, ErrorDetection&Correction-Types of Errors, Hamming Distance, Error Detection-Parity Check, Cyclic Redundancy Check, Checksum Check Error correction
- **Network layer:** -Network layer Design issues, Routing Algorithm: Optimality Principle, Shortest Path Routing, Distance Vector Routing, Link State Routing, Broadcast Routing, Multicast Routing
- **Transport, Session, Presentation & Application layers:-** Elements of Transport Protocols-Addressing, Connection establishment, Connection Release, Flow Control & Buffering, TCP/IP protocol suite-Transmission Control Protocol, User Datagram Protocol, IP, Real Time Transport Protocol, DNS, SMTP, HTTP, WWW, SNMP, ARP, RARP, etc.

Module2:Network,WebSecurityandNetwork Services

- **Networksecurity**,SecurityTechniques-Encryption&decryption,DigitalSignatures, Cryptography, Authentication Mechanisms-Passwords, Smart Card, Biometrics. WebSecurity:SSLEncryption,TLS,SET,E-mailSecurity
- **NetworkServices:**-VPN,Virtual LAN,Wi-Fi Network,RemoteSensing,GPS,GPRS, GSM, Bluetooth, Video Conferencing.

RecommendedBooks:

- ComputerNetworking byTannenbaum.
- NetworkSecurityEssentialsbyWilliamStallings
- DorothyE.Denning,"CryptographyandDataSecurity",Addison-Wesley

NEPCurriculum:w.e.fJune2023				
Programme:BCAII(Level5.0)				
Semester:	IV	**Assessment&Evaluation Pattern**	**L/W***	**Credits**
PaperCategory:	MinorMandatory4			

PaperName:	LaboratoryCourseon Major Mandatory 10&11	**ESE***	**ISE***	**Total**	4	4
PaperCode:	23BCAMN241	60	40	100		

PHP

1) WritePHPcodetocheckenterednumberisArmstrongor Not.
2) Write a menu driven program to perform following operations: a) Check Number is Palindrome or not. b) Check Number is Perfect or not. c) Find face value ofEntered number. d)CheckNumberisPrimeor not.e) CheckNumber isStrongornot.
3) Write a PHP code to perform following operations: a) Sort array element b) Find Maximum and Minimum number in array c) Merge two arrays in third array. d) Swap two array elements
4) Writea programtooverloadthe constructor.
5) Writeaprogramwhichusesthestaticmethodsand staticvariables.
6) Writeaprogramtoimplementdifferenttypesofinheritance.
7) Writeaprogramtoimplementinterface.
8) Writeaprogramtohandledifferenttypesofexceptions.
9) Writeaprogramwhichshowstheuseof`final'keyword.
10) Writea programto copythe contentofonefileintoanother.
11) Writeaprogramtomergetwofilesintothirdfile.
12) Design a web application to perform following task on employee table. I) Add New II) Save III) Delete IV) Update V) Move First VI) Move Last 13) Design a web application that uses cookies and session object

CoreJava

1) WAP todemonstratethe useofvariousdatatypes.
2) WAPtoprintfollowing pattern.a.Ab.ABc.ABCd.ABCD
3) WAPwhichwillchecknumberforArmstrong,prime,palindrome&perfectnumber.
4) WAPtodemonstratetheuseofAccessControl.(Public,private,protected).
5) WAPusingstatic& non-staticdatamembers.
6) WAPusingInterface.
7) WAPtodemonstrateuseofExceptionHandling.
8) WAPwhichwillcreateuserdefinedException.
9) WAPwhichwillacceptstringandcalculatehowmanyvowelspresentinit.
10) WAPwhichwillacceptrangeofyearsfromusersandprintleapyearsbetweenthem.
11) WAPtoreversethe number.
12) WAPwhichwillaccept numberanddisplays it inwords.a. e.g.- Ifnumber-123asonetwo three.(use switch).
13) WAP whichwillcreate following threads. a.Print even &odd numbers. b. Print the prime number.
14) WAPwhichwilldemonstrateoverloading&Inheritance.
15) WAPtodisplaytheallpattern.
16) WAPtoshowdemoofparameterized constructor.
17) WAPtoappend thecontentsofonefilewithanotherfile.
18) WAPtodevelopacalculatorusing Applet(functionsshowingadd,sub,MultiandDivi)
19) WAP whichwill insert student records into database having fieldsroll no, name, marksof five subjects, total marks and percentage and display the same.

