Bachelor of Computer Application (BCA)

Semester II

Programme : **BCA**

Course : **TO3 - Issues That Matter (Common)**

Semester : **2**

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Significance of the Course

To sensitize the learners on contemporary issues of concern. The text outlines the political and social topics that are currently significant, to stimulate young minds, and thus widen the cultural contexts of some of the most pressing issues in the country and the world. It also aims at representing diverse experiences, historical and contemporary, to create a more circumspect and informed vision of future.

Course Objectives

On Completion of the course, the student should be able to discern the following:

1. Identify the major issues of contemporary significance

 2. Respond rationally and positively to the issues raised

3. Internalise the values imparted through the selections.

Expected Course Outcomes:

  On completion of the Course, it is expected that the student will be able to:

 CO1: **Analyse** the issues that affect modern society and their origin in history

 CO2: **Create** a rational and empathetic outlook on such matters.

CO3: **Identify** the sustainable measures for protecting our environment.

CO4: **Examine** the aftereffects of colonialism through the lens of issues faced by the colonized natives.

CO5: **Explain** to students how to positively and rationally respond to the issues raised.

CO6: **Apply** values of empathy and tolerance as shown through selected literary works.

Allocation of Sessions:

Module/ Section	1	2		3	4	5	6	7	8	Total
Sessions Allotted	20	20		10	5	15	5	10	5	90

Session Plan

Module	Topics	CO Linkage
Module 1	1.1 Kenzaburo Oe :"The Unsurrendered People" 1.2 Judith Wright: "The Old Prison" 1.3 Luigi Pirandello: "War "	CO 1, 2 &6

Learning Outcomes	Assessment
1 Analyse the after effect of world war on Hiroshima 2. Introduce war poetry and its features 3. Understand the psychological trauma of war victims	1.Power point Presentation 2. Class test 3. Worksheet

Module	Topics	CO Linkage
Module 2	2.1 Salman Rushdie : "Persuasions on the Power of the World". Toni Morrison: "Peril" 2.2 Bertolt Brecht: "The Burning of the Books" 2.3 Luisa Valenzuela: "The Censors"	CO 1, 2 &5

Learning Outcomes	Assessment
1. To analyse the role of dissent in a healthy society 2. Evaluate how literature can used as a tool to raise voice against injustice 3. Explores how state imposed censorships affects human life.	1. Assignment 2. Power Point Presentation 3. Class Test

Module	Topics	CO Linkage
Module 3	3.1 Bandhu Madhav: "The Poisoned Bread" 3.2 Zitkala-sa : "A Trip Westward" 3.3 Temsula Ao: "The Pot Maker"	CO 1,4 &6

Learning Outcomes	Assessment
1. Identify the problems faced by Dalit communities 2. Discuss about the negative impacts of cultural encroachments 3.Explores the tribal tradition and customs on an individual and her aspiration	1. Worksheet 2.Power Point Presentation 3. Seminar

Module	Topics	CO Linkage
Module 4	4.1 Richard Leakey: "Does it Matter?" 4.2 Gieve Patel: "On Killing a Tree" 4.3 Sarah Joseph : "Hagar : A Story of a Women and Water"	CO 1,2,& 3

Learning Outcomes	Assessment
1. Analyse philosophical and practical concerns about the impact of human activity on the environment 2. Identify the importance of nature protection 3. Understand the theme of water as the fundamental giver and preserver of life.	1. Group Discussion 2. Worksheets 3.Power Point presentation

Module	Topics	CO Linkage
Module 5	5.1 Mallica Mishra: "Understanding Refugeeism: An Introduction to Tibetan Refugees in India" 5.2 W.H Auden: "Refugee Blues" 5.3 Ghassan Kanafani : "The Child Goes to the Camp"	CO 1, 4 & 6

Learning Outcomes	Assessment
1. Understanding what it means to be a refugee 2. Describe the indifference and antagonism faced by Jewish refugees from Nazi Germany. 3. Analyse the harsh realities in a refugee camp.	1. Seminar 2. Worksheet 3. Assignment

Reference Books

1. Anita,R and Jimmy James. *Issues That Matter*, Macmillan education and Mahatma Gandhi University, Kottayam.

Programme   : **BCA**

Course   : **MM2CMT03 – DISCRETE MATHEMATICS (II)**

Semester   : **2**

Name of the Faculty : Ms. Anuja Varghese

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Significance of the Course

Discrete mathematics is a branch of mathematics concerned with the study of objects that can be represented finitely (or countably). It encompasses a wide array of topics that can be used to answer many tangible questions that arise in everyday life. Discrete Mathematics provides an essential foundation for virtually every area of computer science, and its applications are correspondingly vast.

