

BCA (2nd Semester)

Teaching Schedule

030010214: CC4 Object Oriented Programming

Objective: To design and develop programs using object oriented concepts namely classes and object, inheritance, polymorphism and file handling.

Course Outcomes: Upon completion of the course, the student shall be able to

- CO1: Perceive the basic Object Oriented Programming concepts.
- CO2: Utilize the object initialization and destruction concept using constructors and destructors.
- CO3: Apply the concept of inheritance to reduce the length of code.
- CO4: Apply concept of dynamic polymorphism using virtual functions, overriding functions and abstract class in programs.
- CO5: Apply the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.
- CO6: Apply file operations concept in programs.
- CO7: Design, implement and test programs using object oriented concepts.

Unit	Sub Unit	No. of Lecture(s)	Topics	Reference Chapter/Additional Reading	Teaching Methodology to be used	Active Learning Activities	Evaluation Parameters
Unit 1: Introduction							
	1.1	1	Need	BR#1, Page No:1-30 VR#1-Page No.1-30	Discussion	For Slow Learner: Students must write answer of two or three question(s) given by teacher after completion of Unit. For Active Learner: Students must find at least two syntax error with solution and demonstrate.	Quiz
	1.2		Principles	BR#1, Page No:1-30 VR#1-Page No.1-30	Discussion		
	1.3	1	Object Oriented Programming vs other Paradigms	BR#1, Page No:1-30 VR#1-Page No.1-30	Discussion		
	1.4	2	Classes and Object: Defining Class, Access Specifier, Creating Object, Instance Method Calling	BR#7, Page No:166-173, 180-194	Chalk & talk Demonstration		
	1.5	1	Console I/O Operations: Unformatted, Formatted	BR#2, Page No:45-48	Chalk & talk Demonstration		
	1.6	2	Friend Function and Class	VR#10-Page No.342-349	Chalk & talk Demonstration		
	1.7	2	Static Data Members and Member Functions	BR#7, Page No:194-197	Chalk & talk Demonstration		
Unit 2 : Object Initialization and Cleanup							
	2.1	2	Constructor: Type of Constructor, Constructor Overloading,	BR#7, Page No:174-177 VR#10-Page No.363-387	Chalk & talk Demonstration	For Slow Learner: Students must write answer of two or three question(s) given by teacher after completion of Unit. For Active Learner: Students must find at least two syntax error with solution and demonstrate.	
	2.2	1	Constructor with Default Argument	BR#7, Page No:174-177 VR#10-Page No.363-387	Chalk & talk Demonstration		
	2.3	1	Garbage Collection and Finalization	BR#7, Page No:174-177 VR#10-Page No.363-387	Chalk & talk Demonstration		
	2.4	1	Nameless Object	BR#7, Page No:174-177 VR#10-Page No.363-387	Chalk & talk Demonstration		

2.5	1	Dynamic Memory Allocation	BR#7, Page No:174-177 VR#10-Page No.363-387	Chalk & talk Demonstration	Unit Test 1
2.6	2	Array of Object	BR#7, Page No:174-177 VR#10-Page No.363-398	Chalk & talk Demonstration	
Unit 3: Inheritance					
3.1	2	Accessibility of Base Class Members	BR#8, Page No:205-219 VR#14-Page No.499-525	Chalk & talk Demonstration	<p>For Slow Learner: Students must write answer of two or three question(s) given by teacher after completion of Unit.</p> <p>For Active Learner: Students must find at least two syntax error with solution and demonstrate.</p>
3.2	2	Types of Inheritance	BR#8, Page No:205-219 VR#14-Page No.499-525	Chalk & talk Demonstration	
3.3	2	Order of Calling of Constructor and Destructor	BR#8, Page No:205-219 VR#14-Page No.499-525	Chalk & talk Demonstration	
3.4	2	Object Composition - Delegation	BR#8, Page No:205-219 VR#14-Page No.499-525	Chalk & talk Demonstration	
Unit 4: Polymorphism					
4.1	2	Member Function Overloading and Overriding	BR#8, Page No:217-231 VR#14-Page No.525-580	Chalk & talk Demonstration	<p>For Slow Learner: Students must write answer of two or three question(s) given by teacher after completion of Unit.</p> <p>For Active Learner: Students must find at least two syntax error with solution and demonstrate.</p>
4.2	1	Need and Rules for Virtual Function	BR#8, Page No:217-231 VR#14-Page No.525-580	Chalk & talk Demonstration	
4.3	2	Virtual Base Class and Pure Virtual Function	BR#8, Page No:217-231 VR#14-Page No.525-580	Chalk & talk Demonstration	
4.4	2	Abstract Method	BR#8, Page No:217-231 VR#14-Page No.525-580	Chalk & talk Demonstration	
4.5	1	Abstract Classes	BR#8, Page No:217-231 VR#14-Page No.525-580	Chalk & talk Demonstration	
Unit 5: Operator Overloading					
5.1	2	Unary and Binary Operator Overloading: Overloading using Member Functions, Overloading using Friend Functions	VR#13, Page No:432-465	Chalk & talk Demonstration	<p>For Slow Learner: Students must write answer of two or three question(s) given by teacher after completion of Unit.</p> <p>For Active Learner: Students must find at least two syntax error with solution and demonstrate.</p>
5.2	2	Overloading Special Operators: Increment and Decrement Operators	VR#13, Page No:432-465	Chalk & talk Demonstration	
5.3	2	Type Conversion: Basic Type to Class Type	VR#13, Page No:432-465	Chalk & talk Demonstration	
5.4	2	Wrapper and String	BR#11,	Chalk & talk	