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	IV	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	GE4					
PaperName:	AWS(AmazonWeb Services)	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAGE241	30	20	50		

Course Objective:

- Tolearnandunderstandbasicsandworkingdefinitionsof AWS.
- TodescribeandprovideanexampleofthecoreAWSservices,includingcompute, network, database, and storage services.
- TounderstandtheAWSWell-ArchitectedFramework.

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1Remember(Knowledge):** Understandingdifferentcloudcomputing model
- **CO2Understand(Comprehension)**:Understandingdifferent imperativeofcloud computing. .
- **CO3Apply(Application):**Applyingcouldcomputingenvironment asPaaS,IaaS&SaaS..
- **CO4Analyze(Analysis):**Evaluateandaccessbenefitsofcloudcomputingapplications.
- **CO5Evaluate(Evaluation):**Understandingsocialimpactofcloudcomputing.

Module1:

AWS Cloud Computing Basics: Overview of AWS cloud, AWS Free tier account creation, AWS Management Console, AWS Region, AWS Availability Zone, AWS Support Plan
Identity & Access Management(IAM): Create IAM Users & Group, Copy Permission from existing users, Applying Policies/Permission to Groups, IAM Users Sign-in link, Set Password Policy for IAM Users, Create Access Key, Activate/Deactivate Keys, Set up rules and policies governing user access and permissions.

Module2:

EC2: Basic of virtualization, What is EC2, EC2 instance Families, AmazonMachine Image,AWS Makrketplace, Launching an EC2 instance, Create Public/ Private Key pair, EC2Instance State, EC2 Shutdown Behavior, EC2 instance state
Create Volume : Generate a storage volume and attach it to the remote Microsoft Windows Server instance.
ElasticBlockStorage(EBS):WhatisEBS,CreateEBS,TypesofEBSvolume,GeneralPurpose&ProvisionedIOPSSSD,ThroughputOptimized&ColdHDD,Persistent/Non- Persistent Volume, EBS Volume SLA, EBS Backed Instance & Instance Store Backend Instance **Create Buckets**: Establish buckets and upload documents and files to them.
DatabaseServices:ExploreandutilizeAWSdatabaseservices.
DevOpsServices:UtilizeAWSDevOpsservicesforcontinuous integrationand deployment.

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	IV	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	GE4					
PaperName:	SAP	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAGE242	30	20	50		

Course Objective:

The course objectives for Enterprise Application Development using SAP ABAP (Advanced Business Application Programming) on typically aim to equip participants with the skills and knowledge necessary to develop and maintain SAP applications using the ABAP programming language.

LearningOutcomes: Afterthe completionofthiscourse,thestudentshouldbeableto:

- **CO1Remember(Knowledge):** Understandthekeyconceptsandprinciplesof ABAP programming.
- **CO2Understand(Comprehension)**:AcquireskillsforwritingbasicABAPcode effectively.
- **CO3Apply(Application):** Learnto utilizetheABAPworkbenchtoolsforcodingand debugging.
- **CO4Analyze(Analysis):** AnalyzethedifferentSAPmoduleforitseffective implementation.
- **CO5 Evaluate (Evaluation):** Gain proficiency in using control flow structures to guideprogram execution.

Module1:

OverallintroductiontoERP
Introduction SAP R/3 architecture, Introduction to SAP ABAP/4
ABAP/4editor(FocusonthefunctionalitiesofnewABAPeditor) Data types, Output statements
Writingsmallprograms
Arithmeticoperations,Stringoperations Control statements
Parameters
OpenSQL–statements(insert,modify,delete,update). Simple reporting
Selection screens
Transactioncodecreation
Data Dictionary

- Tables
- Dataelement
- Domain
- Structures
- Search helps
- Views
- TypeGroups
- TablemaintenancegeneratorandT-code creation
- Primaryandforeignkeys.
- Checkand valuetables.

Reporting:

- Debuggingtechniques.
  - Breakpointcreation.
  - Watchpointcreation.
  - Emphasizeontheusageof New Debugger.
- Internaltables.
  - Declaration
  - Processing.
  - Population.
- ControlBreakStatements.
- Modularizationtechniques.
  - Includes.
  - Subroutines.
  - Functionmodules.
  - Macros

- Variants.
- Conversionexits.
- Forallentriesandjoins(innerandleftouter).
- Messageclasscreation&messagetypesandhandlingmessages.
- Eventsfor classicalreports.
- Eventsforinteractivereports.
- Hideand hotspot.
- Creatingandhandling buttons.
- Menupainter.

