

Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj
Master of Science (Computer Applications & Information Technology)
Semester: III

Paper Code: CCCS309		Total Credit : 4
Title of Paper: Object Oriented Programming with C++		Total Marks : 70
		Time : 3 Hrs
Unit	Description	Weighting
I	Object Oriented Programming (OOP) Concepts and Introduction to C++ Structured programming vs. object oriented programming Basic OOP concepts : objects , classes , encapsulation , data hiding , inheritance, polymorphism Introduction to C++: structure of a C++ program , data types , variables, constants, expressions, statements and operators Usage of header files Control flow statements : if else, for loop, while loop, do while loop, switch, break and continue	20%
II	Basic I/O in C++ Arrays in C++ : introduction, declaration, initialization of one , two and multi-dimensional arrays, operations on arrays Working with strings : introduction, declaration, string manipulation and arrays of string Classes and objects in C++ Constructors : default, parameterized, copy, constructor overloading and destructor	20%
III	Access specifiers, implementing and accessing class members Working with objects: constant objects, nameless objects, live objects, arrays of objects. Introduction to functions, library and user-defined functions, parameters passing, default arguments Functions overloading , inline functions, friend functions and virtual functions Inheritance: Introduction, derived class declaration, forms of inheritance, Inheritance and member access ability, constructor and destructor in derived class, construction invocation and data member initialization.	20%
IV	Operator overloading : Introduction, overloaded operators, unary operator overloading, operator keyword, operator return values, binary operators overloading, overloading with friend function Usages of Pointers in C++ : basic overview Dynamic memory allocation	20%
V	Files : Introduction and applications File operations: open, read, write, seek and close, Command Line Arguments. Exception Handling, Components of exception handling and its example, Namespaces: The Name conflict problem, Using Namespaces, Defining Namespaces, Unnamed Namespaces, Nested namespaces, Namespace Aliases, std Namespace	20%
Basic Text & Reference Books :-		
1.	Object Oriented Programming with C++ by E. Balagurusamy, Tata McGraw-Hill.	
2.	Object Oriented Programming in Turbo C++ by Robert Lafore, Galgotia Publications.	
3.	Programming with ANSI C++ by Bhusan Trivedi	

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		Time : 3 Hrs
Unit	Description	Total Marks
All	Q.1 (A) Multiple Choice Question.	06
	Q.1 (B) Answer the following. (With Internal Option) (Definitions, Blanks, Full Forms, True/False, Match the Following)	08
I, II	Q.2 (A) Short / Medium Questions (With Internal Option)	06
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08
II, III	Q.3 (A) Short / Medium Questions (With Internal Option)	06
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08
III, IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06
	Q.4 (B) C++ Program. (With Internal Option)	08
IV, V	Q.5 (A) Short / Medium Questions (With Internal Option)	06
	Q.5 (B) C++ Program. (With Internal Option)	08

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Paper Code: CCCS310		Total Credit : 4
Title of Paper: Database Management System – I		Total Marks : 70
		Time : 3 Hrs
Unit	Description	Weighting
I	Database Management System Introduction Definition of DBMS File processing system Vs DBMS <ul style="list-style-type: none"> - Limitation of file processing system - Comparison of File processing system and DBMS Advantages and Disadvantages of DBMS Users of DBMS <ul style="list-style-type: none"> - Database Designers - Application programmer - Sophisticated Users - End Users Capabilities of good DBMS Overall System structure	20%
II	Data Models Introduction Object Based Logical Model Record Base Logical Model <ul style="list-style-type: none"> - Relational Model, Network Model, Hierarchical Model Entity Relationship Model <ul style="list-style-type: none"> - Entity Set, Attribute, Relationship Set Entity Relationship Diagram (ERD) Extended features of ERD	20%
III	Relational Databases Introduction Terms <ul style="list-style-type: none"> - Relation, Tuple, Attribute, Cardinality, Degree, Domain Keys <ul style="list-style-type: none"> - Super Key, Candidate Key, Primary Key, Foreign Key Relational Algebra Operations <ul style="list-style-type: none"> - Select, Project, Union, Difference, Intersection, Cartesian, Product, Natural Join 	20%
IV	Relational Database Design Introduction, Anomalies of un normalized database Normalization, Normal Forms: 1 NF, 2 NF, 3 NF, 4 NF, BCNF, DKNF	20%
V	SQL (Structured Query Language) Introduction, History Of SQL, Basic Structure DDL Commands: CREATE, ALTER, DROP, TRUNCATE DML Commands: SELECT, INSERT, UPDATE, DELETE Clauses : FROM, GROUP BY, HAVING, ORDER BY, IN Aggregate Functions: AVG, COUNT, FIRST, LAST, MIN, MAX, SUM Simple Queries and Nested Queries MS Access Forms and Reports	20%
Basic Text & Reference Books :-		
1.	Database System Concepts By Henry Korth and A. Silberschatz	
2.	An Introduction to Database System by Bipin Desai	

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Paper Code: CCCS310		Total Credit : 4	
Title of Paper: Database Management System – I		Total Marks : 70	
		Time : 3 Hrs	
Unit	Description	Total Marks	
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Medium / Long Questions. (With Internal Option)	08	

