KSKV Kachchh University
Program: BCA
Semester: III
Syllabus with effect from June 2017

Course Type	Course Code	Name of the Course	T/P	Credit	Exam Duration In Hrs	Components Of Marks		
						Internal	External	Total
Core Courses	CCCS-311	Object Oriented Programming with C++	T	4	2:15	40	60	100
	CCCS-312	Advanced Data and File Structures	T	4	2:15	40	60	100
	CCCS-313	Database Management System – II	T	4	2:15	40	60	100
	CCCS-314	Practical based on CCCS-311	P	4	2:15	40	60	100
	CCCS-315	Practical based on CCCS-312, CCCS-313	P	4	2:15	40	60	100
Foundation Courses	FCCS-304	Mathematical Foundation of Computer Science – II	T	4	2:15	40	60	100
Elective Courses (Any One)	CECS-305	E-Commerce and M-Commerce	T	2	2:15	40	60	100
	CECS-306	Advanced Computer Architecture	T	2	2:15	40	60	100
Total				24		280	420	700

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Paper Code: CCCS-311	Total Credit : 2
Title of Paper: Object Oriented Programming with C++	Total Marks : 60
	Time : 2:15 Hrs

Unit	Description	Weighting
I	**Introduction** Procedure – oriented programming, Object oriented programming paradigm, Basic concepts of object oriented Programming, Benefits of object oriented programming, Application of object oriented programming, Application of c++, Input/output operators, Structure of c++ program Tokens : keywords, identifiers, basic data types, user defined types, derived data types, symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables Operators in C++: scope resolution operator, member referencing operator, memory management operator, manipulators, type cast operator. Expression : Expression and their types, special assignment operator, implicit conversions, operator precedence, Conditional control structure, Looping control structure	25%
II	**Functions** The main function, Function prototype, Call by reference, Return by reference, Inline function, Default arguments, Const arguments, Functions overloading **Classes and Objects** C structures revisited, Specifying a class, Defining member functions, nesting of Member functions, private member function, making outside function inline, Arrays within a class, Memory allocation for objects, Static data member, Static member functions, Arrays of objects, Objects as function arguments, Friendly functions, Returning objects, Const member function, Pointer to members	25%
III	**Constructor and Destructor** Characteristics of constructor, Parameterized constructor, Multiple constructor in a class, Constructor with default argument, Copy constructor, Dynamic initialization of objects, Constructing two dimensional array, Dynamic constructor, Destructors **Operating Overloading** Concept of operator overloading, Over loading unary and binary operators, Overloading of operators using friend Function, Manipulation of string using operators, Rules for operator overloading, Type conversions.	25%

		25%
IV	**Inheritance** Defining derived classes, Types of inheritance (Single, Multiple, Multi-level, Hierarchical, Hybrid), Virtual base class & Abstract class, Constructors in derived class, Nesting of classes. **Pointer, Virtual Functions and Polymorphism** Pointer to Object, Pointer to derived class, this pointer, Rules for virtual function, Virtual function and pure virtual function **Working with Files** File stream classes, Opening and closing a file, Error handling, File modes, File pointers, Sequential I/O operations, Updating a file (Random access), Command line arguments	

Basic Text & Reference Books :-	
1.	Object Oriented Programming in C++ - E.Balagurusamy, BPB
2.	Let us C++ - Yashvant Kanitkar, BPB

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Paper Code:CCCS-311	Total Credit : 2
Title of Paper: Object Oriented Programming with C++	Total Marks : 60 Time : 2:15 Hrs

Unit	Description		Total Marks
I, II, III,IV	Q.1(A) Multiple Choice Questions (MCQ)	07	15
	Q.1 (B) Short Questions (Definitions, Blanks, Full Forms, True/False, Match the Following)	08	
I, II	Q.2(A) Medium Questions (Any Two)	06	15
	Q.2(B) Medium Questions / Long Questions (Any Three)	09	
II,III	Q.3(A) Medium Questions / Long Questions (Any Two)	06	15
	Q.3(B) C++ Program (Any One)	08	
III,IV	Q.4(A) Medium Questions / Long Questions (Any Two)	07	15
	Q.4(B) C++ Program (Any One)	08	

