MANGALORE UNIVERSITY

State Education Policy – 2024
[SEP-2024]

CURRICULUM STRUCTURE

FOR

BACHELOR OF COMPUTER APPLICATIONS
BCA-ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

MANGALORE UNIVERSITY

Suggested programme structure for the Under Graduate Programmes

[BCA, BCA (A.I & M.L, BCA (D.A)]

Semester	Course 1	Course 2	Course 3	Elective / Optional	Course	Language	Compulsory	Total Credit	Total Working hour
I	5 (3T+2P)	5 (3T+2P)	5 T			3+3	2	23	4+4+4+4+5+4+4+2=31
II	5 (3T+2P)	5 (3T+2P)	5T			3+3	2	23	4+4+4+4+5+4+4+2=31
III	5 (3T+2P)	5 (3T+2P)	5T	2		3+3		23	4+4+4+4+5+4+4+2=31
IV	5 (3T+2P)	5 (3T+2P)	5T	2		3+3	2	25	4+4+4+4+5+2+4+4+2=33
V	8[(2x3T)+2P]	8[(2x3T)+2P]	8[(2x3T)+2P]				2	26	3+3+4+3+3+4+3+3+4+2=32
VI	3T	3T	3T		3T	Project work 12		24	3+3+3+3+24=36
								144	

Note:

- **Course1 and Course2: I to IV Semester: Theory 3 credit=4 contact hours & Practical 2 credit=4 contact hours**
- **Course3: I to IV Semester: Theory 5 credit=5 contact hours**
- **Course1, Course2 and Course3: V and VI Semester: Theory 3 credit=3 contact hours & Practical 2 credit=4 contact hours**
- **Elective/Optional: 2 credit=2 contact hours**
- **Languages: 3 credit=4 contact hours**
- **Compulsory: 2 credit=2 contact hours**

CURRICULUM STRUCTURE FOR BCA- ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Semester I								
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1		Fundamentals of Information Technology	Theory	4	80	20	100	3
2		Fundamentals of Information Technology Lab	Practical	4	40	10	50	2
3		Problem Solving using C	Theory	4	80	20	100	3
4		C Programming Lab	Practical	4	40	10	50	2
5		Computational Mathematics	Theory	5	80	20	100	5
6		Language-I	Lang	4	80	20	100	3
7		Language-II	Lang	4	80	20	100	3
8		Constitutional Values	Compulsory	3	40	10	50	2
Sub - Total				**32**	**520**	**130**	**650**	**23**
Semester II								
6		Data Structure using C	Theory	4	80	20	100	3
7		Data Structures Lab	Practical	4	40	10	50	2
8		Database Management System	Theory	4	80	20	100	3
9		Database Management	Practical	4	40	10	50	2
10		Computer Architecture	Theory	5	80	20	100	5

11		Language-I	Lang	4	80	20	100	3
12		Language-II	Lang	4	80	20	100	3
13		Environmental Studies	Compulsory	3	40	10	50	2
Sub - Total				**32**	**520**	**130**	**650**	**23**

Semester III								
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1		**Language-I**	**Lang**	**4**	**80**	**20**	**100**	**3**
2		**Language-II**	**Lang**	**4**	**80**	**20**	**100**	**3**
3	**BCA - AIML -3.1**	**Object Oriented Programming using Java**	**Core**	**4**	**80**	**20**	**100**	**3**
4	**BCA- AIML -3.2**	**Operating Systems**	**Core**	**4**	**80**	**20**	**100**	**3**
5	**BCA- AIML- 3.3**	**Computer Networks**	**Core**	**5**	**80**	**20**	**100**	**5**
6	**BCA- AIML- 3.4**	**Object Oriented Programming Lab**	**Practical**	**4**	**40**	**10**	**50**	**2**
7	**BCA- AIML-3.5**	**Operating SystemsLab**	**Practical**	**4**	**40**	**10**	**50**	**2**
8	**BCA- AIML-3.6**	**A) Digital Marketing** **B) Web Content Management System** **C) DEVOPS**	**Elective**	**2**	**40**	**10**	**50**	**2**
Sub - Total				**31**	**520**	**130**	**650**	**23**

Semester IV								
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1		**Language-I**	**Lang**	**4**	**80**	**20**	**100**	**3**
2		**Language-II**	**Lang**	**4**	**80**	**20**	**100**	**3**
3	**BCA – AIML-4.1**	**Artificial Intelligence-I**	**Core**	**4**	**80**	**20**	**100**	**3**
4	**BCA-AIML -4.2**	**Python Programming**	**Core**	**4**	**80**	**20**	**100**	**3**
5	**BCA – AIML-4.3**	**Software Engineering**	**Core**	**5**	**80**	**20**	**100**	**5**
6	**BCA-AIML-4.4**	**Artificial Intelligence-I Lab**	**Practical**	**4**	**40**	**10**	**50**	**2**
7	**BCA-AIML-4.5**	**Python Programming Lab**	**Practical**	**4**	**40**	**10**	**50**	**2**
8	**BCA – AIML-4.6**	**A) Cloud Computing** **B) Object Oriented Analysis and Design** **C) Digital Image Processing**	**Elective**	**2**	**40**	**10**	**50**	**2**
9	**BCA – AIML-4.7**	**Internet Basics**	**Compulsory**	**2**	**40**	**10**	**50**	**2**
Sub - Total				**33**	**640**	**160**	**800**	**25**

Semester V								
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BCA - AIML –5.1**	**Machine Learning Techniques**	**Core**	**3**	**80**	**20**	**100**	**3**
2	**BCA- AIML –5.2**	**Web Development**	**Core**	**3**	**80**	**20**	**100**	**3**
3	**BCA - AIML –5.3**	**Data Analytics Using R**	**Core**	**3**	**80**	**20**	**100**	**3**
4	**BCA - AIML –5.4**	**Internet Of Things**	**Core**	**3**	**80**	**20**	**100**	**3**
5	**BCA- AIML –5.5**	**Artificial Intelligence -II**	**Core**	**3**	**80**	**20**	**100**	**3**
6	**BCA- AIML –5.6**	**Natural Language Processing**	**Core**	**3**	**80**	**20**	**100**	**3**
7	**BCA- AIML –5.7**	**Web Development Lab**	**Practical**	**4**	**40**	**10**	**50**	**2**
8	**BCA- AIML –5.8**	**Data Analytics Lab**	**Practical**	**4**	**40**	**10**	**50**	**2**
9	**BCA- AIML –5.9**	**Machine Learning and IOTLab**	**Practical**	**4**	**40**	**10**	**50**	**2**
10	**BCA- AIML-5.10**	**AI Tools and Techniques**	**Compulsory**	**2**	**40**	**10**	**50**	**2**
Sub - Total				**32**	**640**	**160**	**800**	**26**

Semester VI								
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BCA-AIML -6.1**	**Artificial Neural Network**	**Core**	**3**	**80**	**20**	**100**	**3**
2	**BCA-AIML -6.2**	**Deep Learning**	**Core**	**3**	**80**	**20**	**100**	**3**
3	**BCA-AIML -6.3**	**Principles of Cyber Security**	**Core**	**3**	**80**	**20**	**100**	**3**
3	**BCA-AIML -6.4**	**Computer Vision**	**Core**	**3**	**80**	**20**	**100**	**3**
4	**BCA-AIML -6.5**	**Project Work**	**Project Work**	**24**	**300**	**100**	**400**	**12**
Sub - Total				**36**	**620**	**180**	**800**	**24**

