


CMR Institute of Technology, Bangalore		
Department :Master of Computer Applications		
Semester: 02	Section(s): A	
Data Structures using C	13MCA21	Lectures/week: 05
Course Instructor(s): Dr Senthil S		
Course duration: Feb 2016 – May 2016		

Prerequisites:

Problem Solving using C (13MCA11)

- Data Types
- Structure
- Arrays
- Functions
- Pointers
- Dynamic Memory Allocation (DMA)

Class #	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1	TB1: 1.1 & 1.2	Information and its meaning	19 %	19 %
2		Abstract Data Types		
3		Sequences as Value Definitions		
4		ADT for Varying length character Strings		
5		Data Types		
6		Pointers and review of Pointers		
7		Data Structures. Arrays		
8		Array as an ADT		
9		Using One-dimensional Arrays		
10		Implementing One- Dimensional Arrays		
11		Arrays as Parameters		
12		Handling of Character Strings and Character Strings		
13	TB1: 2.1 to 2.3	Definition and examples , Primitive operations, Example	15 %	34 %
14		The stack as an ADT, Representing stacks		
15		Implementing the pop operation, Testing for exceptional conditions , Implementing the push operations		
16		Examples for infix , postfix, and prefix expressions, Basic definition and Examples		
17		Program to evaluate a postfix expression		
18		Converting an expression from infix to postfix		
19		Program to convert an expression from infix to postfix		
20		Applications of Stacks:		
21		Expression Evaluations		
22	TB1: 3.1 to 3.3	Recursive definition and processes, Factorial function, Multiplication of natural numbers	5 %	39 %
23		Fibonacci sequence, Binary search		
24		Properties of recursive definition or algorithm		
25		Binary search, Towers of Hanoi problem		
26	TB1: 4.1 to 4.3, 4.5	The queue and its sequential representation, the queue as ADT, Insert operation	26 %	65 %
27		Priority queue, Array implementation of a priority queue		
28		Linked lists, Inserting and removing nodes from a list, Linked implementations of stacks		
29		getnode and Freenode operations, Linked implementation of queues		

30		Linked list as a data Structure		
31		Example of list operations, Header nodes		
32		Array implementation of lists, Limitations of array implementation		
33		allocating and freeing dynamic variables		
34		Linked lists using dynamic variables		
35		Non integer and non-homogenous lists		
36		Other list structures: Circular lists		
37		Stack as a circular lists		
38		doubly linked lists		
39		Application of Linked Lists		
40		Stacks, Queues		
41		Double-ended Queues, Priority Queues		
42	TB1: 6.2 to 6.5	Bubble sort, Quick sort	15 %	80 %
43		Selection sort, Tree Sorting		
44		Binary Tree Sort		
45		Heap Sort		
46		Insertion Sorts		
47		Simple Insertion		
48		Shell Sort		
49		Address Calculation Sort		
50		Merge and Radix Sort		
51	TB1: 7.1, 7.2 7.4	Basic Search Techniques: Algorithmic Notations, Sequential searching	10 %	90 %
52		Searching an ordered table, Indexed sequential search, Binary search		
53		Interpolation search, Tree searching		
54		Inserting into a Binary Search Tree		
55		Deleting form a binary search tree		
56	Hashing : Resolving hash clashes by open addressing, Choosing a hash Function			
57	TB1: 5.1 to 5.2	Tree traversals	10 %	100 %
58		Binary Search Tree and Operations		
59		AVL Tree and Operati ons		
60		Red-Black Tree		
61		Threaded binary trees and operations		
62	Threaded binary trees and operations			


Syllabus for Sessionals :

Sessional #	Syllabus
T1	Class # 01 -25
T2	Class # 26 - 48
T3	Class # 49 - 62

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition&Publisher	ISBN #
Text Book	TB1	YediyahLangsam and Moshe J. Augenstein and Aaron M Tenanbanurñ Data Structures Using C and C++	2nd Edition, Pearson EducationAsia, 2002.	8120311779
Reference Book	RB1	Mark Allen Weiss' Data Structures and Algorithm Analysis in C	2nd Edition, Pearson Education Aisa, 1997	0201498405