Course Objectives

1. To identify basic concepts Graph and graph models.
2. To understand about Graph Isomorphism, Connectivity and Euler & Hamilton paths.
3. To summarise Trees, application of trees, tree traversal and spanning trees.
4. To identify basic concepts about Boolean function and Logic gates.
5. To interpret the ideas about Matrices.

Expected Course Outcomes (ECO):

On completion of the Course, it is expected that the student will be able to:
ECO 1: Summarising the concepts about Graph and graph models, Graph Isomorphism, Connectivity and Euler & Hamiltonian paths.

ECO 2: Describing Trees, application of trees, tree traversal and spanning trees.
ECO 3: Explaining Boolean function, representation of Boolean functions and Logic gates.
ECO 4: Summarising Matrices, different types of Matrices, Rank of a matrix, Cramer's rule, characteristic roots and characteristic vectors of a matrix and Cayley Hamilton theorem and applications.

Allocation of Sessions:

Module	1	2	3	4	Total
Sessions Allotted	18	17	17	20	72

Session Plan

Module	Topics	CO Linkage
Module 1	**Graphs –** Graph and Graph models, graph terminology and special types of graphs, representing graphs and Graph Isomorphism, Connectivity, Euler and Hamilton paths.	CO 1 & CO2

Learning Outcomes	Assessment
1. Structuring Graph and graph models.	1. Drawing different type of graphs.
2. Describing different terminologies related to graph.	2. Assignments in related topics.
3. Inferring special types of graphs.	3. Interactive sessions and discussion.
4. Explaining the Graph Isomorphism.	4. Test.
5. Describing the concepts of connectivity.	5. Problem solving method.
6. Summarising Euler & Hamilton paths.	

Module	Topics	CO Linkage
Module 2	**Trees** – Introduction to Trees, application of trees, Tree traversal and spanning trees.	CO3

Learning Outcomes	Assessment
1. Summarising the concepts about Trees. 2. Implementing application of trees. 3. Structuring tree traversal. 4. Exemplifying spanning trees.	1. Problem solving. 2. Discussion. 3. Assignment. 4. Test.

Module	Topics	CO Linkage
Module 3	**Boolean Algebra** – Boolean function, representing Boolean functions and Logic Gates	CO4

Learning Outcomes	Assessment
1. Describing Boolean Function. 2. Interpreting the representation of Boolean functions. 3. Explaining Logic Gates. 4. Designing Logic Gates.	1. Problem solving. 2. Discussion. 3. Test. 4. Assignment. 5. Designing of Logic Gates.

Module	Topics	CO Linkage
Module 4	**Matrices** – Definitions and examples of Symmetric, Skew-symmetric, conjugate, Hermitian, Skew- Hermitian matrices, Rank of Matrix, determination of rank by Row canonical form and Normal form, Linear equations, solution of non-homogeneous equations using Augmented matrix and Cramer's rule, Homogeneous equations, Characteristic equation, Characteristic roots and Characteristic vectors of matrix, Cayley Hamilton theorem and applications.	CO5

Learning Outcomes	Assessment
1. Explaining Matrices. 2. Comparing Symmetric, Skew-symmetric, conjugate, Hermitian, and Skew- Hermitian matrices. 3. Describing Rank of Matrix.	1. Discussion. 2. Problem solving. 3. Assignment. 4. Test.

4. Explaining solution of non homogeneous equations using Augmented matrix and Cramer's rule. 5. Interpreting Homogeneous equations, Characteristic equation, Characteristic roots and Characteristic vectors of matrix. 6. Explaining Cayley Hamilton theorem and applications.	

Reference Books

1. Kenneth H Rosen ; Discrete Mathematics and its Applications ; 6 th edition ; Tata Mc Graw- Hill publishing company Limited.

2. Frank Ayres Jr : Matrices , Schaum's Outline Series , TMH Edition.

Programme : **BCA**

Course : **CA2CRT03- Database Management Systems (Core)**

Semester : **2**

Name of the Faculty : Ms Jintu John

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Significance of the Course

Database management system is software which is used to manage the database. This course introduces the core principles and techniques required in the design and implementation of database systems. This course focus on relational database management systems, including database design theory: E-R modelling, data definition and manipulation languages, database security and administration. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control etc. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

Expected Course Outcomes (ECO):

On completion of the Course, it is expected that the student will be able to:

ECO 1: Summarizing the basic concepts of database management system and its applications.
ECO 2: Identifying entity relationship and create entity relationship diagrams.
ECO 3: Implementing ER diagram and formulate SQL queries on the data.
ECO 4: Applying normalization techniques on the tables created using sql queries.
ECO 5: Inferring the basics of transaction processing and concurrency control.