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Paper Code: CCCS-312	Total Credit : 2
Title of Paper: Database Management System – II	Total Marks : 60
	Time : 2:15 Hrs

Unit	Description	Weighting
I	Introduction to SQL, SQL Commands and Data types, Operators and Expressions Creating and Altering tables (Including constraints), Data Manipulation Command like Insert, update, delete, SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL, BETWEEN, EXISTS, LIKE, Joins, subquery	25%
II	Built – In Function of SQL View, Sequence, Synonyms, Database Links, Index, Cluster , Snapshot Grant, Revoke, Role, Creating Users, Introduction to transaction, Starting and Ending of Transaction, Commit, Rollback, Savepoint	25%
III	Introduction to PL/SQL SQL v/s PL/SQL, PL/SQL Block Structure, Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.), %TYPE and %ROWTYPE, Using Cursor(Implicit, Explicit)	25%
IV	**Stored Procedure and Functions** Introduction, Storage and advantages, Creating and using stored procedures and functions **Database Triggers** Introduction and use, Database triggers v/s procedures, Database triggers v/s integrity constraints, Types of triggers, Creating and deleting triggers	25%

Basic Text & Reference Books :-	
1.	SQL,PL/SQL The programming - Lang.Of Oracle, Ivan Bayross – BPB
2.	Using Oracle 8i - Page, Hughes - QUE & PHI Publications

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Paper Code: CCCS-312	Total Credit : 2
Title of Paper: Database Management System – II	Total Marks : 60 Time : 2:15 Hrs

Unit	Description		Total Marks
I	Q.1(A) Medium Questions (Any Two)	07	15
	Q.1(B) Medium Questions / Long Questions (Any Three)	08	
II	Q.2(A) Medium Questions (Any Two)	06	15
	Q.2(B) Medium Questions / Long Questions (Any Three)	09	
III	Q.3(A) Medium Questions / Long Questions (Any Two)	06	15
	Q.3(B) Medium Questions / Long Questions (Any Two)	08	
IV	Q.4(A) Medium Questions / Long Questions (Any Two)	07	15
	Q.4(B) Medium Questions / Long Questions (Any Two)	08	

Paper Code: CCCS-313	Total Credit : 4
Title of Paper: Practical based on CCCS-311	**Total Marks : 60**
	Time : 2:15 Hrs

C++ Program List

1. Implementation of a scope resolution operator, Manipulators and reference variable
2. Implementation of feature of a inline function.
3. Implementation of user defined functions and its various features
4. Implementation of Class and its basic feature
5. 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 operator
15. Implementation of inheritance and its types
16. Concept of virtual base class.
17. Implementation of pointers to objects.
18. Implementation of *this* pointer.
19. Implementation of virtual function.
20. Implantation of file and its various operations
21. Implementation of exception handling

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Paper Code: CCCS-313		Total Credit : 2
Title of Paper: Practical based on CCCS-311		Total Marks : 60
		Time : 2:15 Hrs

Unit	Description		Total Marks
	Q.1 Practical Based on C	40	60
	Q.2 Viva – Voce	20	

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Paper Code: CCCS-313	Total Credit : 4
Title of Paper: Practical based on CCCS-311	Total Marks : 60
	Time : 2:15 Hrs

1. Understanding of DDL, DML and DCL commands (Appropriate queries should be given based on the sample table given)
2. Understanding of built in objects of SQL
3. Understanding of built in function of SQL
4. The instructor shall formulate appropriate laboratory exercises which can result into good understanding of following PL/SQL concepts:
   a. Block structure (three practicals)
   b. Variables and data types (three practicals)
   c. Operators (three practicals)
   d. Control structures (three practicals)
   e. Procedures and functions (five practicals)
   f. Cursors (three practicals)
   g. Triggers (three practicals)

5. Hands-on understanding of any one distributed database (preferably Apache HBase): installation, understanding basic functions, study of algorithms used and applications. (At the end of the student shall write down the findings in the journal.)