Reference Book	RB2	Richard F Giberg and Behrouz A Forouzan   Data Structures- A Pseudo code Approach with C#	2nd Edition, Cengage Learning	0534390803
Reference Book	RB3	Robert Kruse, C L Tondo, Bruce Leung and ShashiMogal   Data Structures and Program Design in C#	2nd Edition, Pearson Education	8177584235

CMR Institute of Technology, Bangalore		
Department(s): Master of Computer Applications		
Semester: 02	Section(s): A	
Object Oriented Programming using C++	13MCA22	Lectures/week: 05
Course Instructor(s): Ms. Varsha P		
Course duration: Feb 2016 - 23 May 2016		

Prerequisite : C programming language. Concepts of variables, data types ,functions ,pointers, structures etc

Class #	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1		Introduction to C++ , Object Oriented Concepts.		
2	TB2 : 1 Chapter	Object Oriented Paradigm,	6%	6%
3		Structure vs. Object Oriented Paradigm		
4		Elements of Object Programming, Object, class		
5		Encapsulation, data abstraction, Inheritance, Polymorphism etc.		
6	TB2 : 2 to 5 chapters	Introduction to Different data types, expressions,	6%	12%
7		Qualifiers, arrays and strings		
8		Reference variables		
9		Reference Variable		
10	TB1 : 6 chapter	Function Components	16 %	28 %
11		argument passing,		
12		inline functions		
13		function overloading		
14		function Template		
15		Class Template		
16		recursive functions		
17	recursive functions			
18	TB1 :12, 13, 14, 15 chapters	Introduction, Class Specification, Class Objects	28 %	56%
19		Access members, Defining member functions,		
20		Access members, Defining member functions,		
21		Data hiding		
22		Constructors, Destructors, Parameterized constructors		
23		Parameterized constructors		
24		Static data members,		
25		Functions, Scope resolution operator,		
26		Passing objects as arguments		
27		Returning Objects		
28		Arrays of objects,		
29		Friend functions,		
30		Dynamic objects-Pointers to objects		
31		Copy constructors		
32		Generic functions and classes		
33		Operator overloading using friend functions such as ++, --, []		
34		Operator overloading using friend functions such as ++, --, []		
35		Operator overloading using friend functions such as ++, --, []		
36	TB1 : 16 to 18 chapters	Base Class, Inheritance and protected members	28%	84 %
37		Protected base class inheritance		
38		Inheriting multiple base classes		
39		Constructors, Destructors and Inheritance		
40		Passing parameters to base class constructors		

41		Passing parameters to base class constructors		
42		Granting access, Virtual base classes, Virtual function		
43		Calling a Virtual function through a base class reference		
44		Virtual attribute is inherited		
45		Virtual functions are hierarchical		
46		Pure virtual functions, Abstract classes		
47		Using virtual functions, Early and late binding.		
48		IO Stream Library, output operator <<, input >> ,		
49		Overloading the i/p << , overloading i/o operator >> ,		
50		Overloading i/o operator >>		
51		file input and output.		
52		Exception handling fundamentals		
53		Exception handling options		
54	TB2 : 19-21 , 24 chapters	Exception handling options	16 %	100 %
55		STL: An overview		
56		containers		
57		vectors		
58		vectors		
59		lists		
60		lists		
61		maps		
62		maps		

Syllabus for Sessionals :

Sessional #	Syllabus
T1	Class # 04 17
T2	Class # 18 47
T3	Class # 48- 62

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book	TB1	Herbert Schildt: C++ The Complete Reference, 4th Edition,	Tata McGraw Hill, 2007.	ISBN=0071502394
References	RB1	Stephen Prata : C++ Primer Plus, 6th Edition,	Pearson Education.	ISBN-13: 978-0321776402
References	RB2	Al Stevens: C++ Programming, 7th Edition,	Wiley India Publications	ISBN-13: 978-81-265-0398-8
References	RB3	Stanley B.Lippmann, Josee Lajore: C++Primer, 4th Edition,	Addison Wesley, 2005.	ISBN 0-321-71411-3

CMR Institute of Technology, Bangalore  
 Department(s): Master of Computer Applications



Semester: 02      Section(s): A  
 Operating Systems      13MCA23      Lectures/week: 05

Course Instructor(s): New Faculty  
 Course duration: Feb 2016 - May 2016

**Prerequisites:**

The prerequisites for Operating System is the basic knowledge of Computer and its functions. For example: What is a Computer, Memory, CPU etc.