ALV

- TypesofALV
- SimplereporttodisplaysimpleALVListusingFunctionModules
- InteractiveALVReports.
- AddingnewbuttonsintheALVtoolbarandhandlingevents.
- WorkingwithALVusingclasses(List,Gridand Tree).
- UsageoflatestclasslibraryinECC6.0forALV.

DIALOGPROGRAMMING

- Introductiontoscreenpainteranddialog programming.
- Flowlogic
  - PAI
  - PBO
  - POV
  - POH
- Screendesigning
- Programminginobjectbrowser
- Fieldvalidations
- Creationof
  - NormalScreens
  - SubScreens
  - TableControls
  - TabStrips
- DynamicScreen.
  - CallScreen
  - SetScreen
  - LeavetoScreen
  - LeaveScreen
- Processingoflistfromtransactionandviceversa.
- Screentableanditsfields.
- Lockobjects.

Module2:

InterfaceProgramming

- WhyDataTransfers
- IntroductiontoBDC.
- FileHandling.
  - Presentationserver.
  - Applicationserver.
- Recordings.
- MethodsinBDC.
  - Calltransaction.
  - Sessionmethod.
- ErrorHandlinginCallTransaction.
- HandlingTableControlsinBDCandScreenResolutions.
- MassUpdation.
  - Vendor master.
  - Customer master.
- LegacySystemMigrationWorkbench(LSMW)
  - Differentmethods.
  - StepstoCreateanLSMW Project.
  - Flatfilecreation.
  - Uploadingdata.

SAPScripts

- Introduction.
- LayoutSets.
- SAPScriptElements.
- Modifyingstandardlayoutsets(by using subroutines).
- Uploadinglogo.

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	IV	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	MajorMandatory12					
PaperName:	SoftwareTesting	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCASE241	30	20	50		

Course Objectives:

- Introducebasic conceptsofsoftwaretesting
- Understandwhite box,blockbox,objectoriented,webbasedandcloudtesting
- Understandtheimportanceofsoftwarequality &assurancesoftwaresystemsdevelopment

LearningOutcomes: Afterthecompletionofthiscourse,thestudentshouldbeableto:

- **CO1Remember(Knowledge):** List arangeofdifferent softwaretestingtechniquesandstrategies and be able to apply specific(automated) unit testing method to the projects.
- **CO2Understand(Comprehension)**: Distinguishcharacteristicsofstructuraltestingmethods.
- **CO3Apply(Application):** Demonstratethe integrationtestingwhichaimsto uncoverinteraction and compatibility problems as early as possible.
- **CO4Analyze(Analysis):** Discussabout thefunctionalandsystemtestingmethods.
- **CO5Evaluate(Evaluation):** Demonstratevariousissuesforobjectorientedtesting

Module1:

IntroductionToSoftwareTesting:

- What is Software Testing, Importance or need of software testing, Differences between Manual and Automation Testing

WhiteBoxTesting (WBT): IntroductiontoWBT,Advantages&DisadvantagesofWBT.

- StaticTechniques:InformalReviews,Walkthroughs,TechnicalReviews,Inspection
- Dynamic Techniques or Structural Techniques: Statement Coverage Testing, Branch Coverage Testing, Path Coverage Testing, Conditional Coverage, Loop Coverage Testing

BlackBoxTechniques: IntroductiontoBBT,AdvantagesandDisadvantagesofBBT

BoundaryValueAnalysis,EquivalenceClassPartition,StateTransition,CauseEffectiveGraph, Decision Table, Use Case Testing

- ExperiencedBasedTechniques:Errorguessing,Exploratorytesting

LevelsofTesting

- FunctionalTesting:SystemTesting,SmokeTesting,
- IntegrationTesting&types-Top-Down, Bottom-Up,Non-Incremental
- AcceptanceTesting-AlphaandBeta
- RegressionTestingandtypes-Unit/Retest,Regional, Full
- NonFunctionalTesting: AdhocTesting,Recovery Testing
- PerformanceTestingandtypes:LoadTesting,StressTesting,Volume&SoakTesting