6. The instructor shall formulate appropriate laboratory exercises which can result into good understanding of following TCL commands on Oracle database:
   a. Commit
   b. Rollback
   c. Savepoint

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Paper Code: CCCS-314	Total Credit : 2
Title of Paper: Practical based on CCCS-312	Total Marks : 60
	Time : 2:15 Hrs

Unit	Description		Total Marks
	Q.1 Practical Based on C	40	60
	Q.2 Viva – Voce	20	

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Paper Code: FCCS-304	Total Credit : 2
Title of Paper: Mathematical Foundation of Computer Science - II	Total Marks : 60
	Time : 2:15 Hrs

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.	25%
II	**Poset and Lattices** Introduction, Posets, Lattices as Posets, Lattices as algebraic systems, Sublattices, Complete Lattices, Bounds of Lattices, Modular and distributive lattices	25%
III	**Data Analysis – I** Measures of dispersions: range; quartile deviation; mean deviations, Standard deviations	25%
IV	**Data Analysis – II** Introduction to Correlation, Methods of finding coefficient of correlation Rank Correlation	25%

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: FCCS-304	Total Credit : 2
Title of Paper: Mathematical Foundation of Computer Science - II	Total Marks : 60
	Time : 2:15 Hrs

Unit	Description		Total Marks
I	Q.1(A) Medium Questions (Any Two)	07	15
	Q.1(B) Medium Questions / Long Questions (Any Three)	08	
II	Q.2(A) Medium Questions (Any Two)	06	15
	Q.2(B) Medium Questions / Long Questions (Any Three)	09	
III	Q.3(A) Medium Questions / Long Questions (Any Two)	06	15
	Q.3(B) Medium Questions / Long Questions (Any Two)	08	
IV	Q.4(A) Medium Questions / Long Questions (Any Two)	07	15
	Q.4(B) Medium Questions / Long Questions (Any Two)	08	

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Paper Code: CECS-305	Total Credit :4
Title of Paper: Advanced Data Structures	Total Marks : 60
	Time : 2:15 Hrs

Unit	Description	Weighting
I	**Priority Queues and Heaps** What is a Priority 'Queue? Priority Queue ADT, Priority Queue, Applications, Priority Queue Implementations, Heaps and Binary Heaps, Binary Heaps, Heapsort, Priority Queues [Heaps]: Problems & Solutions **Disjoint Sets ADT** Introduction, Equivalence Relations and Equivalence Classes, Disjoint Sets ADT, Applications, Tradeoffs in Implementing Disjoint Sets ADT, Fast UNION Implementation (Slow FIND), Fast UNION Implementations (Quick FIND), Summary, Disjoint Sets: Problems & Solutions	25%
II	**Sorting** What is Sorting? Why is Sorting Necessary? Classification of Sorting Algorithms, Other Classifications, Bubble Sort, Selection Sort, Insertion Sort, Shell Sort, Merge Sort, Heap Sort, Quick Sort, Tree Sort Comparison of Sorting Algorithms, Linear Sorting Algorithms, Counting Sort, Bucket Sort (or Bin Sort), Radix Sort, Topological Sort, External Sorting, Sorting: Problems & Solutions **Searching** What is Searching? Why do we need Searching? Types of Searching Unordered Linear Search, Sorted/Ordered Linear Search, Binary Search, Comparing Basic Searching Algorithms, Symbol Tables and Hashing, String Searching Algorithms, Searching: Problems & Solutions	25%
III	**Graph Algorithms** Introduction, Glossary, Applications of Graphs, Graph Representation Graph Traversals, Topological Sort, Shortest Path Algorithms, Minimal Spanning Tree, Graph Algorithms: Problems & Solutions **Selection Algorithms [Medians]** What are Selection Algorithms? Selection by Sorting, Partition-based Selection Algorithm, Linear Selection Algorithm - Median of Medians Algorithm, Finding the K Smallest Elements in Sorted Order Selection Algorithms: Problems & Solutions	20%
IV	**Symbol Tables** Introduction, What are Symbol Tables? Symbol Table Implementations, Comparison Table of Symbols for Implementations **Hashing** What is Hashing? Why Hashing? HashTable ADT, Understanding Hashing	25%

