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No.AC.2(S)/507/12-13

Dated: 01-06-2013.

**NOTIFICATION**

**Sub:** Revision of the Syllabus of B.Sc. Computer Science.

- Ref:** 1. Proceedings of Faculty of Science & Technology Meeting held on 21-02-2013.  
2. Proceedings of the Meeting of Academic Council held on 27-03-2013.

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The Board of Studies in **Computer Science (UG)** at its meeting held on 21-12-2012 has resolved to revise the syllabi of B.Sc. Computer Science which is one of the Optional Subjects to be effect from the academic year 2013-14.

The Faculty of Science and Technology and the Academic Council at their meetings held on 21-02-2013 and 27-03-2013 respectively approved the above proposals and the same is hereby notified.

The copy of Revision of the Syllabus of B.Sc. Computer Science is annexed herewith.

*for S. Sampath*  
**REGISTRAR.** *slatha*

**To**

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Chairperson, BOS/DOS in Computer Science, MGM.
3. The Dean, Faculty of Science & Technology, DOS in Zoology, MGM.
4. The Principals of the Affiliated Colleges running B.Sc. course.
5. The Director, College Development Council, UOM, Mysore
6. The Deputy/Assistant Registrar (Evaluation), University of Mysore, Mysore.
7. Sri Narasimha Murthy, Statistician, E.B. UOM, Mysore.
8. The Supdt. AC.1 & AC.2, A.B., Academic Section, UOM., Mysore.
9. The P.A. to the Vice-Chancellor/Registrar/Registrar( Evaluation), UOM., Mysore.
10. The Case Worker, AC.7, Academic Section, University of Mysore, Mysore.
11. The Section Guard File(Supdt.AC.2), A.B., A.C., UOM.
12. The Schedule File.

**UNIVERSITY OF MYSORE**  
**PROPOSED REVISED SYLLABI, REGULATIONS &**  
**SCHEME OF STUDY FOR BSc.(COMPUTER SCIENCE)**  
**2013-2014**

**Pre amble:-**

BSc., Computer Science and BCA syllabi had been framed and executed since from the academic year 2005 – 2006 and 2007 – 2008, respectively. After completion of 5 years of tenure and in tune with the industrial requirements, the Board of Studies has felt that, both the BSc Computer Science and BCA (Degree) syllabi has to be revised and put in to the effect from the academic year 2013-2014.

**UNIVERSITY OF MYSORE**  
**B.Sc Syllabus (Revised-2013-2014)**

**SEMESTER: 1**

<b>Sl. No.</b>	<b>Subject Code</b>	<b>Title</b>	<b>Remarks</b>	<b>Max. Marks</b>
1.	MA280	Paper 1: Computer Concepts and C Programming	Theory Exam Paper - 1	60
2.	MA281	- ” -	Theory IA Paper - 1	10
3.	MA282	C Programming Lab – 1.	Practical Exam Paper - 1	20
4.	MA283	- ” -	Practical IA Paper - 1	10
<b>Total Marks</b>				100

**SEMESTER: 2**

<b>Sl. No.</b>	<b>Subject Code</b>	<b>Title</b>	<b>Remarks</b>	<b>Max. Marks</b>
1.	MB280	Paper 2: Data Structure Applications with C	Theory Exam Paper - 2	60
2.	MB281	- ” -	Theory IA Paper - 2	10
3.	MB282	Data Structures Programming Lab – 2.	Practical Exam Paper - 2	20
4.	MB283	- ” -	Practical IA Paper - 2	10
<b>Total Marks</b>				100

**SEMESTER: 3**

<b>Sl. No.</b>	<b>Subject Code</b>	<b>Title</b>	<b>Remarks</b>	<b>Max. Marks</b>
1.	MC280	Paper 3: Data Base Management System	Theory Exam Paper - 3	60
2.	MC281	- ” -	Theory IA Paper - 3	10
3.	MC282	Data Base Management System Lab – 3.	Practical Exam Paper - 3	20
4.	MC283	- ” -	Practical IA Paper - 3	10
<b>Total Marks</b>				<b>100</b>