Module2:

- QARole&Responsibility,DifferentWayofDevelopingasoftware-AgileVsWaterfall
- ProjectIntroduction,RequirementAnalysis,JiraInstallation,AgileProcess
- IntroductiontoJira,UserStories,Defects:Backlogs,UserStories,Epic
- JiraUsreStories&SprintPlanning
- CompleteRequirementcreationinJiraBasedonthe project.
- TestCaseandTestPlanCreation
- FunctionalTesting, UI Testing,TestingonStoreNavigationPage
- ConceptofBoundaryvalueanalysisandEquivalenceportioningmethod
- WritingDefect,DefectLifeCycle
- DifferentTypeoftesting, DifferenttypeofEnvironment
- APITesting:Introduction,APITypes&theirdifferences,Realtimeexample

RecommendedBooks:

- TheartofSoftwareTesting–GlenfordJ.Myers
- LessonslearnedinSoftwareTesting–CemKaner,JamesBach,BretPettichord
- APractitioner'sGuideto SoftwareTestDesign-LeeCopel

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	IV	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	SEC3					
PaperName:	BusinessAnalytics	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCAAE241	30	20	50		

Course Objectives:

- Tohelpstudentsinunderstandinghowthemanagersusebusinessanalyticsfor managerialdecision making

Course Outcomes:

- Thestudentswillbe familiarwiththepracticesofanalyzingandreportingthebusinessdatauseful for the insights of business growth and development.

Module1:

- **Understanding Business Analytics Introduction**: Meaning of Analytics - Evolution of Analytics - Need ofAnalytics – Business Analysis vs. Business Analytics - CategorizationofAnalyticalModels - Data Scientist vs. Data Engineer vs. Business Analyst-Business Analytics in Practice-Types of Data-Role of Business Analyst.
- **Dealing with Data and Data Science Data**: Data Collection - Data Management - Big Data Management - Organization/Sources of Data-Importance of Data Quality-Dealing with Missing or Incomplete Data-Data Visualization-Data Classification.

Module2:

- **Data Mining and Machine Learning Data Mining**: The Origins of Data Mining - Data Mining Tasks - OLAP and Multidimensional Data Analysis- Basic Concept of Association Analysis and Cluster Analysis. Machine Learning: History and Evolution - AI Evolution - Statistics vs. Data Mining vs. Data Analytics vs. Data Science - Supervised Learning - Unsupervised Learning – Reinforcement Learning-Frameworks for Building Machine Learning Systems.
- **Applications of Business Analytics:** Overview of Business Analytics Applications: Financial Analytics - Marketing Analytics – HR Analytics - Supply Chain Analytics - Retail Industry - Sales Analytics - Web & Social MediaAnalytics-HealthcareAnalytics-EnergyAnalytics-TransportationAnalytics-LendingAnalytics –Sports Analytics-Future of Business Analytics.

RecommendedBookds:

- JamesREvans, Business Analytics, GlobalEdition, PearsonEducationUDineshKumar,
- BusinessAnalytics,WileyIndiaPvt.Ltd.,NewDelhi
- GerKoole,AnIntroductiontoBusinessAnalytics,Lulu.com,2019
- J.D.Camm,J.J.Cochran,M.J.Fry,J.W.Ohlmann,D.R.Anderson,D.J.Sweeney,T.A.Williams Essentials of Business Analytics,2e;Cengage Learning.
- VipinKumar,IntroductiontoDataMining,PangNingTan,MichaelSteinbach,PearsonEducation India
- BhimasankaramPochiraju,SridharSeshadri,EssentialsofBusinessAnalytics:AnIntroductionto the Methodology and its Application, Springer

NEPCurriculum:w.e.fJune2023						
Programme:BCAII(Level5.0)						
Semester:	IV	**Assessment&Evaluation Pattern**			**L/W***	**Credits**
PaperCategory:	CEP1					
PaperName:	DigitalMarketing	**ESE***	**ISE***	**Total**	3	2
PaperCode:	23BCACE241	30	20	50		

Course Objective:

- Thiscourseaimsto familiarizestudentswiththeconceptofdigitalmarketingand itscurrent and future evolutions.
- Itfurtheraimsto beableto equipstudentswiththeabilitytounderstandandsubsequentlycreate strategic and targeted campaigns using digital media tools.