Allocation of Sessions:

Module	1	2	3	4	5	Total
Sessions Allotted	12	16	14	15	15	72

Session Plan

Module	Topics	CO Linkage
Module 1	Characteristics of the Database Approach – Database users :DBA , Database Designers ,End users – Advantages of using the DBMS Approach – Data models, Schemas , and Instances – Three-Schema Architecture and Data Independence. DBMS Languages: DDL, DML – The Database System Environment: DBMS Component Modules.	CO 1

Learning Outcomes	Assessment
1. Explaining advantages and disadvantages of database management system 2. Describing different users of DBMS. 3. Explaining the 3 schema architecture. 4. Comparing different types of languages. 5. Summarising DBMS component modules.	**1)** Assignments in related topics. **2)** Interactive sessions and discussion. **3)** Test

Module	Topics	CO Linkage
Module 2	**Entity Relationship Modelling**: Introduction – Entity Types, Entity Sets, Attributes and Keys – Relationship Types, Relationship Sets, Roles, and Structural Constraints – Weak Entity Types – Notation for ER diagrams – Sample ER diagrams. **Relational Model concepts**: Domains ,Attributes , Tuples , and Relations – Characteristics of	CO2

	Relations – Relational Model Constraints and Relational Database Schemas : Domain Constraints, Key Constraints, Relational Database Schemas , Entity Integrity , Referential Integrity, and Foreign Keys .	

Learning Outcomes	Assessment
1. Identifying different attributes and keys 2. Designing ER diagram. 3. Explaining domains, attributes and tuples. 4. Describing relational model. 5. Implementing different constraints.	1. Discussion. 2.Test 3.Assignment

Module	Topics	CO Linkage
Module 3	Data Types – Data Definition commands CREATE , ALTER ,DROP - Adding constraints in SQL – Basic SQL Queries INSERT ,SELECT ,DELETE ,UPDATE - Substring comparison using LIKE operator ,BETWEEN operator – Ordering of rows – SQL set operations UNION , EXCEPT , INTERSECT – Complex Queries : Comparison involving NULL and Three-valued logic ,Nested queries , EXISTS and UNIQUE functions, Renaming of attributes and Joining of tables, Aggregate functions ,Grouping – Managing Views	**CO3**

Learning Outcomes	Assessment
1. Describing different commands in SQL. 2. Designing queries using DDL and DML statements 3. Constructing nested queries and views.	1. Assignment 2. Class test 3. seminar

Module	Topics	CO Linkage
Module 4	**Normalization**: Informal Design Guidelines for Relational Schemas – Functional Dependencies – Normal forms : First Normal Form , Second Normal Form , Third Normal Form – General Definitions of Second and Third Normal Forms – BCNF. **Indexing Structures for files**: -Types of Single-Level Ordered Indexes: Primary Indexes, Clustering Indexes, and Secondary Indexes.	**CO4**

Learning Outcomes		**Assessment**
1. Identifying different normal forms that can be applied to tables. 2. Explaining indexing structure for files.		1. Test 2. Assignment.

Module	Topics	CO Linkage
Module 5	**Transaction Processing**: Introduction to Transaction Processing - Transaction and System Concepts – Desirable properties of Transactions. **Database Security and Authorization**: Types of Security – Control measures – Database Security and DBA – Access Control , User Accounts, and Database Audits –Access Control based on Granting and Revoking Privileges	**CO5**

Learning Outcomes	Assessment
1. Describing transaction and its properties 2. Explaining database security and authorization. 3. Understanding grant and revoke privileges.	1. Test. 2. Assignment

Reference Books

1. Ramez Elmasri and Shamkant B.Bavathe - DATABASE SYSTEMS, Sixth Edition, Pearson Education.

2. C.J Date- An Introduction to Database Systems, Eighth edition, Pearson Education, 2003

3 .Reghu Ramakrishnan and Johannes Gehrke- Database Management Systems, Third edition, Mc Graw Hill International Edition.