**SEMESTER: 4**

<b>Sl. No.</b>	<b>Subject Code</b>	<b>Title</b>	<b>Remarks</b>	<b>Max. Marks</b>
1.	MD280	Paper 4: Analysis and Design of Algorithms	Theory Exam Paper - 4	60
2.	MD281	- ” -	Theory IA Paper - 4	10
3.	MD282	Algorithmic Lab – 4.	Practical Exam Paper - 4	20
4.	MD283	- ” -	Practical IA Paper - 4	10
<b>Total Marks</b>				<b>100</b>

**SEMESTER: 5**

<b>Sl. No.</b>	<b>Subject Code</b>	<b>Title</b>	<b>Remarks</b>	<b>Max. Marks</b>
1.	ME280	Paper 5: Operating System and System Software	Theory Exam Paper - 5	80
2.	ME281	- ” -	Theory IA Paper - 5	20
3.	ME282	Paper 6: Object Oriented Programming with C++	Theory Exam Paper - 6	80
4.	ME283	- ” -	Theory IA Paper - 6	20
5.	ME284	Paper 7(a): C++ Lab – 7(a).	Practical Exam Paper - 7(a)	40
6.	ME285	- ” -	Practical IA Paper - 7(a)	10
7.	*ME286	Paper 7(b): Web Designing Lab – 7(b).	Practical Exam Paper - 7(b)	40
8.	ME287	- ” -	Practical IA Paper - 7(b)	10
<b>Total Marks</b>				300

**\*The appropriate theory instructions for web designing should be given in the practical session only.**

**SEMESTER: 6**

<b>Sl. No.</b>	<b>Subject Code</b>	<b>Title</b>	<b>Remarks</b>	<b>Max. Marks</b>
1.	MF280	Paper 8: Computer Networks	Theory Exam Paper - 8	80
2.	MF281	- ” -	Theory IA Paper - 8	20
3.	MF282	Paper 9: Numerical Algorithms and Operation Research.	Theory Exam Paper - 9	80
4.	MF283	- ” -	Theory IA Paper - 9	20
5.	*MF284	Paper 10(a): DOT (.)Net Lab.	Practical Exam Paper - 10(a)	40
6.	MF285	- ” -	Practical IA Paper - 10(a)	10
7.	MF286	Paper 10(b) Numerical Algorithms Lab.	Practical Exam Paper - 10(b)	40
8.	MF287	- ” -	Practical IA Paper - 10(b)	10
<b>Total Marks</b>				300

**\*The appropriate theory instructions for DOT (.)Net should be given in the practical session only.**

## **SEMESTER -1**

### **PAPER 1: COMPUTER CONCEPTS & C PROGRAMMING**

#### **MA280**

THEORY: 60(EXAM) + 10 (IA)

Teaching Hours 14 Weeks X 3Hrs/ week =42 hrs/Semester (Theory).

#### **UNIT-I**

##### **Computer Fundamentals**

**14 HOURS**

Introduction, Classification of Computers (Based on all Criteria), Functional units, Evolutional of Computer Languages, Assembler, Compiler, Interpreter.

##### **Number Systems and Boolean Algebra**

Introduction to number systems- Numeric and Non-numeric representation of data - Decimal, Binary (Addition, subtraction, Multiplication, division, 1's and 2's complement methods), Octal and hexadecimal number systems. Conversion from one number system to another number system. Excess-3-code and gray code. Conversion between gray and binary codes.

Boolean Algebra- Laws, De-Morgan's Theorem, Simplification of Expressions using K Map (Upto 4 Variables), Logic Gates- AND, OR, NOT, and Universal Gates. Combinational Logic Circuit- Half and Full Adder, Half and Full Subtractors.

#### **UNIT 2**

**14 HOURS**

##### **Introduction to C language**

History, Features and Applications of 'C'.

**Programming preliminaries** – Character set, definitions and declarations of identifiers, Variables, Constants, Keywords, Data types with examples.