SEMESTER - I

Program Name	**BCA-AIML**	Semester	**I**
Course Title	**Fundamentals of Information Technology(Theory)**		
Course Code:	**BCA- AIML -1.1**	No.of Credits	**03**
Contact hours	**4 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Understand the fundamentals of computer system
- Identify different components within the computer system
- Understand different types of input and output devices
- Demonstrate the working concepts of different devices connected to computer
- Explain different generations of programming languages and their significance
- Exploring MS Office Word 2007,Access 2007,Excel 2007 And Powerpoint 2007

Unit	Description	Hours
1	**Computer Basics:** Introduction, Characteristics computers, Evolution computers, Generation of computers, Classification of computers, the computer system, Application of computers. Computer Architecture: Introduction, Central processing unit-ALU, Registers, Control unit, system bus, main memory unit,	

	cache memory, communication between various units of a computer system. Components inside a computer system – System case, Power supply, Mother board, BIOS, Ports and Interfaces, Expansion card, Ribbon cable, Memory chips, Processors	**13**
2	**Computer memory and storage :** Introduction, memory representation, memory hierarchy, Random access memory, Types of RAM, Read-only memory, Types of ROM,RAM, ROM and CPU interaction. **Secondary Storage:** Types of secondary storage device - Magnetic tape, magnetic disk, Floppy disk, Hard disk, Advantages and disadvantages of magnetic disk, **Computer Software: Introduction**, categories of software, system software, Operating Systems, device drivers, language translators, System Utility, Application Software **Operating Systems:** Introduction, Functions of an operating System, Classification of Operating Systems	**13**
3	**Input devices:** Introduction, Types of input devices, Keyboard, Mouse, Introduction to Track ball, Joystick, light pen, Touch screen and track pad. Speech recognition, digital camera, webcam, flat bed scanner, **Output devices:** Types of output, Classification of output devices, Printers- Dot matrix, drum printer, Ink jet, Laser, Hydra, Plotter, Monitor- CRT, Displaying graphics on CRT, Colour display on CRT,LCD, Differences between LCD and CRT **Computer programming languages:** Introduction, Developing a program, Program development cycle, Types of programming languages, generation of programming languages, Features of a good programming language.	**13**

4	**Word processing software:** Word environment, using files and folders ,working with text, working with tables ,checking spelling and grammar, printing document **Spreadsheet software:** Excel environment, formatting and Copying formulas, working with rows and columns, additional features and charting **Presentation software:** Introduction, PowerPoint environment, creating a new presentation, working with different views, using masters, adding animation, adding transition. **Microsoft Access:** Access environment, Database objects.	**13**

Text Book:

1. ITL Education Solution Limited, Introduction to Information Technology, Pearson- Second Edition.

Reference Books:

1. A K SHARMA, Computer Fundamentals and Programming in C, Universities Press, 2nd edition, 2018
2. Peter Norton, Introduction to Computers, 7th edition, Tata McGraw Hill Publication, 2011
3. Anita Goel, Computer Fundamentals, Pearson Education, 2011.

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Program Name	**BCA -AIML**	Semester	**I**
Course Title	**Problem Solving using C(Theory)**		
Course Code:	**BCA –AIML- 1.2**	No.of Credits	**03**
Contact hours	**4 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Confidently operate Desktop Computers to carry out computational tasks
- Understand working of Hardware and Software and the importance of operating systems
- Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts
- Read, understand and trace the execution of programs written in C language
- Write the C code for a given problem
- Perform input and output operations using programs in C
- Write programs that perform operations on arrays

Unit	Description	Hours
1	**Computer Programming and Languages –** Introduction, Algorithm, Flowchart, Program Control Structures, Programming Paradigms, Programming Languages. **Introduction to C**: Overview of C Program, Importance of C Program, Basic structure of a C-program, Programming style, Execution of C Program. **Constants, Variables & Data types**: Character set, C token, Keywords & identifiers, Constants, Variables, data types, Declaration of variables, Declaration of storage class, Assigning values to variables, defining symbolic constants.	**13**

2	**Operators and Expression**: Arithmetic, Relational, logical, assignment, increment & decrement, conditional, bit wise & special operators, Arithmetic expressions, Evaluation of expressions, Precedence of arithmetic operators, type conversions in expressions, operator precedence andassociativity, built in mathematical functions. **Managing Input and Output operations**: Reading a character, Writing a Character, formatted input-inputting integer numbers, inputting real numbers, inputting character strings, reading mixed-data types, formatted output-output of integer numbers, output of real numbers, printing of mixed data types. **Decision Making and Branching**: Decision making with if statement, simple if statement, the if else statement, nesting of if … else statements, the else if ladder, the switch statement, the?: operator, the go to statement.	**13**
3	**Decision making and looping**: The while statement, the do statement, for statement, jumps in loops **Arrays**: Introduction,one dimensional arrays, declaration and initialization of one dimensional arrays, two dimensional arrays, initializing two dimensional arrays. **Handling of Strings**: Declaring & initializing string variables, reading strings from terminal, writing strings to screen, Arithmetic operations on characters, Putting strings together, Comparison of two strings, String Handling functions,table of strings. **User defined functions**: Need for user defined functions, Declaring, defining and calling functions return values and their types, Function calls, Function declaration, Categories of functions: With/without arguments, with/without return values. Recursive functions. The scope, visibility and lifetime of variables.	**13**
4	**Structures and union**: Defining a structure, Declaring structure variables, structure initialization, copying and comparing structure variables, operations on individual members, arrays of structures, arrays within structures, Unions. **Pointers**: Understanding pointers, initialization of pointer variables, accessing a variable through its pointer, chain of pointers, pointer expressions, pointer increments and scale	**13**

	factor, pointers and arrays. **File Management**- Defining and Opening a file, closing a file, Input/Output operations on files, Error handling during I/O operations	

Text Books:

1. Introduction to Information Technology ITL education solution Ltd, Second Edition
2. E Balagurusamy, Programming in ANSI C, 7th Edition, Tata McGraw Hill.

Reference Books:

1. Deitel, P., & Deitel, H. (2012). **C How to Program** (7th ed.). Prentice Hall.
2. Kanetkar, Y. (2016). **Let Us C** (15th ed.). BPB Publications.
3. Kernighan, B. W., & Ritchie, D. M. (1988). **The C Programming Language** (2nd ed.). Prentice Hall.
4. Schildt, H. (2017). **C: The Complete Reference** (4th ed.). McGraw Hill Education.
5. Kochan, S. G. (2014). **Programming in C** (4th ed.). Addison-Wesley.
6. K.R. Venugopal, Sudeep R Prasad, **Programming with C**, 4th Edition, Tata McGraw-Hill Education.