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Paper Code: CCCS311	Total Credit : 4
Title of Paper: Practical Based on CCCS309	Total Marks : 70
	Time : 3 Hrs
Description	
C++ Program List	
<ol style="list-style-type: none">1. Implementation of a scope resolution operator, Manipulators and reference variable2. Implementation of feature of a inline function.3. Implementation of user defined functions and its various features4. Implementation of Class and its basic feature5. Implantation of arrays within a class.6. Show use of "Static Member Function".7. Concept of "Array of Object".8. Concept of "Object as a Arguments".9. Implementation of a friend function and its various features.10. Concept of a returning objects.11. Implementation of constructors and its various features.12. Concept of constructing matrix objects.13. Implementation of destructors.14. Implantation of overloading various operator15. Implementation of inheritance and its types16. Concept of virtual base class.17. Implementation of pointers to objects.18. Implementation of <i>this</i> pointer.19. Implementation of virtual function.20. Implantation of file and its various operations21. Implementation of exception handling	

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Paper Code : CCCS311		Total Credit : 4	
Title of Paper: Practical Based on CCCS309		Total Marks : 70	
		Time : 3 Hrs	
Unit	Description		Total Marks
I	Q.1 (A) Viva – Voce	20	70
	Q.1 (B) Practical	50	

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Paper Code: CCCS312		Total Credit : 4 Total Marks : 70 Time : 3 Hrs
Title of Paper: Practical Based on CCCS310 and Elective Courses		
Unit		
Description		
	<ol style="list-style-type: none"> 1. To create ER diagrams using MS Access and at least one other such tool e.g. MS Visio. 2. To create a database from given ER diagram. 3. To understand Primary Key constraint. (<i>Given an ERD, the students shall identify suitable primary keys for each table.</i>) 4. To understand Foreign Key constraint. (<i>Identify suitable relationships and foreign keys and granularity of the relationship for given ERD.</i>) 5. The instructor shall formulate appropriate laboratory exercises which can result into good understanding of : <ol style="list-style-type: none"> a. Data definition commands: CREATE, ALTER, DROP and TRUNCATE. b. Data manipulation commands: INSERT, UPDATE and SELECT. c. Clauses in SQL : FROM, GROUP BY, HAVING, ORDER BY, IN d. Nested queries e. Aggregate functions: AVG, COUNT, FIRST, LAST, MIN, MAX, SUM f. Project, Union, Difference, Intersection, Cartesian Product and Natural Join. 6. To create forms and reports in MS Access: student should be able to create a tiny self sufficient application in MS Access. 7. To understand need of normalization: the instructor shall present students with a spreadsheet and show anomalies in it (e.g. data redundancy, multiple updates etc.) and show how relational database can be used to remove these anomalies. 8. To normalize given database (or spreadsheet) up to given normal form. 9. To understand the differences between various normal forms. 10. To understand design of a real life database used by an organization. 	

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Paper Code : CCCS312		Total Credit : 4	
Title of Paper: Practical Based on CCCS310 and Elective Courses		Total Marks : 70	
		Time : 3 Hrs	
Unit	Description		Total Marks
I	Q.1 (A) Viva – Voce	20	70
	Q.1 (B) Practical	50	

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Paper Code: FCCS304		Total Credit : 4 Total Marks : 70 Time : 3 Hrs
Title of Paper: Mathematical Foundation of Computer Science – II		
Unit		
	Description	Weighting
I	Connectives Introduction Statements, Connectives, Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Equivalence of formulae and well-formed formulae, Two state devices, Gate and module, Two level networks, NOR and NAND gates.	20%
II	Poset and Lattices Introduction, Posets, Lattices as Posets, Lattices as algebraic systems, Sublattices, Complete Lattices, Bounds of Lattices, Modular and distributive lattices	20%
III	Algebraic System Binary operations, Semigroups, Groups, Homomorphism, Rings, Integral domains, Fields.	20%
IV	Data Analysis – I Measures of dispersions: range; quartile deviation; mean deviations, Standard deviations	20%
V	Data Analysis – II Introduction to Correlation, Methods of finding coefficient of correlation Rank Correlation	20%
Basic Text & Reference Books :-		
1.	S.Lipschutz and Marc Lars Lipson : Discrete Mathematics, Schaum's series(Interational edition,1992)	
2.	Vinay Kumar: Discrete Mathematics (BPB Publication,First edition-2002)	
3.	S. C. Gupta, Fundamentals of Statistics, Himalaya Publishing House, 2004	

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Paper Code: FCCS304		Total Credit : 4	
Title of Paper: Mathematical Foundation of Computer Science - II		Total Marks : 70	
		Time : 3 Hrs	
Unit			
Description		Total Marks	
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Medium / Long Questions. (With Internal Option)	08	