4. Dipin Desai, An Introduction to Database Systems, First Edition, Galgotia Publications.

Programme : **BCA**

Course : **CA2CRT04 - Computer Organization and Architecture**

Semester : **2**

Name of the Faculty : Ms Saritha N Pillai

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Course Objectives:

This course provides the basic concepts of fundamental organization, addressing modes, instruction formats and program control statements. The basic concept of parallel computing, pipelining and vector processing are also included.

Expected Course Outcomes:

On completion of the Course, it is expected that the student will be able to:

ECO 1: Describe the fundamental organisation of a computer system.

ECO 2: Explain addressing modes, instruction formats and program control statements.

ECO 3: Distinguish the organization of various parts of a system memory hierarchy

ECO 4: Describe basic concept of parallel computing

ECO 5: Describe fundamentals concepts of pipeline and vector processing

Allocation of Sessions

Module	1	2	3	4	5	Total
Sessions Allotted	12	15	16	15	14	72

Session Plan

Module	Topics	CO Linkage
Module 1	Operational concepts, Instruction codes, Computer Registers, Computer Instructions, Memory locations and addresses, Instruction cycle, Timing and control, Bus organization.	ECO-1
Learning Outcomes		**Assessment**
1. Describe the different Operational concepts.		1. Test
2. Explain the Bus organization.		2. Example
3. Understand the instruction codes, computer registers and instructions.		3. Explanation
		4. Presentation
Module	**Topics**	**CO Linkage**
Module 2	General Register Organization, Stack Organization, Addressing modes, Instruction Classification, Program control.	ECO-2
Learning Outcomes		**Assessment**
1. Explain different organizations.		1. Test
2. Summarize the addressing modes		2. Example
3. Explain classification of instructions.		3. Explanation
		4. Presentation
Module	**Topics**	**CO Linkage**
Module 3	Memory Hierarchy, Main Memory, Organization of RAM, SRAM, DRAM, Read Only Memory-ROM- PROM, EROM, EEPROM, Auxiliary memory, Cache memory, Virtual Memory, Memory mapping Techniques.	ECO-3

Learning Outcomes	Assessment
1. Compare various ROMs	1.Test
2. Explain auxiliary memory, cache memory, virtual memory	2. Example
3. Exemplify memory mapping techniques.	3. Explanation
	4. Presentation

Module	Topics	CO Linkage
Module 4	**Parallel Computer Structures**: Introduction to parallel processing, Pipeline computers, Multi processing systems, Architectural classification scheme-SISD, SIMD, MISD, MIMD.	ECO-4

Learning Outcomes	Assessment
1. Understand parallel processing, pipeline computers.	1.Test
2. Classify architectural classification scheme-SISD, SIMD, MISD, MIMD. 3. Explain multi-processing systems.	2. Example
	3. Explanation
	4. Presentation

Module	Topics	CO Linkage
Module 5	**Pipelining and Vector processing**: Introduction to pipelining, Instruction and Arithmetic pipelines (design) Vector processing, Array Processors.	ECO-5

Learning Outcomes	Assessment
1. Explain pipelining.	1.Explanation
2. Classify instruction and arithmetic pipelines.	2. Example
3. Exemplify vector processing, array Processors.	3.Presentation
	4.Test

References Books

1. M. Morris Mano-Computer Systems Architecture, Third Edition, Pearson Education

2. Kai Hwang and F A Briggs-Computer Architecture and parallel processing, McGraw Hills, 1990

3. Carl Hamacher -Computer Organization, Fifth Edition, Tata McGraw Hill.

4. John P Hayes -Computer Architecture & Organization–Mc Graw Hill

5. William Stallings-Computer Organization and Architecture, Seventh Edition.

Programme   : **BCA**

Course   : **CA2CRT05- Object Oriented Programming using C++ (Core)**

Semester   : **2**

Name of the Faculty   : Mr. Vinumon Jacob

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Significance of the Course

Object Oriented Programming (OOP) has become preferred programming approach by the programming approach by the software industries, as it offers a powerful way to cope with the complexity of real-world problems. C++ explains in a simple and easy-to-understand style in what, why, and how of object oriented programming. The course syllabus presents the concept of object oriented approach and discusses important elements of object oriented analysis and design of systems. Object oriented concepts including classes and objects, constructors and destructors, polymorphism, abstract classes and inheritance, string manipulations, and virtual functions. Students can easily study the basic concepts of OOP by using this course.

Course Objectives

1. To identify the principles of Object Oriented Programming, benefits and applications.
2. To understand classes and objects with data and member functions, and their operations.
3. To interpret basic and user-defined data types to appropriate processing types. .
4. To manage pointers to derived classes, compile-time and run-time polymorphisms, and file stream classes input and output operations.