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Program Name	**BCA -AIML**	Semester	**I**
Course Title	**Computational Mathematics(Theory)**		
Course Code:	**BCA –AIML- 1.3**	No.of Credits	**05**
Contact hours	**5 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Study and solve problems related to connectives, predicates and quantifiers under different situations.
- Develop basic knowledge of matrices and to solve equations using Cramer's rule.
- Know the concept of Eigen values.
- To develop the knowledge about derivatives and know various applications of differentiation.
- Understand the basic concepts of Mathematical reasoning, set and functions

Unit	Description	Hours
1	**Logarithms**: Introduction, Definition, Laws of operations, change of base. **Binomial theorems**: Introduction, Binomial theorem, Position of terms. **Analytical geometry**: Introduction, directed line, midpoint, distance between two points, Section formula, external division, coordinates of a centroid, Area of a triangle. **The straight line**: slope of a straight line, different forms of equations of the straight line. **Circle**: The equation of a circle, different forms of circles, General equation of the circle, equation of tangent and normal to	**15**

	the circle.	
2	**Matrix Algebra**: Definition, types of matrices, algebra of matrices – addition of matrices, subtraction of matrices, multiplication of matrices, determinant of a matrix, Adjoint of a matrix, orthogonal and unitary matrix, rank of a matrix, echelon form of a matrix, normal form of a matrix, equivalence of matrices. Inverse of matrix. **Solutions of Linear equations**: Matrix method, Cramer's rule. **Arithmetic progression**: Definition, formula for nth term, sum to n terms, Arithmetic mean, problems. **Geometric progression**: Definition, formula for nth term, sum to n terms, geometric mean, problems.	**15**
3	**Mathematical logic**: Introduction, statements, Connectives, negation, conjunction, disjunction, statement formulas and truth tables, conditional and bi Conditional statements, tautology, contradiction, equivalence of formulas, duality law, Predicates and Quantifiers, arguments, Joint Daniel. **Sets**: Definition, notation, inclusion and equality of sets, the power set, Operations on sets, Venn diagram, ordered pairs, and n-tuples, Cartesian product. **Relations**: Introduction, properties of a binary relation in a set, Relation matrix and graph of a relation, equivalence relations, compatibility relations, composition of Binary relation. **Functions**: Definition and introduction, types of functions, composition of functions, inverse functions.	**15**
4	**Counting**: Basics of counting, Pigeonhole principle, Permutation and combination, Generalized. **Permutations and Combinations**: Generating permutation and combination, inclusion and exclusion. **Graphs**: Graphs and Graph models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Colouring.	**15**

	Trees: Directed tree, leaf node, branch node, ordered tree, degree of a node, forest, descendent, m-ary tree, conversion of directed tree into a binary tree **Applications of Discrete Mathematics in Modelling Computation:** Language and Grammars – Introduction, Phrase-Structured, Types, Derivation Trees; Finite State Machines with Output – Introduction, Finite State Machines, Types; Finite State Machines without Output - Introduction, Set of Strings, Finite State Automata, Language Recognition by FSM; Language Recognition – Introduction; Turing Machine – Introduction, Definition	

Text Books:

1. D C Sancheti and V K Kapoor, Business Mathematics, Sultan Chand & Sons, 2011
2. P R Vittal, Business Mathematics and Statistics, Margham Publications, Chennai.
3. J P Trembley and R Manohar, Discrete Mathematical Structures, McGraw Hill Education Private Limited, New Delhi.
4. Kenneth H Rosen, Discrete Mathematics and Its Applications., Seventh edition, 2012
5. C. L. Liu, D. P, Mohapatra, Elements of Discrete Mathematics, 4th Edition McGraw Hill Education Private Limited, New Delhi.

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Program Name	**BCA -AIML**	Semester	**I**
Course Title	**Fundamentals of Information Technology Lab**		
Course Code:	**BCA –AIML-1.4**	No.of Credits	**02**
Contact hours	**4 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

PART-A: MS WORD

1. Prepare a document using different formatting tools

Highlights of the National Education Policy (NEP) 2020

Note4Students

From UPSC perspective, the following things are important :

Prelims level : National Education Policy

Mains level : Need for imbibing competitiveness in Indian education system

New Policy aims for **universalization of education** from pre-school to secondary level with 100 % Gross Enrolment Ratio (GER) in school education by 2030. NEP 2020 will bring 2 crores out of school children back into the mainstream through the open schooling system.

- *The current 10+2 system to be replaced by a **new 5+3+3+4 curricular structure** corresponding to ages 3-8, 8-11, 11-14, and 14-18 years respectively.* **This will bring the hitherto uncovered age group of 3-6 years under the school curriculum, which has been recognized globally as the crucial stage for the development of mental faculties of a child.**
- The new system will have 12 years of schooling with three years of Anganwadi/ pre-schooling.
  - Emphasis on Foundational Literacy and Numeracy, no rigid separation between academic streams, extracurricular, vocational streams in schools; Vocational Education to start from Class 6 with Internships
  - Teaching up to at least Grade 5 to be in mother tongue/ regional language. No language will be imposed on any student.
- Assessment reforms with **360° Holistic Progress Card**, tracking Student Progress for achieving Learning Outcomes
- A new and comprehensive National Curriculum Framework for Teacher Education, NCFTE 2021, will be formulated by the NCTE in consultation with NCERT.
- By 2030, the minimum degree qualification for teaching will be a 4-year integrated B.Ed. degree.
- Gross Enrolment Ratio in higher education to be raised to **50% by 2035; 3.5 crore seats to be added in higher education.**
- The policy envisages broad-based, multi-disciplinary, holistic Under Graduate Program with flexible curricula, creative combinations of subjects, integration of vocational education and multiple entries and exit points with appropriate certification.
- **Academic Bank of Credits to be established to facilitate Transfer of Credits**

Multidisciplinary Education and Research Universities (MERUs), at par with IITs, IIMs, to be set up as models of best multidisciplinary education of global standards in the country.

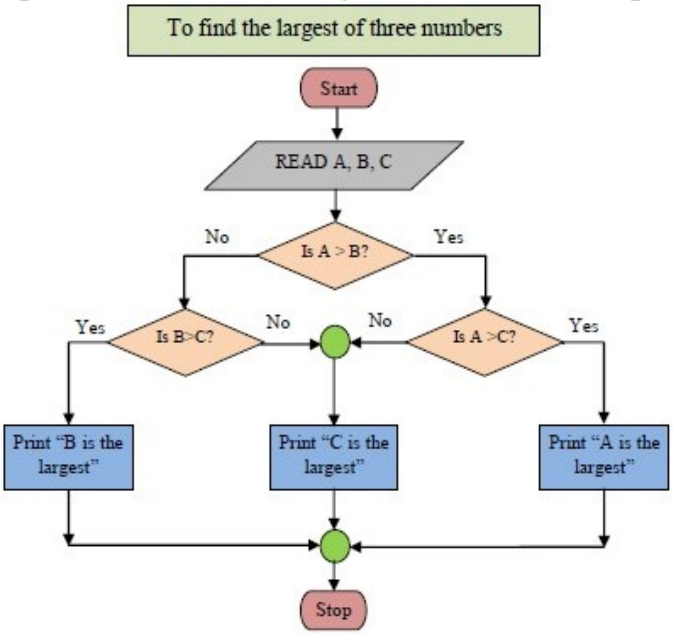
Affiliation of colleges is to be **phased out in 15 years** and a stage-wise mechanism is to be established for granting graded autonomy to colleges.

Over a period of time, it is envisaged that every college would develop into either an Autonomous degree-granting College or a constituent college of a university.