		Components of Hashing, Hash Table, Hash Function, Load Factor, Collisions, Collision Resolution Techniques, Separate Chaining, Open Addressing, Comparison of Collision Resolution Techniques, How Hashing Gets O(1) Complexity? Hashing Techniques, Problems for which Hash Tables are not suitable, Bloom Filters, Hashing: Problems & Solutions **String Algorithms** Introduction, String Matching Algorithms, Brute Force Method, Robin-Karp String Matching Algorithm, String Matching with Finite Automata, KMP Algorithm, Boyce-Moore Algorithm, Data Structures for Storing Strings, Hash Tables for Strings, Binary Search Trees for Strings, Tries, Ternary Search Trees,Comparing BSTs, Tries and TSTs,Suffix Trees, Strings: Problems & Solutions	
Basic Text & Reference Books :-		
1.	Data Structures And Algorithmic Thinking With Python, Narasimha Karumanchi, CareerMonk Publications	
2.	Introduction to Algorithms, Thomas H. Cormen, Prentice-Hall of India	

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Paper Code: CECS-305		Total Credit : 4
		Total Marks : 60
Title of Paper: Advanced Data Structures		Time : 2:15 Hrs

Unit	Description		Total Marks
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	15
	Q.1 (B) Medium / Long Questions. (With Internal Option)	09	
II	Q.2 (A) Short / Medium Questions (With Internal Option)	06	15
	Q.2 (B) Medium / Long Questions. (With Internal Option)	09	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	15
	Q.3 (B) Medium / Long Questions. (With Internal Option)	09	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	07	17
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	

Paper Code: CECS-306	Total Credit : 4
Title of Paper: E-Commerce and M-Commerce	Total Marks : 60
	Time : 2:15 Hrs

Unit	Description	Weighting
I	**E-Commerce** Introduction -The e-commerce environment - The e-commerce marketplace - Focus on portals, Location of trading in the marketplace - Commercial arrangement for transactions - Focus on auctions - Business models for e-commerce - Revenue models - Focus on internet start-up companies – the dot-com - E-commerce versus E-business.	25%
II	**M-Commerce** Introduction – Infrastructure Of M– Commerce – Types Of Mobile Commerce Services – Technologies Of Wireless Business – Benefits And Limitations, Support, Mobile Marketing & Advertisement, Non– Internet Applications In M– Commerce –Wireless/Wired Commerce Comparisons	25%
III	**M-Commerce – Technology** A Framework For The Study Of Mobile Commerce NTT Docomo's I– Mode Wireless Devices For Mobile Commerce Towards A Classification Framework For Mobile Location Based Services Wireless Personal And Local Area Networks The Impact Of Technology Advances On Strategy Formulation In Mobile Communications Networks	25%
IV	**M-Commerce – Theory and Application** The Ecology Of Mobile Commerce The Wireless Application Protocol Mobile Business Services Mobile Portal Factors Influencing The Adoption Of Mobile Gaming Services Mobile Data Technologies And Small Business Adoption And Diffusion M–Commerce In The Automotive Industry Location– Based Services: Criteria For Adoption And Solution Deployment The Role Of Mobile Advertising In Building A Brand M– Commerce Business Models	25%

Basic Text & Reference Books :-

1.	Dave Chaffey, "E-Business and E-Commerce Management", Third Edition, 2009, Pearson Education
2.	Brian E. Mennecke, Troy J. Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group Inc., IRM press, 2003.
3.	Paul May, "Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business" Cambridge University Press March 2001

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Paper Code: CECS-306		Total Credit : 4 Total Marks : 60
Title of Paper: E-Commerce and M-Commerce		Time : 2:15 Hrs

Unit	Description		Total Marks
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	15
	Q.1 (B) Medium / Long Questions. (With Internal Option)	09	
II	Q.2 (A) Short / Medium Questions (With Internal Option)	06	15
	Q.2 (B) Medium / Long Questions. (With Internal Option)	09	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	15
	Q.3 (B) Medium / Long Questions. (With Internal Option)	09	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	07	17
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	