**Operators and expressions** – Various operators and expressions, Operator precedence with example programs.

**Input-output statements** – various types of standard input output statements, standard mathematical functions, with example programs.

**Control structures** – Decisions making- Different forms of if statements, switch statements, unconditional branching statements (with example programs), Looping statements with example programs.

**Arrays**– Definitions and need of arrays, 1-D and 2-D arrays with example programs.

### **UNIT 3**

**14 HOURS**

**STRING HANDLING** – Declarations, Initialization, reading and writing of strings, operations and string functions with example programs.

**FUNCTIONS** – Definitions and need of functions. Library functions, user defined functions in detail, function declaration and prototypes call by value and call by reference, functions and arrays, recursion, storage classes with example program.

**STRUCTURES AND UNIONS** – Definition and use of structures. Declaring, Initializing and Accessing Structure member, Arrays of Structures, Nested Structures, uses of structures, Introduction to Union.

### **Reference Books:**

1. Digital Fundamentals, Floyd UBS Publication.
2. Digital Logic- Thomas C Bartee.
3. Problem Solving with C, M.T. Somashekara, PHI Learning, New Delhi, 2009
4. Programming in C – E Balaguruswamy, Tata McGraw Hill Publications.
5. Computer Concepts and C- P B Kotur.



## **SEMESTER -1**

### **C Programming Lab (MA282)**

PRACTICALS: 20 (EXAM) + 10 (IA)

Practical Hours: 14 Weeks x 3Hours/Week=42 Hours/ Semester.

#### **Part A**

1. Program to pick out the biggest and smallest number among three given numbers.
2. Program to find sum of even and odd numbers separately in the given list.
3. Program to find largest and smallest of N numbers
4. Program to find the roots of the quadratic equation using nested if.
5. Given two numbers, program to perform arithmetic operations using switch statement.
6. Program to generate Fibonacci series up to N numbers using do – while loop.
7. Program to find the reverse of the given number. Also sum and count the number of digits and check whether the given number is palindrome or not using while – do loop.
8. Program to generate prime numbers using for loop.
9. Program to search an element using linear search technique.
10. Program to check whether the given number is factorial of a number or not.

#### **Part B**

11. Program to insert a sub-string into a given string.
12. Program to add and subtract two M x N matrices.
13. Program to multiply two M x N matrices.
14. Program to find trace and norm of a square matrix and print its principle diagonal elements.
15. Program to exchange principle and secondary diagonal elements of a square matrix.
16. Program to find the factorial of a number using recursion.
17. Program to swap two number using functions.
18. Program to read and write information of an employee using structure.
19. Program to create simple marks card assuming appropriate conditions.
20. Program to read and write information of an employee using a file.

## SEMESTER- 2

### PAPER 2: DATA STRUCTURE APPLICATIONS WITH C

#### MB280

THEORY: 60(EXAM) + 10 (IA)

Teaching Hours 14 Weeks X 3Hrs/ week =42 hrs/Semester (Theory).

#### UNIT 1

14 HOURS

**Pointers** – Introduction, declaring and initializing a pointer, accessing a variable through its pointer. Pointer expressions, pointer increments and scale factor, pointers and arrays, pointers and functions, pointers and structures with example programs.

**File Handling:** - Introduction defining and opening a file, closing a file, input/output operations on files, error handling during input/output operations, random access to files with examples.

**Dynamic memory allocation** – MALLOC, CALLOC, REALLOC, FREE with examples, Pre-processing directives, macro with arguments.

#### **Introduction to Problem Solving Techniques**

Steps in problem solving -Algorithm and flow charts.

#### UNIT 2

14 HOURS

#### **Linear Data Structure and their sequential storage representation**

Concept and terminology for non-primitive Data structures, Storage structures for arrays,

Various operations on Arrays-Traversal, Insertion, Deletion, Sorting and Searching.

Stacks, Definitions and Concepts, Operations on stacks, Applications of stacks- Recursion, Infix to postfix, Evaluating postfix expressions, Queues-Linear and circular Queue.