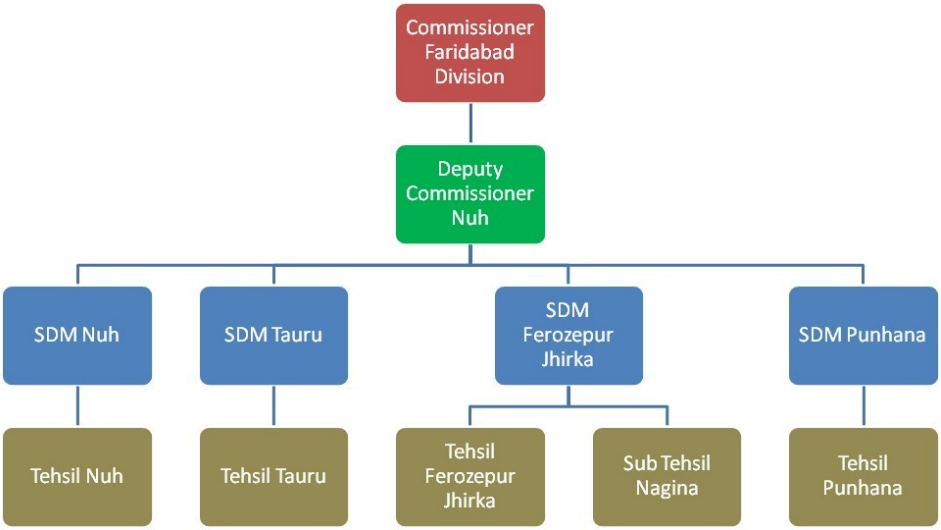
$$\frac{df}{dt} = \lim_{h \to 0} \frac{f(t+h) - f(t)}{h}$$

$$(a+b)^2 = a^2 + 2ab + b^2$$
$$(a-b)^2 = (a+b)^2 - 4ab$$
$$a^2 + b^2 = (a-b)^2 + 2ab$$

2. Prepare a document using SmartArt and Shapes tools



Organization Chart – Administration Faridabad Division



3. Prepare a document with table to store sales details of a company for different quarters and calculate total, average and find maximum, minimum sales value.

Branch Code	Branch	Sales in Quarters				Total	Avg
		1	2	3	4		
A101	Mangalore	354690	244610	383290	413670		
A102	Udupi						
Total (Across Branches)							
Average (Across Branches)							
Highest Sales (Across Branches)							
Lowest Sales (Across Branches)							

TIME TABLE

Class : I BCA						Room No. 206	
Day	**I**	**II**	**III**	**IV**		**V**	**VI**
Monday					LUNCH BREAK		
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday						***	

4. Prepare interview call letters for five candidates describing about the company and instructions about the interview. Use Mail merge feature

Interview call Letter Format

Date:
[Name of the candidate]
[Address]

Dear [name of the candidate]

This is to the reference of your application for the job [name of the job] indicating interest in seeking employment in our organisation. We thank you for the same.

We would like to inform you that your profile is being shortlisted for the job role and is best suited for it. Therefore, we would like to take a face to face interview with you on [date of interview] at [venue details].

We hope that the venue is suitable for you. If not please get in touch with us, so that we can arrange the date and venue according to your availability.

The company will reimburse you all the expenses incurred by you for this interview. This letter has an attachment in which you need to fill the details and carry it along on the date of interview. Please carry your CV also along with you.

Kindly confirm your availability for the date and venue. If there are any changes to be done, please contact us at phone number: [999xxxx999] and email id: abcnd@mail.com.

We look forward to seeing you.

Regards,
Name of the Manager
Designation Name
Company name

PART-B: MS POWERPOINT

1. Create a presentation (minimum 5 slides) about your college. It should contain images, chart, Bulleted text… The slides should be displayed automatically in a loop.

2. A simple quiz program. Use hyperlinks to move to another slide in the presentation to display the result and correct answer/wrong answer status. Use at least four questions.

[**Navigation must be done by hyperlink**]

3. Create a presentation for a business proposal (minimum 5 slides).
   - Slides must include company logo in header
   - A title slide with table of contents
   - financial data of the company in the table
   - Company sales and profit in charts
   - Make use of animation and transition

4. Create a presentation for a college project (minimum 5 slides).
   - Master slide
   - Add comments for each slide
   - Add Audio and video to the slide
   - Add header and footer.
   - Add source citation
   - Make use of animation and transition

[Presentation must include title slide, Module Design, Chart, references]

PART-C: MS EXCEL

(Note: Give proper titles, column headings for the worksheet. Insert 10 records for each exercise in such a way to get the result for all the conditions. Format the numbers appropriately wherever needed).

1. Create a worksheet to maintain student information such *as RollNo, Name, Class, Marks in three subjects* of 10 students. Calculate total marks, average and grade. Find grade for Distinction, First class, Second class, Pass and Fail using normally used conditions.

• Using custom sort, sort the data according to class: - Distinction first, First Class next, and so on. Within each class, average marks should be in descending order.

• Also draw the Column Chart showing the RollNo versus Average scored.

(Note: Worksheet creation and formatting 2 marks, calculations: 3 marks, sorting: 2 marks, chart: 3 marks)

2. Prepare a worksheet to store details of electricity consumed by customers. Details are Customer No, Customer Name, Meter No, Previous meter reading, Current meter reading of 10 customers. Calculate total number of units consumed and total amount to be paid by each consumer using following conditions:

• If unit consumed is up to 30, charge is 100.

• 31 to 100 units, 4.70 per unit

• 101 to 200 units, 6.25 per unit

• Above 200 units, 7.30 per unit.

• Use Data validation to see that current reading is more than previous reading.

• Arrange the records in the alphabetic order of names.

• Filter the records whose bill amount is more than Rs.1500.

(Note: Worksheet creation and formatting 2 marks, Data validation: 2 marks, calculations: 2 marks, sorting: 2 marks, filtering: 2 marks)

3. Create Employee worksheet having EmpNo, EmpName, DOJ, Department, Designation and Basic Pay of 8 employees. Calculate DA, HRA, Gross Pay, Profession Tax, Net Pay, Provident Fund as per the rule:

• DA = 30% of basic pay

• HRA = 10% of basic pay if basic pay is less than 25000, 15% of basic pay otherwise.

• Gross =DA +HRA+ Basic pay

• Provident fund =12% of Basic pay or Rs.2000, whichever is less.

• Profession Tax= Rs.100 if Gross pay is less than 10000, Rs.200 otherwise.

• NetPay = Gross - (Professional tax + Provident Fund)

• Using Pivot table, display the number of employees in each department and represent it using Pie chart.

(Note: Worksheet creation and formatting 2 marks, calculations: 3 marks, Pivot table: 3 marks, Chart: 2 marks)

4. Create a table COMMISSION containing the percentage of commission to be given to salesmen in different zones as follows:

Zone	Percentage
South	10
North	12.5
East	14
West	13

Create another table SALES in the same worksheet to store salesman name, zone name, place, name of the item sold, rate per unit, quantity sold. Calculate total sales amount of each salesman. Referring the COMMISSION table, write the formula to compute the commission to be given. (Hint: Use if function and absolute cell addresses)

Using advanced filtering show the result in other parts of the worksheet.
• Show the records of various zones separately.
• Show the records of only East and West zones.
• Display the details of the items sold more than 50, in South or North zones.

(Note: Worksheet creation and formatting: 2 marks, calculations: 2 marks, filtering: 6 marks)

PART-D: MS ACCESS

1. Create Employee database and table Emp using MS ACCESS with following Structure

Emp no	Ename	Designation	Dep tno	DOJ	Basic Salary
101	RAMESH	MANAGER	10	10/10/2000	25000
102	SMITHA	CLERK	12	12/5/1999	15000
103	DEVIKA	ATTENDER	10	11/9/2001	12000
104	RAJESH	HR	15	15/4/2000	12000
105	GIRISH	SUPERVISOR	12	6/11/2005	18000
106	SATHYA	DRIVER	16	11/9/2001	11000
107	MANOJ	SWEEPER	10	22/6/2006	8000
108	BHOOMIKA	SECURITY	15	12/5/1999	10500
109	KIRAN	CLERK	14	11/9/2001	15000
110	PRATHIKSHA	SUPERVISOR	10	8/8/2005	18000

Perform following operation

a) List all the Employees Who are working in Dept no.10
b) List all the Employees who get less than 20000 Salary
c) Update Salary by adding the increments as per the following:-
   i. 10% Increment in Basic Salary who get < 20000
   ii. 5% Increment in Basic Salary who get >=20000.