Course Outcomes:

Attheendofthiscourse,studentswouldbeableto:

- Understandtheconceptofdigitalmarketinganditsreal-worlditerations
- Articulateinnovative insightsofdigitalmarketingenablingacompetitive edge
- Understandhowtocreateandrundigitalmediabasedcampaigns
- Identifyandutilizevarioustoolssuchassocialmediaetc.

Module1–

- Fundamentals ofDigitalmarketing &ItsSignificance, Traditionalmarketing Vs DigitalMarketing, Evolution of Digital Marketing, Fundamentals of Social Media Marketing& its significance, NecessityofSocialmediaMarketing, BuildingaSuccessfulstrategy:GoalSetting, Implementation.
- FacebookMarketing:FacebookforBusiness,FacebookInsight,DifferenttypesofAdformats, Setting up Facebook Advertising Account
- LinkedInMarketing:ImportanceofLinkedInpresence,LinkedInStrategy,Content Strategy, LinkedIn analysis
- YouTubeAdvertising:-YouTubeChannels,YouTubeAds,TypeofVideos

Module2-

- WebsitePlanning&Development- Website, TypesofWebsites, Phasesofwebsitedevelopment, Keywords: Selection process
- Domain&WebHosting:- Domain, TypesofDomain, WheretoBuyDomain, Webhosting, Howto buy Webhosting
- Introduction to SEO, How Search engine works, SEO Phases, HistoryOf SEO, How SEO Works, What isGooglebot(GoogleCrawler),TypesOfSEOtechnique, Keywords, KeywordPlannertools

HIRACHANDNEMCHANDCOLLEGEOFCOMMERCE,SOALPUR

(AutonomousCollege)

BCANatureofQuestionPaperforChoiceBasedCreditSystem(CBCS)

Semester Pattern

ComputerScience&InformationTechnology(w.e.f.June2024)

Date:

Time:-2hrs. TotalMarks-30

Instructions:*1.AllQuestionsareCompulsory*

2. Marksareindicatedtotherightofeachquestion.

3. UseofCalculatorsisallowed

Q.1:Fillin theblanksandrewritethefollowingsentences: **(06)**

1.
2.
3.
4.
5.
6.

Q.2:Writeshort note/Shortanswer/Short problemanythreefromthe following: **(06)**

A

B

C

D

Q. 3Solvethefollowing(Longanswer/Problem) **(06)**

A

B

Q. 4Answerthe following (Anytwo) **(06)**

A

B

C

Q. 5Answerthefollowing(Anyone) **(06)**

A

B

C

HIRACHANDNEMCHANDCOLLEGEOFCOMMERCE,SOALPUR

(AutonomousCollege)

BCANatureofQuestionPaperforChoiceBased CreditSystem(CBCS)

Semester Pattern

ComputerScience&InformationTechnology(w.e.f.June2024)

Date:

Time:-2hrs. TotalMarks-60

Instructions:*1.AllQuestionsareCompulsory*

2. Marksareindicatedtotherightofeachquestion.

3. UseofCalculatorsisallowed

Q.1:A) Selectthemostappropriatealternativeandrewritethefollowingsentences: (06)

1.
2.
3.
4.
5.
6.

B)FillintheBlanks: (06)

1.
2.
3.
4.
5.
6.

Q.2:Answer*Any Six*ofthe Following: (12)

a)
b)
c)
d)
e)
f)
g)
h)
i)
j)

Q.3:A) Writeshort notesonAnyTwoofthefollowing: **(06)**

a)

b)

c)

B) **(06)**

Q.4: A)Answerthe following: **(06)**

a)

b)

B) **(06)**

Q.5:AttemptAnyThreeofthefollowing: **(12)**

1.

2.

3.

4.

HIRACHANDNEMCHANDCOLLEGEOFCOMMERCE,SOALPUR

(AutonomousCollege)

BCANatureofQuestionPaperforChoiceBasedCreditSystem(CBCS)

Semester Pattern

ComputerScience&InformationTechnology(w.e.f.June2024)

LaboratoryCourse

Date:

Time:-2hrs. TotalMarks-60

Instructions:1.Studentsneedto solveany 4questions
2.Eachquestioncarries10 marks.
3.20 marksisforviva-voce

1.
2.
3.
4.
5.