		Classes	Page No:281-303	Demonstration	
Unit 6: File Handling					
6.1	1	File Types : Sequential and Random Access	BR#12, Page No:318-343	Chalk & talk Demonstration	For Slow Learner: Students must write answer of two or three question(s) given by teacher after completion of Unit. For Active Learner: Students must find at least two syntax error with solution and demonstrate.
6.2	2	File Operations: Opening, Reading, Writing and Closing	BR#12, Page No:318-343	Chalk & talk Demonstration	
6.3	3	Master and Transaction File Processing	BR#12, Page No:318-343	Chalk & talk Demonstration	
6.4	1	File Pointers	BR#12, Page No:318-343	Chalk & talk Demonstration	
6.5	1	File Error Handling	BR#12, Page No:318-343	Chalk & talk Demonstration	
References : Textbooks: 1. Venugopal, Rajkumar, Ravishankar. - Mastering C++ - Tata McGraw Hill [VRR] 2. Buyya, R. - Object-oriented programming with Java: Essentials and Applications - McGraw Hill[BR]					
References : 1. Forouzan B. Gilberg R. Computer Science - A Structured Approach Using C++ - Cengage Learning.[EG] 2. Kanetkar Y. - Let us C++ - BPB Publications.[KY] 3. S. Malhotra, S. Choudhary - Programming in Java - Oxford University Press. [SS] 4. Farrell, J. - Java for Beginners - Cengage Learning[FJ]					
Note: # denotes chapter number					

Internal Examination

Course objectives and Course outcomes mapping:

- Understand the basic Object Oriented Programming concepts: CO1, CO7
- Ability to design, implement and test object oriented programs : CO2, CO3, CO4, CO5, CO6, CO7

Course units and Course outcome mapping:

Unit No.	Unit Name	Course Outcomes						
		CO1	CO2	CO3	CO4	CO5	CO6	CO7
1	Introduction	✓						✓
2	Object Initialization and Cleanup	✓	✓					✓
3	Inheritance	✓	✓	✓				✓
4	Polymorphism	✓	✓	✓	✓			✓
5	Operator Overloading	✓	✓	✓	✓	✓		✓
6	File Handling	✓					✓	✓

Programme Outcomes:

- PO1: Proficiency in and ability to identify problems related to computer science as well as design and apply computational knowledge to solve them.
- PO2: Ability to design, develop, test and maintain system, component, product or process as per needs and specification.
- PO3: Understanding of professional and ethical role and responsibility.
- PO4: Recognition of the need for and an ability towards life-long learning
- PO5: Knowledge of programming languages, database systems, operating systems, software engineering, Web & Mobile technology and relevant modern issues alongwith strong project development skill.
- PO6: Ability to demonstrate the use of modern tools, models and languages to solve problems related to software development.
- PO7: An ability to communicate effectively with a range of audiences.

Programme Outcomes and Course Outcomes mapping:

Programme Outcome	Course Outcomes						
	CO1	CO2	CO3	CO4	CO5	CO6	CO7
PO1	✓	✓	✓	✓	✓	✓	✓
PO2	✓	✓	✓	✓	✓	✓	✓
PO3	✓						✓
PO4	✓	✓	✓	✓	✓	✓	✓
PO5	✓	✓	✓	✓	✓	✓	✓
PO6		✓	✓	✓	✓	✓	
PO7	✓	✓	✓	✓	✓	✓	✓

Computing Environment:

A student must have the following computing environment in laboratory and or on his/her laptop and.

- ❖ GNU g++ and Java compiler in linux platform.

Demonstrate topics 1.6, 4.2, 4.3, 5.1, 5.2 in g++ and topics 5.3 in java only.

Concept Linkage:

Unit/Sub-Unit	Prior concept linkage	Post concept linkage
Unit 2:Introduction	060060112-Fundamental of Programming - Unit-6	