2. Create the " Order" database and a table "Orderdtl" having following records:

Order No	Order Date	Order Item	Order Qty	Order Price	Client Code	Delivery Type	Order Status
1011	12/02/2015	LED Monitors	100	750000	1025	Road	Delivered
1012	12/03/2015	CPU	12	500000	1026	SHIP	Not Delivered
1005	15/02/2014	Keyboard	80	48000	1027	Road	Delivered
1010	02/02/2016	LED Monitors	30	64000	1028	Flight	Delivered
1016	19/4/2015	Scanner	40	35000	1029	Road	Delivered
1009	9/05/2018	LED Monitors	25	125000	1030	Flight	Not Delivered
1008	13/8/2017	CPU	25	450000	1031	SHIP	Delivered
1014	1/7/2018	Printer	50	90000	1032	Road	Not Delivered

Execute following Query

a. Display all the Order No. which have not been yet Delivered.
b. Display all the Orders of LED Monitor and CPU.

c. Display all the Orders of LED Monitor and CPU which are not have been delivered yet.

3. Create a "Stock" database having "Inventory" table:

Item Code	Item Name	Opening Stock(Qty)	Purchase(Qty)	Sale (Qty)	Closing Stock(Qty)	Remark
101	MONITOR	100	25	35		
102	PRINTER	75	40	15		
103	SCANNER	120	30	20		
104	CPU	50	35	10		
105	KEYBOARD	105	45	55		

Perform the followings:

a) Calculate the closing stock of each item (Closing Stock = Opening Stock + Purchase – Sales)
b) Display all the Items which has closing stock < 100
c) If closing stock is less than 100 then set the remark as "Re-Order Level" otherwise "Enough Stock".

4. Create a "Company" database having "Sales" table with fields saleid, quarter, product, no_of_sales.

Perform the followings:

a. Design a form to insert records to Sales table
b. Generate a report to display Sales details of product based on quarters.

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**MS WORD**	**8Marks**
Program-2	**MS POWERPOINT**	**7 Marks**
Program-3	**MS EXCEL**	**10**
Program-4	**MS ACCESS**	**10**

Practical Record	**05 Marks**
Total	**40 Marks**

Program Name	**BCA-AIML**	Semester	**I**
Course Title	**C Programming Lab**		
Course Code:	**BCA-AIML-1.5**	No.of Credits	**02**
Contact hours	**4 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

PART – A

1. Program to find the roots of quadratic equation using else if ladder.
2. Program to read two integer values & a operator as character and perform basic arithmetic operations on them using switch case (+, -, *, / operations)
3. Program to reverse a number and find the sum of individual digits. Also check for palindrome.
4. Program to calculate and display the first ‘n’ Fibonacci numbers
5. Program to find given number is a prime or not.
6. Program to count occurrences of each character in a given string.
7. Program to read string with alphabets, digits and special characters and convert upper case letters to lower case and vice a versa and retain the digits and special characters as it is.
8. Program to search for number of occurrences of number in a list of numbers using one-dimensional array also display its positions.

PART-B

1. Program to find the largest and smallest elements with their position in a one-dimensional array.

2. Program to read ‘n’ integer values into a single dimension array and arrange them in ascending order using bubble sort method.
3. Menu driven Program to perform addition and multiplication of two Matrices
4. Program to find nCr and nPr using recursive function to calculate factorial.
5. Program to read a string and count number of letters, digits, vowels, consonants, spaces and special characters present in it using user defined function
6. Program sort a list of strings in ascending order using Pointers
7. Program to enter the information of a student like name, register number, marks in three subjects into a structure and display total, average and grade Display details in a neat form
8. Write a menu driven program to
    a. Create a text file
    b. Append the contents of a text file to another existing file by accepting filenames
    c. Display the content of entered filename
    d. Exit

    Create two text files during the execution of the program. Display their contents. Perform Appending. Display the contents again. Always check for the existence of the inputted file names.

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**PART-A** **Writing:7 Marks Execution:8Marks**	**15Marks**
Program-2	**PART-B** **Writing:10 Marks Execution:10 Marks**	**20 Marks**
Practical Record		**05 Marks**
Total		**40 Marks**

SEMESTER- II

Program Name	**BCA-AIML**	Semester	**II**
Course Title	**Data Structure using C(Theory)**		
Course Code:	**BCA-AIML-2.1**	No.of Credits	**03**
Contact hours	**4 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
- Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs
- Write programs that use arrays, linked structures, stacks, queues, trees, and graphs
- Demonstrate different methods for traversing trees
- Compare alternative implementations of data structures with respect to performance
- Describe the concept of recursion, give examples of its use
- Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing

Unit	Description	Hours

1	**Introduction andOverview:**Definition, Elementary dataorganization,Data Structures,DataStructuresoperations, Abstractdatatypes, algorithmscomplexity, timespacetradeoff.Preliminaries:Mathematical notations andfunctions,Algorithmicnotations,controlstructures,Arrays:Definitio n,Linear arrays, , Representation of Linear Arrays in Memory, Traversing Linear arrays, Insertinganddeleting,Multi-dimensionalarrays,MatricesandSparsematrices. **Fundamentals of Algorithmic problem Solving:** Important Problem Type Fundamentals of Data Structures, Fundamentals of the Analysis of Algorithm Efficiency, Analysis Framework, Measuring the input size, Units for measuring Running time, Orders of Growth, Worst-case, Best-case and Average- case efficiencies. **Asymptotic Notations and Basic:** Efficiency classes, Informal Introduction, O-notation, Ω-notation, θ-notation	**13**
2	**Linked list:** Definition, Representation of Singly Linked List in memory, traversing a Singly linked list, searching in a Singly linked list, Memory allocation, Garbage collection, Insertion into a singly linked list, Deletion from a singly linked list; Doubly linked list, Header linked list, Circular linked list. **Stacks:**Definition, Array representation of stacks, linked representation of stacks, Arithmetic Expressions: Polish Notation, Conversion of infix expression to postfix expression, Evaluation of Postfixexpression,Applications ofStacks,Recursion,TowersofHanoi,Implementationofrecursiveproced ures by stack. **Queues:** Definition, Array representation of queue, Linked list representation ofqueues. Typesofqueue:Simplequeue,Circular queue,Double-endedqueue,Priorityqueue,Operationson Queues, Applications of queues.	**13**
3	**Binary Trees:** Definitions, Tree Search, Traversal of Binary Tree, Tree Sort, Building a Binary Search Tree, Contiguous Representation of Binary Trees: Heaps, Lexicographic Search Trees: Tries, External Searching: B-Trees, Applications of Trees.	**13**

	Graphs: Mathematical Background,ComputerRepresentation,Graph Traversal,Topological Sorting	
4	**Searching:** Introduction and Notation, Sequential Search, Binary Search, Comparison of Methods. Sorting: Introduction and Notation, Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer, Merge sort for Linked List, Quick sort for Contiguous List. **Hashing:** Sparse Tables, Choosing a Hash function,CollisionResolutionwithOpen Addressing, CollisionResolution by Chaining.	**13**

Text Books:

1. SeymourLipschutz,"DataStructureswithC",Schaum'soutLines,TataMcGrawHill, 2011.
2. Anany Levitin: "Introduction to The Design & Analysis of Algorithms"

Reference Books:

1. Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures, Computer Science Press, 1982.
2. Aaron M. Tenenbaum , Data structures using C, First Edition, Pearson Education
3. Kamathane, Introduction to Data structures, Pearson Education , 2004
4. Y. Kanitkar, Data Structures Using C, Third Edition, BPB
5. Padma Reddy: Data Structure Using C, Revised Edition 2003, Sai Ram Publications.
6. Sudipa Mukherjee, Data Structures using C – 1000 Problems and Solutions, McGraw Hill Education, 2007

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Program Name	**BCA-AIML**	Semester	**II**
Course Title	**Database Management System(Theory)**		
Course Code:	**BCA-AIML-2.2**	No.of Credits	**03**
Contact hours	**4 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Demonstrate an understanding of the basic concepts of database systems.
- Design a relational database using ER modelling and normalization techniques.
- Write complex SQL queries to retrieve and manipulate data from databases.
- Develop PL/SQL programs to implement business logic in databases.
- Explain the concepts of transaction management, concurrency control, and database recovery.