Class #	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1	TB2: 1.1 to 1.10 TB2: 2.2 to TB1: 2.4	Basic Elements, Processor Registers, Instruction Execution,	11%	11%
2		Interrupts, The Memory Hierarchy, Cache Memory, I/O Communication Techniques		
3		Introduction to Operating System, Mainframe Systems,		
4		Desktop Systems, Multiprocessor Systems, Distributed Systems		
5		Clustered Systems, Real - Time Systems,		
6		Handheld Systems, Feature Migration		
7		Computing Environments		
8	TB2: 3.1 to 3.8	System Components, Operating System Services	10%	21%
9		System Calls, System Programs		
10		System Structure, Virtual Machines		
11		System Design and Implementation		
12	System Generation	12%	33%	
13	Process, Process States, Process Description,			
14	Process Control, Execution of the Operating System			
15	Security Issues, Processes and Threads,			
16	Symmetric Multiprocessing(SMP), Micro kernels			
17	CPU Scheduler and Scheduling.	12%	45%	
18	CPU Scheduler and Scheduling.			
19	Principles of Concurrency			
20	Mutual Exclusion			
21	Hardware Support			
22	Semaphores			
23	Monitors			
24	Message Passing			
25	Readers/Writes Problem	8%	53%	
26	Principles of Deadlock,			
27	Deadlock Prevention			
28	Deadlock Avoidance			
29	Deadlock Detection			

30		An Integrated Deadlock Strategy		
31		Dining Philosophers Problem		
32	T.B2: 9.1 to 9.6 T.B2: 10.1 to 10.6	Swapping,	15%	68%
33		Contiguous Memory Allocation		
34		Paging		
35		Segmentation		
36		Segmentation with Paging		
37		Demand Paging		
38		Process Creation		
39		Page Replacement		
40		Allocation of Frames		
41		Thrashing		
42	TB2: 11.1 to 11.2, TB: 12.1 to 12.6	File Concept, Access Methods	13%	81%
43		Directory Structure		
44		File-System Mounting		
45		File Sharing, Protection,		
46		File-System Structure, File System		
47		Implementation		
48		Directory Implementation		
49		Allocation Methods		
50	T.B2: 14.1 to 14.3, T.B2: 19.1 to 19.4	Free-Space Management.	8%	89%
51		Disk Structure, Disk Scheduling		
52		Disk Management		
53		The Security Problem		
54		User Authentication		
55		Program Threats		
56	T.B2: 20.1 to 20.9	System Threats.	11%	100%
57		Linux System , Linux history		
58		Design Principles		
59		Kernel modules		
60		Process management		
61		scheduling		
62		Memory management, File systems, Input and output, Inter-process communications.		

Syllabus for Sessionals:

Sessional #	Syllabus
T1	Class # 01 – 18
T2	Class # 18 - 41
T3	Class # 42 - 62

Literature:

Book Type	Code	Author & Title	Publication info
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			Edition & Publisher	ISBN #
Text Book	TB1	Operating Systems	Thakur Publishers	978-93-82249-52-8
Text Book	TB2	Silberschatz, Galvin, Gagne, "Operating System Concepts"	John Wiley, Sixth Edition, 2004	9812-53-055-X
Text Book	TB3	William Stallings, "Operating Systems – Internals and Design Principles"	Pearson, 6th edition, 2012	978-81-317-2528-3
References	RB1	Chakraborty, "Operating Systems"	Jaico Publishing House, 2011.	9788179929766.
References	RB2	Dhananjay M. Dhamdhere, "Operating Systems – A Concept-Based Approach"	Tata McGraw Hill, 3rd Edition, 2012	978-1-25-900558-9
References	RB3	Elmasri, Carrick, Levine, "Operating Systems – A spiral Approach"	Tata McGraw Hill, 2012	978-0072449815



CMR Institute of Technology, Bangalore



Department(s): Master of Computer Applications

Semester: 02 Section(s): A

System Software 13MCA24 Lectures/week: 05

Course Instructor(s): Mr Nagarajan S

Course duration: Feb 2016 - May 2016

**Prerequisites:**

Basic knowledge of Computer architecture and Assembly language programming is needed. Basics of Interpreter, Compiler, Assembler, Loader and Linker, Editors and Macro processors is required.