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Paper Code: CCCS306		Total Credit : 4 Total Marks : 70 Time : 3 Hrs
Title of Paper: Operating Systems		
Unit		
	Description	Weighting
I	Introduction to Operating System, Functions of OS Different types of Operating Systems: Real time, Multi-user, Time sharing OS Structure – Monolithic, Layered, Virtual Machine, Client-Server CPU Scheduling: Introduction to process, process control block, process scheduling	20%
II	FCFS Scheduling, SJF scheduling, Priority scheduling, Round Robin Scheduling Memory Management: Concept, Basic memory management techniques;, Swapping, Virtual Memory System, Demand Paging 1) The Optimal Page Replacement Algorithm 2) The NRU Page Replacement Algorithm 3) The FIFO Page Replacement Algorithm 4) The second change Page Replacement Algorithm 5) The clock Page Replacement Algorithm	20%
III	Introduction to Cooperating process Process Synchronization, Critical Section Problem Two process solution, Multiple process solution Semaphores and race condition, Deadlock and characterization, Starvation, RAID	20%
IV	Introduction to Linux System & History Features of Linux Introduction to File System & Memory Management Basic Commands: login, logout, date, man, pwd, who, whoami, dir, ls, cd, mkdir, rmdir Use of Wild card characters and introduction to vi editor Introduction to environment variable like HOME, PATH, PS 1 Types of FAP, use of chmod command	20%
V	Basic commands like cp, mv, rm, rev, file redirection, grep, cut, paste, find sort commands with example Introduction to shell script: execution of it, shell script variable, expr, test commands Control structure: if, if..else, case structure Iteration: while, for construct, break, continue, exit commands	20%
Basic Text & Reference Books :-		
1.	Andrew S. Tanenbaum: Operating System deign & Implementation, Prentice Hall International	
2.	James Peterson and Abraham Silberschatz: Operating System Concept, Addition Wesley	
3.	Linux Commands Instant reference – Bryan Pfaffenberger, BPB Publication	
4.	Advanced Linux Programming – Samuel, Techmedia Publications	

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Paper Code: CCCS306		Total Credit : 4	
Title of Paper: Operating Systems		Total Marks : 70	
		Time : 3 Hrs	
Unit	Description	Total Marks	
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Shell Script Program. (With Internal Option)	08	

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Paper Code: CECS307		Total Credit : 4 Total Marks : 70 Time : 3 Hrs
Title of Paper: Advanced Computer Architecture		
Unit		
	Description	Weighting
I	Fundamentals of Computer design: Instruction set principles and examples- classifying instruction set - memory addressing- type and size of operands - addressing modes for signal processing-operations in the instruction set- instructions for control flow- encoding an instruction set. Overview of Parallel Processing and Pipelining Processing Necessity of high performance, Constraints of conventional architecture, Parallelism in uniprocessor system, Evolution of parallel processors, Architectural Classification, Applications of parallel processing	20%
II	Parallel Computer methods: Multiprocessor and multi computers – Shared-Memory multiprocessors, Distributed-Memory Multiprocessors. Multi-vector and SIMD computers. PRAM and VLSI models - Architectural development tracks - Multiple-Processor Tracks, Multi-vector and SIMD Tracks, Multi-threaded and Dataflow Tracks. Program and Network properties: Conditions of parallelism - Program partitioning and scheduling - Program flow mechanism - System interconnect architecture. Principles of Scalable Performance: Performance metrics and measures - Speedup performance laws - Scalability analysis and approaches	20%
III	Processors and Memory Hierarchy: Advanced processor technology - Super scalar and vector processors - Memory hierarchy technology - Virtual memory technology. Bus, Cache and Shared Memory: Bus System-Cache memory organizations-Shared memory organization-Sequential and weak consistency models.	20%
IV	Instruction level Parallelism & Data Parallel Architectures: Instruction level parallelism (ILP)- over coming data hazards-reducing branch costs –high performance instruction delivery-hardware based speculation- limitation of ILP - ILP software approach- compiler techniques- static branch protection- VLIW approach- H.W support for more ILP at compile time- H.W verses S.W solutions - SIMD Architectures – Associative and Neural Architectures – Data-Parallel Pipelined and Systolic Architectures – Vector Architectures	20%
V	Multiprocessors and Thread level parallelism: Multi-threaded Architectures, Distributed Memory MIMD Architectures, Shared Memory Architectures. Architecture of Multi-threaded processors, Latency hiding techniques, Principles of multithreading, Issues and solutions. Synchronization and Multiprocessing modes – Shared-Variable program structures, Message Passing program development, Mapping programs onto Multicomputers	20%
Basic Text & Reference Books :-		
1.	Dezso Sima, Terence Fountain, Peter Kacsuk, “Advanced Computer Architectures – A Design Space approach”, Pearson Education, 2009	
2.	Kai Hwang, “Advanced Computer Architecture – Parallelism, Scalability, Programmability”, Tata McGraw-Hill, 2008	
3.	John L. Hennessy and David A. Patterson, “Computer architecture – A quantitative approach”, Morgan Kaufmann / Elsevier Publishers, 5 th Edition	

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Paper Code: CECS307			Total Credit : 4 Total Marks : 70 Time : 3 Hrs
Title of Paper: Advanced Computer Architecture			
Unit	Description		Total Marks
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions based on Table Designing. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Medium / Long Questions. (With Internal Option)	08	