Unit	Description	Hours
1	**Database and Database Users**: DBMS Definition, Characteristics of the Database Approach, Advantages of Using a DBMS **Database System concepts and architecture**: Data Models, Schemas, and Instances, Three-schema architecture and Data	

	Independence, Database Languages and Interfaces, The Database System Environment, Classification of Database Management Systems. **Data Modeling Using the Entity-Relationship Model**: High-Level Conceptual Data Models for Database Design, An example database application, Entity Types, Entity Sets, Attributes and Keys, Relationships, Relationship Types, sets, roles, and Structural Constraints, Weak Entity Types, ER Diagrams.	**13**
2	**Relational Data Model, Relational Constraints**: Relational Model Concepts, Relational model Constraints and Relational Database Schemas, Update Operations, transactions and Dealing with Constraint Violations. **Disk Storage, basic file structures and Hashing:** Secondary storage devices, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records (Heap Files), Files of Ordered Records (Sorted Files), Hashing Techniques **Functional dependencies and Normalization for Relational databases:**Functional dependencies, Normal Forms based on primary keys, General definitions of second and third normal forms, Boyce-Codd Normal form.	**13**
3	**Interactive SQL**: Table fundaments, oracle data types, CREATE TABLE command, inserting data into table, Viewing Data in the table, sorting data in a table, creating a table from a table, insertingdata into a table from another table, Delete operations, Updating the contents of a table, Modifying the structure of tables, Renaming tables, destroying tables, displaying table structure. **Data Constraints**: Types of data constraints, IO constraints- The PRIMARY KEY constraint, The FOREIGN KEY constraint, The UNIQUE KEY constraint, Business Rule Constraints- NULL value concepts, NOT NULL constraints, CHECK constraint, DEFAULT VALUE concepts. **Computations on table data**: Arithmetic Operators, Logical Operators, Range Searching, Pattern Matching, Oracle Table – DUAL, Oracle Function- Types, Aggregate Function, Date Conversion Function. GROUPING DATA FROM TABLES IN SQL, Group By clause, Having clause, subqueries, JOINS, Using the UNION, INTERSECTION, MINUS clause	**13**

	SQL transaction commands COMMIT, ROLLBACK and SAVEPOINT. Security Management using SQL- Granting and Revoking Permissions	
4	**INTRODUCTION TO PL/SQL**: Advantages of PL/SQL, The Generic PL/SQL Block, PL/SQL-The character set, Literals, PL/SQL datatypes, variables, Logical comparisons, Displaying User Messages on The VDU Screen, comments. Control Structure - Conditional Control, Iterative Control **PL/SQL Transactions**: Cursor-Types of Cursor, Cursor Attributes. Explicit cursor ,Explicit cursor Management, cursor for loop PL/SQL **Database Objects**: Procedures and Functions, Oracle Packages, Error Handling in PL/SQL, Triggers	**13**

Text Books:

1. RamezElmasri and ShamkanthB.Navate, Fundamentals of Database Systems, 7th Edition, Pearson Education
2. Ivan Bayross, SQL/PL/SQL- the Programming language of Oracle, 2nd Revised edition (or 4th revised Ed), BPB Publications

Reference Books:

1. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.
2. Introduction to Database System, C J Date, Pearson, 1999.
3. Database Systems Concepts, Abraham Silberschatz, Henry Korth, S.Sudarshan, 6th Edition, McGraw Hill, 2010.
4. Database Management Systems, Raghu Rama Krishnan and Johannes Gehrke, 3rd Edition, McGraw Hill, 2002

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Program Name	**BCA-AIML**	Semester	**II**
Course Title	**Computer Architecture(Theory)**		
Course Code:	**BCA-AIML-2.3**	No.of Credits	**05**
Contact hours	**5 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Use number systems and complements
- Identify the importance of canonical forms in the minimization or other optimization of Boolean formulas in general and digital circuits.
- Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh map or Tabulation method).
- Analyze the design procedures of Combinational and Sequential circuits.
- Design the finite state machine using algorithmic state machine charts and perform simple projects with a few flip-flops.

Unit	Description	Hours
1	**Digital computers and Digital system**: Introduction to Number system, Decimal number, Binary number, Octal and Hexadecimal numbers, Number base conversion, Complements, Binary codes, Binary arithmetic's, Addition , Subtraction in the 1's and 2's complements system, Subtraction in the 9's and 10's complement system. Boolean Algebra: Basic definitions, Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Venn diagram.	**15**

2	**Digital logical gate**: Boolean functions, Canonical and Standard forms, other logic operations, Digital logic gates, Universal gate. Simplification of Boolean function: The map method, Two and three variable maps, Four-variable maps, Don't care conditions, Product of sum Simplification, NAND implementation, NOR implementation. Implementation of EX-OR,EX-NOR using NAND and NOR gate	**15**
3	**Combinational Logic**: Introduction, Design Procedure, Half adder, Full adder, half Subtractor, Full Subtractor, Binary parallel adder, BCD adder. Combinational logic with MSI and LSI: Code converter, Exclusive-OR and Equivalence functions. Magnitude comparator, Decoders, Encoders, Multiplexers, Demultiplexers	**15**
4	**Sequential Logic**: Introduction, Flip flops,RS-FF ,D-FF, T-FF, and JK-FF,Triggering of flip-flops, Master slave Flip flop, state table, and State diagram. State equations, Flip Flop excitation tables, Sequential circuits design. Registers, Counters: Synchronous Counter Design using RS, JK, D & T flip flops. Ripple counters Introduction, Registers, Shift registers, Timing sequences, Bidirectional shift register.	**15**

Text Book:

1. M.Morris Mano,Digital Logic and Computer design, PHI, 2015

Reference Books:

1. Thomas L Floyd, Digital Fundamentals, 10th Edition, Pearson, 2011.
2. Thomas. C. Bartee, Digital Computer Fundamentals, 6th edition, TMH.

Pedagogy: Lecture / PPT/ Videos / Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Program Name	**BCA-AIML**	Semester	**II**
Course Title	**Data StructuresLab**		
Course Code:	**BCA-AIML-2.4**	No.of Credits	**02**
Contact hours	**4 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

PART-A

1. Program to sort the given list using selection sort technique.
2. Program to sort the given list using insertion sort technique
3. Program to solve Tower of Hanoi using Recursion
4. Program to reverse String using Stack
5. Program to search an element using recursive binary search technique.
6. Program to implement Stack operations using arrays.
7. Program to implement Queue operations using arrays.
8. Program to implement dynamic array. Find smallest and largest element.