Pointers and Linked Allocation, Linked linear lists,

Operations on Linear lists using singly linked storage structures-Insertion and Deletion operations circularly linked linear lists-memory representation, Doubly linked linear lists- memory representation.

## UNIT 3

14 HOURS

### Nonlinear Data Structures

**Trees** - Introduction as non-linear data structure, Concepts of node, Terminal node, Depth, General Tree, Definition for Binary Tree, Left Skewed Tree, Right Skewed Tree, memory representation using Arrays and Linked List, Tree Traversal Algorithms- Pre-order , In-order, Post-order and Implementation of Tree Traversal Algorithm

**Graphs** – Introduction, Definition, Terminology, Representation, Traversal.

### Reference Books:

1. An Introduction to Data Structures with Applications 2<sup>nd</sup> edition - J.P.Trembly and Sorenson, McGraw Hill 2001.
2. Dromey-How to solve it by computer, PHI.
3. Data Structures using C- Padma Reddy.
4. Data structures using C & C++ by Yedidyah Langsun, Moshe J Augenstein, Tenenbaum, Second Edition, Prentice Hall of India Ltd.
5. Problem Solving with Data Structure, Schaum Outline Series.

## Semester 2

### Data Structures Lab (MB282)

PRACTICAL: 20 (EXAM) + 10 (IA)

Practical Hours: 14 Weeks x 3Hours/Week=42 Hours/ Semester.

#### Part - A

1. Program to find lower triangular and upper triangular matrices for the given matrix.
2. Write an interactive program to insert an element at the given position and delete an element at the specified position in the given array.
3. Program to search an element identify the number of occurrences with locations in linear array.
4. Program to sort the given M x N matrix row-wise and column-wise using bubble sorting technique.
5. Write an interactive program to search an element in the given linear array using linear and binary searching technique.
6. Write a program to Merge two sorted arrays.

#### Part – B

7. Write an interactive program to implement the following operations on stack using arrays
  - a. PUSH
  - b. POP
8. Program to implement Tower of Hanoi problem.
9. Write an interactive program to perform insertion and deletion operations in Linear Queue using arrays.
10. Write an interactive program to perform insertion and deletion operations in Circular Queue using arrays.
11. Write an interactive program to insert a node in a linked list at the front, delete a node from the rear and display.
12. Write an interactive program to implement preorder, post order and in order traversal of a binary tree using linked list.

**SEMESTER-3**  
**PAPER 3: DATABASE MANAGEMENT SYSTEM**  
**MC280**

THEORY: 60(EXAM) + 10 (IA)

Teaching Hours 14 Weeks X 3Hrs/ week =42 hrs/Semester (Theory).

**Unit 1:** **14Hours**

Data and Information, types of information system, need of a computer-based information system, management structure, management and information requirements and quality of information.

The role and task of a system analyst, attributes of a system analyst, tools used by system analyst.

Strategy to gather information, information sources, methods of searching for information, interviewing techniques, questionnaires, case example – hostel information system.

Introduction to Database System Concepts and Architecture.

Problem with file-based systems, database and database management system, objective of database management system, overview of database management systems, database administrator

**Unit 2:** **14Hours**

Databases and Database Users, Characteristics of the Database Approach, Actors on the Scene, Advantages of Using a DBMS

Data Models, Schemas and Instances, DBMS Architecture and Data Independence, Database Languages and Interfaces, the Database System Environment

**Entity-Relationship Model**

Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, ER Diagrams, Naming Conventions and Design Aspects

**Relational Data Model**

Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Basic Relational Algebra Operations.

Normalization- Functional Dependencies, Transitive and Multi-valued dependency, First Normal form, Second Normal Form, Third Normal Form and Boyce Codd Normal Form

**Unit 3:** **14Hours**

**SQL-The Relational Database Standard**

Data Definition, SQL Data Types and Schemas, Constraints, Basic Queries in SQL, Insert, Delete, and Update Statements in SQL, Set Operations, Aggregate functions, Views (Virtual Tables) in SQL, Joins – Inner, Outer and Self, Additional Features of SQL, DCL-Commit, Rollback, Save-point, Grant privileges.