Class #	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1	TB1: 1.1 to 1.3.3	Introduction to System Software	11%	11%
2		System Software and Machine Architecture		
3		Simplified Instructional Computer		
4		SIC Machine Architecture		
5		SIC/XE Machine Architecture till Instruction Formats		
6		SIC/XE Machine Architecture Addressing modes		
7		SIC Programming Examples		
8	TB1 : 2.1 to 2.5.1	Basic Assembler Functions, A simple SIC Assembler	23 %	34%
9		Assembler Algorithm		
10		Assembler Data Structures		
11		Machine Dependent Assembler Features Instruction Formats		
12		Machine Dependent Assembler Features Addressing Modes		
13		Machine Dependent Assembler Features Program Relocation		
14		Machine Independent Assembler Features Literals,		
15		Machine Independent Assembler Features - Symbol-Definition Statements, Expressions		
16		Machine Independent Assembler Features Program Blocks		
17		Control Sections and Program Linking		
18		Assembler Design Options One Pass Assembler		
19		Assembler Design Options Multi Pass Assembler		
20		Implementation Examples MASM Assembler		
21	Implementation Examples on Other Assemblers			
22	TB1: 3.1 to 3.4, 3.5.1	Basic Loader Functions Design of an Absolute Loader	17%	51%
23		A Simple Bootstrap Loader		
24		Machine Dependent Loader Features Relocation		
25		Machine Dependent Loader Features - Program Linking		
26		Algorithm for a Linking Loader		
27		Data Structures for a Linking Loader		
28		Machine Independent Loader Features Automatic Library Search		
29		Loader Options		
30		Loader Design Options - Linkage Editor		


31		Loader Design Options - Dynamic Linkage, Bootstrap Loaders		
32		Implementation Examples MS DOS Linker		
33	TB1: 7.2, 7.3	Text Editors- Overview of Editing Process	10%	61%
34		User Interface		
35		Editor structure- explanation with diagram		
36		Debugging Functions and capabilities		
37		Relationship with Other Parts of the System		
38		User Interface Criteria		
39	TB1: 4.1 to 4.4	Basic Macro Processor Functions Macro Definitions and Expansion	16%	77%
40		Macro Processor Algorithm and Data Structures		
41		Machine Independent Macro Processor Features		
42		Concatenation of Macro Parameters		
43		Generation of Unique Labels		
44		Conditional Macro Expansion		
45		Keyword Macro Parameters, Macro Processor Design Options		
46		Recursive Macro Expansion		
47		General-Purpose Macro Processors		
48		Macro Processing Within Language Translators		
49	TB1: 5.1 to 5.4	Implementation Examples-MASM Macro Processor, ANSI C Macro Processor	23%	100%
49		Basic Compiler Functions		
50		Grammars		
51		Lexical analysis		
52		Modeling scanners as Finite Automata		
53		Syntactic Analysis		
54		Code Generation		
55		Machine Dependent Compiler features Intermediate Form of the program		
56		Machine dependent Code Optimization		
57		Machine Independent Compiler features – Structured Variables		
58		Machine Independent Code optimization		
59		Compiler Design options Division into Passes		
60		Interpreters		
61		P-code Compilers		
62	Compiler- Compilers			

### Syllabus for Sessionals:

Sessional #	Syllabus
T1	Class # 04- 21
T2	Class # 22 - 42
T3	Class # 43- 62

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book	TB1	Leland L. Beck, D. Manjula "System Software"]	3 <sup>rd</sup> Edition, Addison-Wesley, 1997	81-7808-036-2
References	RB1	D.M. Dhamdhere, "System Programming and Operating Systems"]	2 <sup>nd</sup> Edition, Tata McGraw Hill, 1999	978-0074630839

CMR Institute of Technology, Bangalore		
Department(s): Master of Computer Applications		
Semester: 02	Section : A	
Database Management Systems	13MCA25	Lectures/week: 05
Course Instructor(s): Ms. Vijayalakshmi B		
Course duration: Feb 2016 - May 2016		

**Prerequisites:**

Data, Information, Application, File Structure, Computer Systems.