PART-B

1. Program to sort the given list using merge sort technique.
2. Program to implement circular queue using array.
3. Program to sort the given list using quick sort technique.
4. Program to implement Stack operations using linked list.
5. Program to implement Queue operations using linked list.
6. Program to evaluate postfix expression.
7. Program to perform insert node at the end, delete a given node and display contents of single linked list.
8. Menu driven program for the following operations on Binary Search Tree(BST) of Integers

(a) Create a BST of N Integers
(b) Traverse the BST in Inorder, Preorder and Post Order.

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**PART-A** **Writing:5 Marks Execution:3Marks**	**15 Marks**
Program-2	**PART-B** **Writing:8 Marks Execution:4Marks**	**20 Marks**
Practical Record		**05 Marks**
Total		**40Marks**

Program Name	**BCA-AIML**	Semester	**II**
Course Title	**Database Management System Lab**		
Course Code:	**BCA-AIML-2.5**	No.of Credits	**02**
Contact hours	**4 Hours per Week**	Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

PART-A

1. Create a table EMPLOYEE using SQL command to store details of employees such as EMPNO, NAME, DESIGNATION, DEPARTMENT, GENDER and SALARY. Specify Primary Key and NOT NULL constraints on the table. Allow only 'M' or 'F' for the column GENDER. DEPARTMENT can be SALES, ACCOUNTS, IT. Choose DESIGNATION as CLERK, ANALYST, MANAGER, ACCOUNTANT and SUPERVISOR that depends on department

   Write the following SQL queries:

   a) Display EMPNO, NAME and DESIGNATION of all employees whose name ends with RAJ.
   b) Display the details of all female employees who is earning salary within the range 20000 to 40000 in SALES or IT departments.
   c) List the different DEPARTMENTs with the DESIGNATIONs in that department.
   d) Display the department name, total, average, maximum, minimum salary of the DEPARTMENT only if the total salary given in that department is more than 30000.
   e) List the departments which have more than 2 employees.

2. Create a table CLIENT to store CLIENT_NO, NAME, ADDRESS, STATE, BAL_DUE. Client no must start with 'C'. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table. Insert 10 records.

   Write the following SQL queries:

   a) From the table CLIENT, create a new table CLIENT1 that contains only CLIENT_NO and NAME , BAL_DUE from specified STATE. Accept the state during run time.
   b) Create a new table CLIENT2 that has the same structure as CLIENT but with no records. Display the structure and records.
   c) Add a new column by name PENALTY number (10, 2) to the CLIENT.
   d) Assign Penalty as 10% of BAL_DUE for the clients C1002, C1005, C1009 and for others 8%. Display Records.
   e) Change the name of CLIENT1 as NEW_CLIENT.
   f) Delete the table CLIENT2.

3. Create a table BOOK using SQL command to store Accession No, TITLE, AUTHOR, PUBLISHER, YEAR, PRICE. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table. Insert 10 records.

   Write the following SQL queries:

   a) List the details of publishers having 'a' as the second character in their names.
   b) Display Accession No., TITLE, PUBLISHER and YEAR of the books published by the specified author before 2010 in the descending order of YEAR. Accept author during run time.
   c) Modify the size of TITLE to increase the size 5 characters more.
   d) Display the details of all books other than Microsoft press publishers.
   e) Remove the records of the books published before 1990.

4. Create a table SALES with columns SNO, SNAME, MANAGER_NAME, JOIN_DATE, DATE_BIRTH, SALARY,SALES_AMOUNT and COMMISSION. Minimum age for joining the company must be 18 Yrs. Default value for Commission should be 0. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table. Insert 10 records with data except commission.Manager of Manager can be NULL.

   Write the following SQL queries:

a) Display the details of Sales Persons whose salary is more than Average salary in the company.
b) Update commission as 20% of Sales Amount.
c) Display SNO, SNAME, MANAGER_NAME, SALARY, COMMISSION, MANAGER_SALARY of the sales persons getting sum of salary and commission more than salary of manager.(Self join)
d) Display the records of employees who finished the service of 10years.

5. Create a table Sales_Details with the columns SNO, MONTH, TARGET and QTY_SOLD to store the Sales Details of one year. Specify the composite primary key to the columns SNO and MONTH. TARGET and SALES must be positive numbers.

   Write the following SQL queries:

   a. Display the total sales by each sales person considering only those months sales where target was reached.

   b. If a commission of RS.50 provided for each item after reaching target, calculate and display the total commission for each sales person.

   c. Display the SNO of those who never reached the target.

   d. Display the SNO, MONTH and QTY_SOLD of the sales persons with SNO S0001 or S0003

6. Create a table Bank with the columns ACNO, ACT_NAME, ACT_TYPE and BAL. Specify the Primary Key. Initial BAL must be greater than 500.

   Write a PL/SQL program to perform debit operation by providing acct_no and amount required. The amount must be greater than 100 and less than 20000 for one transaction. If the account exist and BAL-amount>100 Bank table must be updated, otherwise "NO SUFFFICIENT BALANCE" message should be displayed. If account number is not present then display "NO SUCH ACCOUNT" message to the user.

7. Create a table STOCK_DETAIL with the columns PNO, PNAME and QTY_AVL to store stock details of computer accessories. Specify Primary Key and NOT NULL constraints on the table. QTY_AVL should be positive number.

   Write a PL/SQL Program to define a user defined exception named "LOW_STOCK" to validate the transaction. The program facilitates the user to purchase the product by providing product number and quantity required. It should display an error message "NO SUFFICIENT STOCK" when the user tries to purchase a product with quantity

more than QTY_AVL, Otherwise the STOCK_DETAIL table should be updated for valid transaction.

8. Write a PL/SQL cursor program to calculate electricity bill of several domestic customers. Accept Input RR No, name of the customer, previous meter reading, and current meter reading from the table. The rates of electricity consumption are as follows - For the first 30 units Rs. 2.5 per unit, for the next 70 units Rs. 3.5 per unit, for the next 100 units Rs. 4.5 per unit, for the next 100 units Rs. 6 per unit and for units above 300 Rs. 8 per unit. A fixed amount of Rs. 150 is also charged. 5% tax to be paid on the sum of bill amount & fixed amount. Use Data validation to see that current reading is more than previous reading. Assume the records of 5 customer details.

   Create the output which contains the RR number, name of the Customer, previous meter reading, and current meter reading, Units Consumed, Total Bill in the following format.

RR No.	Customer Name	Current Meter Reading	Previous Meter Reading	Units Consumed	Total Bill

PART-B

1. Create the following tables by identifying primary and foreign keys. Specify the not null property for mandatory keys.
   SUPPLIERS (SUPPLIER_NO, SNAME, SADDRESS, SCITY)
   COMPUTER_ITEMS(ITEM_NO,SUPPLIER_NO,ITEM_NAME, IQUANTITY)
   Consider three suppliers. A supplier can supply more than one type of items.

   Write the SQL queries for the following

   a. List *ITEM* and *SUPPLIER* details in alphabetical order of city name and in each city decreasing order of IQUANTITY.

   b. List the name ,city,and address of the suppliers who are supplying keyboard.

   c. List the supplier name, items supplied by the suppliers ‘Cats’ and ‘Electrotech’.

   d. Find the items having quantity less than 5 and insert the details of supplier and item of these, into another table NEWORDER.

2. Create the following tables identifying Primary and Foreign keys. Specify the not null property for mandatory keys.
   EMPLOYEE_MASTER (EMP_ID, EMP_NAME, EMAIL_ID, EMP_ADDRS, PHONE)
   ATTENDANCE (EMP_ID, MONTH, WOM, MHRS, THRS, WHRS, TRHRS, FHRS, SHRS, SUHRS).
   (Valid values for WOM<=5, MONTH can be 1-12). Apply appropriate constraints. Consider 3 employees. And attendance records for at least two months.