**Reference Books:**

1. Analysis and Information System (2<sup>nd</sup> Edition) – V. Rajaraman – Eastern Economy Edition.
2. Fundamentals of Database Systems (Fifth Edition) – Ramez Elmasri – Shamkanth B. Navathe
3. SQL, PL/SQL The programming Language of Oracle (3<sup>rd</sup> Edition) – Ivan Bayross.
4. Database System Concepts – Korth.

**SEMESTER 3**  
**DBMS LAB (MC282)**

PRACTICAL: 20 (EXAM) + 10 (IA)

Practical Hours: 14 Weeks x 3Hours/Week=42 Hours/ Semester.

**Exercise-1**

Create the following tables:

**1) SALESMEN**

Table Structure:

Field	Type	Constraint
SID	VARCHAR2 (5)	Primary Key
SNAME	VARCHAR2 (20)	Not Null
CITY	VARCHAR2 (15)	Not Null
SALARY	NUMBER (5, 2)	
PRODUCT	VARCHAR2 (20)	
TGTTTOGET	NUMBER (5,2)	
COMM	NUMBER (5,2)	

**2) CUSTOMERS**

Table Structure:

Field	Type	Constraint
CID	VARCHAR2 (5)	Primary Key
CNAME	VARCHAR2 (20)	Not Null
CITY	VARCHAR2 (15)	Not Null
STATE	VARCHAR2 (15)	
PINCODE	NUMBER (8)	
PRODUCT	VARCHAR2 (20)	
CLASS	CHAR (1)	Default value 'A'

**3) ORDERS**

Table Structure:

Field	Type	Constraint
OID	VARCHAR2 (5)	Primary Key
CID	VARCHAR2 (5)	Foreign Key (CUSTOMERS)
SID	VARCHAR2 (5)	Foreign Key (SALESMEN)
PRODUCT	VARCHAR2 (20)	
QTY	NUMBER (5)	
ODATE DATE	Not Null	
O_AMT	NUMBER (8, 2)	Minimum zero

## Exercise 2

Insert the following records: (Enter required data in empty columns)

Table 1 → SALESMEN

SID	SNAME	CITY	SALARY	PRODUCT	TGTTOGET	COMM
S101	Ajay Patel	Ahmedabad				1200
S102	Chintan Shah	Baroda				1500
S103	Vinay Mehra	Pune				1200
S104	Jay Pandey	Surat				800
S105	Jimit Dave	Mumbai				300
S106	Manan Gandhi	Ahmedabad				1200

Table 2 → CUSTOMERS

CID	CNAME	CITY	STATE	PINCODE	PRODUCT	CLASS
C301	Nirav Patel	Nadiad				B
C302	Kiran Dave	Delhi				A
C303	Sapan Shah	Bangalore				B
C304	Saurabh Mehta	Baroda				C
C305	Smriti Mishra	Ahmedabad				B
C306	Harshal Pandya	Mumbai				A
C307	Sunil Gandhi	Baroda				B
C308	Bimal Thakkar	Surat				C

Table 3 → ORDERS

OID	CID	SID	PRODUCT	QUANTITY	ODATE	O_AMT
O501	C302	S102			02-JAN-09	700000
O502	C301	S105			21-JAN-09	10000
O503	C308	S103			10-FEB-09	250000
O504	C306	S104			14-FEB-09	400000
O505	C306	S102			29-MAR-09	100000
O506	C303	S101			15-APR-09	90000.50
O507	C304	S105			24-JUN-09	7500.75
O508	C306	S101			27-SEP-09	900000
O509	C302	S102			21-DEC-09	205000
O510	C307	S102			30-DEC-09	27800
O511	C303	S104			31-DEC-09	15000



### **Exercise 3**

Solve the following queries:

- Display all the information about each salesman with appropriate headings.
- List all the salesmen that live outside the Gujarat.
- Displays class 'A' customers with their id and name.
- Add a new field as country in salesmen and customers table.
- Change the name of the city whose name is Sunil Gandhi from customers table.
- List the information of all the customers who are located in Baroda.
- List the name of all the salesmen whose salary is greater than 2000.
- Change the order amount for the order id O501.
- Display order id and order date from orders table whose sales id is S102.