Expected Course Outcomes (ECO):

On completion of the Course, it is expected that the student will be able to:

ECO 1: Summarizing the basic concept of object oriented programming and its basic operations.
ECO 2: Identifying object formation from classes and its data member accessibility.
ECO 3: Describing constructor and destructor execution and its scope based on object formation and object destruction.
ECO 4: Applying various inheritance types and its different processing methods.

ECO 5: Explaining pointers and its applications through class objects and files.

Allocation of Sessions:

Module	1	2	3	4	5	Total
Sessions Allotted	10	10	12	10	12	54

Session Plan

Module	Topics	CO Linkage
Module 1	**Principles of Object Oriented Programming, Beginning with C++:** Procedure Oriented Programming-Object Oriented Programming-Basic concepts of object-oriented programming- Benefits of OOP- Applications of OOP-A simple C++program- Structure of C++ program- C++ data types- Symbolic constants- Reference by variables-Operators in C++- Operator precedence- Control structures- Function in C++ - The main function, Function prototyping- Call by reference- Return by reference- Inline function- Default arguments- Function overloading.	**CO 1**

Learning Outcomes	Assessment
1. Explaining principles of object oriented programming, benefits and applications. 2. Describing structure of C++ program and its data types. 3. Explaining operators and its prudence. 4. Comparing main() and other user-defined function processing methods, 5. Summarising function operations like inline and overloading.	**1)** Assignments **2)** Interactive sessions **3)** Test and Case Studies

Module	Topics	CO Linkage
Module 2	**Classes and Objects :**Specifying a class- Defining member functions-Nesting of member functions - Private member functions - Arrays within a class - Memory allocation for objects-Static data members - Static member functions -Arrays of objects - objects as function arguments -Friendly functions-Returning Objects.	**CO2**

Learning Outcomes	Assessment
1. Identifying classes and objects and their members. 2. Describing private and public members inside the class to other classes. 3. Explaining arrays and memory allocation of objects 4. Identifying static data members in classes and functions. 5. Implementing friendly functions and returning objects.	1. Assignment 2. Quiz. 3. Discussion.

Module	Topics	CO Linkage
Module 3	**Constructers and Destructors, Overloading:** Constructors- Default constructor-Parameterized constructor- Copy constructor- Multiple constructors- Constructors with default arguments- Dynamic constructor- Destructors- Operator overloading- Unary and Binary operator overloading- Overloading using friends- Rules for overloading- Type conversion.	**CO3**

Learning Outcomes	Assessment
1. Describing constructors and destructors with overloading. 2. Interpreting default constructors to parameterized constructors. 3. Comparing operator overloading and function overloading. 4. Implementing type conversion techniques. 5. Describing rules for overloading.	1. Interactive session 2. Quiz. 3. Seminar

Module	Topics	CO Linkage
Module 4	**Inheritance:** Inheritance - Defining derived classes-Visibility modes-Single, Multilevel, Multiple, Hierarchical and Hybrid inheritance- Virtual base classes- Abstract classes- Constructors in derived classes - Nesting of classes.	**CO4**

Learning Outcomes	Assessment
1. Designing inheritance as type and specifying derived classes. 2. Identifying visibility modes in inheritance. 3. Explaining different types of inheritance and its features. 4. Describing virtual base classes and its importance. 5. Implementing constructors in derived classes.	1. Discussion 2. Interactive session 3. Assignment

Module	Topics	CO Linkage
Module 5	**Pointers, Virtual Functions and Polymorphism, Working with Files :** Pointers- Pointers to objects - this pointer-Pointers to derived classes- Virtual functions- Pure virtual functions- File Stream classes, Opening and closing a file- File opening modes- File pointers and their manipulations- Sequential input and output operations.	CO5

Learning Outcomes	Assessment
1. Describing pointers to objects and this pointer. 2. Explaining virtual functions and its implementation. 3. Executing run time and compile time polymorphisms. 4. Implementing processing data in secondary storage as file with pointer notation. 5. Summarising file input and output manipulations.	1. Discussion 2. Quiz 3. Test.

Reference Books

1. E. Balagurusamy - Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill , 2011.

2. Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition, Pearson India.

3. Robert Lafore, Object Oriented Programming in Turbo C++, First Edition, Galgotia Publications.

4. D Ravichandran, Programming with C++, Second edition, Tata McGraw- Hill.

The students may refer any standard text books on 'Object Oriented Programming using C++' in addition to the above set of references.