   Write the SQL queries for the following

   a) Display *EMP_ID*,*EMP_NAME* and *EMAIL_ID* of all employees who are working on every Sunday of 2nd and 4th week in a month.

   b) Display total hours worked by each employee in each month with EMP_ID.

   c) Display the names of the employees who never attended the duty so far(Attendances not given so far).

   d) Display the employee name, month, week, total hours worked for employees who have total no. of hours more than 20 hrs. a week.

3. Create the following tables by identifying primary and foreign keys, specify the not null property for mandatory keys.

PRODUCT_DETAIL				
P_NO	**PRODUCTNAME**	**QTYAVAILABLE**	**PRICE**	**PROFIT %**
P0001	Monitor	10	3000	20
P0002	Pen Drives	50	650	5
P0003	CD Drive	100	10	3
P0004	Key Board	25	600	10

PURCHASED_DETAIL		
CUSTNO	**P_NO**	**QTYSOLD**
C1	P0003	2
C2	P0002	4
C3	P0002	10
C4	P0001	3
C1	P0004	2

C2	P0003	2
C4	P0004	1

Write the following SQL queries:

a) Display total amount spent by C2.
b) Display the names of product for which either QtyAvailable is less than 30 or total QtySold is less than 5(USE UNION).
c) Display the name of products and quantity purchased by C4.
d) How much Profit does the shopkeeper gets on C1's purchase?
e) How many 'Pen Drives' have been sold?

4. Create table STUDENT_PROFILE includes Rollno, name, class, ECCC(Extra-Co curricular he belongs to such as SPORTs, NSS etc.) and another table MARKS_REPORT includes Rollno, Internal_Test, Marks1, Marks2, Marks3 and ECCC_marks.

Constraints

- Internal _Test can be either 1 or 2.
- Each mark can be 0-100. Absence in the test can be entered as -1.
- Consider atleast 3 classes.

Apply suitable data type and constraints to each column.
Insert 5 students marks report in the both the tests.

Write the following SQL queries:

a) Find number of students failed class- wise.
b) Display the complete details of the students secured distinction(Percentage>=70) in I BCA.
c) Display class and highest total marks in second internals in each class.
d) Display the student name with rollno and class of those who passed in I internals and failed in II internals.(use SET operator)

5. Write a PL/SQL program to compute the selling price of books depending on the book code and category. Use Open, Fetch and Close.The Book_detail table contains columns: Book Code, Author, Title, Category and Price.Insert 10 records.

The selling price=Price-Discount.

The discount is calculated as follows:

Book Code	Category	Discount Percentage
A	Novels	10% of Price
	Technology	12.5% of Price
B	Commerce	18% of Price
	Science	19% of Price
C	Songs	25% of Price
	Sports	24% of Price
D	All	28% of Price

Print the result in tabular form with proper alignment

Book Code category title author price discount % discount amount sell price

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6. Write a PL/SQL program to display employee pay bill (using Cursor For loop) Use a **Procedure** to receive basic pay and to compute DA, HRA, Tax, PF, Gross Pay and Net Pay(Use OUT). Base table contains the following columns empnum, empname, basic pay.Insert 3 records.

Allowances are computed as follows.

Basic Pay	DA	HRA
<=20000	35% of Basic	8% of Basic
>20000 &<=30000	38%	9%
>30000 &<=40000	40%	10%
>40000	45%	10%

Gross=Basic+DA+HRA
PF=12% of Gross or Rs. 2000 whichever is minimum.
PT=Rs. 100 upto Gross is 25,000 else Rs. 200.
Net=Gross-(PF+PT)

Print Pay slip as follows.

```
================PAYSLIP==================
Empno              :10011          Empname : Raj
Basic Pay          :20000             P.F.: 3432
DA                 :7000            P.T.: 200
H.R.A.             :1600
Gross              :28600         Net Pay : 24968
*************************************************
================PAYSLIP==================
Empno              :10012          Empname : Rani
Basic Pay          :30000             P.F.: 5292
DA                 :11400             P.T.: 200
H.R.A.             :2700
Gross              :44100         Net Pay : 38608
*************************************************
```

7. Given the following tables:
   ITEM_MASTER(itemno, name, stock, unit_price) [Apply the Primary key and check constraint for stock and price as >0] [Insert 5 records]
   ITEM_TRANS(itemno, quantity and trans_date)
   Create a **package** PCK_ITEM includes a function CHK_ITEM and a procedure PROC_ITEM.

   Function CHK_ITEM gets one argument itemno and is used to check whether the parameter itemno exists in ITEM_MASTER and should return 1 if exist. Otherwise 0 and displays proper message.
   Procedure PROC_ITEM gets two arguments itemno and quantity, and is used to perform the following if item exists. If required quantity is not available, give appropriate message. If available , insert a record of this transaction to ITEM_TRANS and modify the stock in ITEM_MASTER.

   Write a PL/SQL program to accept ITEM_NO and Quantity needed of required item. Use Package to do the transaction process(Transaction date can be current date).

   OUTPUT to be shown as follows:

```
Enter value for accept_itemno: 1
old   5:            X:=&accept_itemno;
new   5:            X:=1;
Enter value for quantity: 3
old   6:          M:=&quantity;
new   6:          M:=3;
Item :aa   Quantity  :3  Price  :15 Total Amount  :45
```

8. Consider the following tables

   LIBRARY(Accession no, Title, Author, Publication, Status). Status can be **A** for available and **I** for Issued. Insert 3 records with status '**A**' for all initially.

ISSUE(Rollno, Accession no, Borrowdate, returndate).

OUTDATED(Accession no, Title, Author, Publication, tdate),

Write the following Trigger programs.

i. Whenever the book is to be issued, Insert a new record to ISSUE without having return date. When the record is **inserted** to ISSUE table, trigger TRIG_ISSUE to be executed to update status in LIBRARY as ***'I'.***

ii. Whenever book is returned, update return date of that record as todays date in ISSUE table. When the record is **updated** to ISSUE table, trigger TRIG_ISSUE to be executed to update status in LIBRARY as ***'A'.***

iii. Whenever the book is **deleted** by accepting Accession no. for status 'A' (at SQL >), trigger TRIG_OUTDATE has to be executed to insert a record to OUTDATED.

Write a PL/SQL program to accept Rollno, Accession no and transaction(**B** for Borrow &**R** for Return). Check for the existence of given Accession no and proceed as follows.

- If does not exist, display the message 'Given accession no. is not available'
- If exist and transaction is B, check the status as 'A', then insert to ISSUE, and display the message with accno, author, title, publication and roll no to whom it is issued.
- If exist and transaction is R, then update return date as current system date in ISSUE by accepting Rollno and Aceession no(for the record having return date empty).
  If searched record is not available, raise the predefined exception.

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**PART-A** **Writing:5 Marks Execution:3Marks**	**15 Marks**

Program-2	**PART-B** **Writing:8 Marks Execution:4Marks**	**20 Marks**
Practical Record		**05 Marks**
Total		**40 Marks**

Questions Paper for Pattern Core Subjects

Duration:3 Hours Max.Marks:80

Note: Answer any ten Questions from Part-A. And one full Questions from each unit in Part-B

Part-A

1. 10*2=20

a.
b.
c.
d.
e.
f.
g.
h.
i.
j.
k.
l.

Part-B

UNIT-I, II, III, IV

Each unit contains two main questions and it carry 15 Marks.
Each main questions contain 2 or more sub question.

4*15=60

UNIT-I

2.

a.
b.
c.

3.

a.
b.
c.