Class #	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1	Unit 1 : INTRODUCTION/ TB1: 1.1 to 1.8 AND 2.1 to 2.6	An example; Characteristics of Database approach.	13	13
2		Actors on the screen; Workers behind the scene; Advantages of using DBMS approach.		
3		A brief history of database applications; when not to use a DBMS.		
4		Data models, schemas and instances; Three-schema architecture and data independence.		
5		Data models, schemas and instances; Three-schema architecture and data independence.		
6		Database languages and interfaces; The database system environment.		
7		Centralized and client-server architectures.		
8		Classification of Database Management systems.		
9	Unit 2 : ENTITY - RELATIONSHIP MODEL / TB1: 3.1 to 3.9 6.5.	Using High-Level Conceptual Data Models for Database Design. An Example Database Application.	13	26
10		Entity Types, Entity Sets, Attributes and Keys		
11		Relationship types, Relationship Sets.		
12		Roles and Structural Constraints;		
13		Weak Entity Types; Refining the ER Design, ER Diagrams.		
14		Naming Conventions and Design Issues;		
15		Relationship types of degree higher than two.		
16		Relational Database Design Using ER- to-Relational Mapping		
17	Unit 3 : RELATIONAL MODEL AND RELATIONAL	Relational Model Concepts.	23	49
18		Relational Model Concepts.		
19		Relational Model Constraints and Relational Database Schemas.		
20		Relational Model Constraints and Relational		

	ALGEBRA /	Database Schemas.		
21	TB1 : 5.1 to 5.3 AND 6.1 to 6.5.	Update Operations, Transactions and dealing with constraint violations;		
22		Update Operations, Transactions and dealing with constraint violations;		
23		Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory.		
24		Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory.		
25		Binary Relational Operations : JOIN and DIVISION.		
26		Binary Relational Operations : JOIN and DIVISION.		
27		Additional Relational Operations.		
28		Additional Relational Operations.		
29		Examples of Queries in Relational Algebra.		
30		Examples of Queries in Relational Algebra.		
31	Unit 4 : SQL / TB1 : 8.1 to 8.9 9.1 to 9.4	SQL Data Definition and Data Types.	26	75
32		Specifying basic constraints in SQL.		
33		Schema change statements in SQL.		
34		Basic queries in SQL.		
35		More complex SQL Queries.		
36		Insert, Delete and Update statements in SQL.		
37		Insert, Delete and Update statements in SQL.		
38		Specifying constraints as Assertion and Trigger.		
39		Views (Virtual Tables) in SQL.		
40		Views (Virtual Tables) in SQL.		
41		Additional features of SQL.		
42		Additional features of SQL.		
43		Database programming issues and techniques.		
44		Database programming issues and techniques.		
45		Embedded SQL, Dynamic SQL.		
46		Database stored procedures and SQL / PSM.		
47	Unit 5 : DATABASE DESIGN / TB1 : 10.1 to 10.5	Informal Design Guidelines for Relation Schemas.	16	91
48		Informal Design Guidelines for Relation Schemas.		
49		Functional Dependencies.		
50		Functional Dependencies.		
51		Normal Forms Based on Primary Keys.		
52		Normal Forms Based on Primary Keys.		
53		Normal Forms Based on Primary Keys.		
54		General Definitions of Second and Third Normal Forms.		
55		Boyce-Codd Normal Form.		
56		Boyce-Codd Normal Form.		

57	Unit 6 : PL/SQL	Introduction, Language fundamentals	9	100
58		Conditional and sequential control		
59		Iterative processing and loops		
60		Exceptional handlers, triggers		
61		Functions, Procedures		
62		Creating and planning PL/SQL		

Syllabus for Sessionals :

Sessional #	Syllabus
T1	Class # 04 #16
T2	Class # 17 - #46
T3	Class # 47 - #62

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book	TB1	Elmasri and Navathe Fundamentals of Database Systems	5 <sup>th</sup> edition, Pearson Education	978-81-317-1625-0
References	RB1	Ramakrishna and Johannes Gehrke, " Database Management Systems.	3 <sup>rd</sup> Edition, McGraw-Hill, 2003.	0-07-123151-X
References	RB1	Silberschatz, Korth and Sudharshan: Data base System Concepts.	5 <sup>th</sup> Edition, McGrawHill ,2006	0-07-295886-3
References	RB3	Database Principles Fundamentals of Design, Implementation and Management by Coronel, Morris	Rob-Cengage Learning,2012	978-1-133-31197-3