### **Exercise 4(Constraints)**

- Add primary key and Foreign Key to the existing tables using alter table command.
- Create cust table which contains cno having pk, cname and occupation where data
- Values inserted for cno must start with the capital letter C and cname should be in upper case.
- Insert the correct values as well as display the error message for incorrect values.
- Find out the name of all the salesmen having 'a' as the second letter in their names.
- List all the information of customers whose state contains null value.
- List all the information of customers in descending order according to their name.

### **Exercise 5(Joins)**

- Display customer no, name, city and order amount.
- Display salesman details with their order details.
- Display customer info of salesman S102 and S105.
- List the salesmen details along with customers names associated with them.

### **Exercise 5 (Group functions)**

- Display order info with salesman name which has given on date before 10 of any month.
- Display minimum order amount of each sales man.
- Display total order amount for each salesman.
- Find the customer city of customer which order amount is minimum.

### **Exercise 6 (aggregate, math and string functions)**

- Count the total number of orders.
- Count the number of salesmen whose commission is greater than 500.
- Find average order amount of each salesman.
- Find out the orders whose order amount is more than 12000 and also find the new order amount as original order amount \* 5.

- Determine the minimum and maximum salary of the salesman and rename the title as “min\_sal” and “max\_sal” respectively.
- Show the use of right and left justify string function.
- Show use of floor and ceiling function.

### **Exercise 7(Sub queries)**

- Display customer name which customer no is highest.
- Display customer name whose salesman staying in Ahmadabad.
- Display order info for which order taken earliest.

### **Exercise 8**

1. Insurance database.

```
1.SQL> create table person(driver_id varchar(10),name varchar(10),address
varchar(10),primary key(driver_id));
```

```
SQL> create table car(regno varchar(10),model varchar(10),year int,primary key(regno));
```

```
SQL> create table accident(report_number int,accd_date date,location
varchar(10),primary key(report_number));
```

```
SQL> create table owns(driver_id varchar(10),regno varchar(10),primary
key(driver_id,regno),foreign key(driver_id) references person(driver_id),foreign
key(regno) references car(regno));
```

```
SQL> create table participated(driver_id varchar(10),regno varchar(10),report_number
int,damage_amount int,primary key(driver_id,regno,report_number),foreign
key(driver_id) references person(driver_id),foreign key(regno) references
car(regno),foreign key(report_number) references accident(report_number));
```

```
2. SQL> insert into person values('&driver_id','&name','&address');
```

```
SQL> insert into car values('&regno','&model','&year');
```

```
SQL> insert into accident values('&report_number','&accd_date','&location');
```

```
SQL> insert into owns values('&driver_id','&regno');
```

```
SQL> insert into participated
values('&driver_id','&regno','&report_number','&damage_amount');
```

```
3a. SQL> update participated set damage_amount=25000 where report_number=12 and
regno='5';
```

```
3b. SQL> insert into accident values('&report_number','&accd_date','&location');
```

```
SQL> insert into participated  
values('&driver_id','&regno','&report_number','&damage_amount');
```

**4.** SQL> select count(distinct o.driver\_id) as People from owns o, participated p, accident a where a.accd\_date like '%08' and o.regno=p.regno and p.report\_number=a.report\_number;

**5.** SQL> select count(\*) as Totalcars from car c, participated p where c.regno=p.regno and c.model='Alto';

**SEMESTER 4**  
**ANALYSIS AND DESIGN OF ALGORITHMS**  
**MD280**

**UNIT – 1**

**14 hours**

**Introduction:** Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Non-Recursive and Recursive Algorithms.

**Brute Force Approaches** - Selection Sort and Bubble Sort, Sequential Search and Brute Force String Matching. Knapsack Problem, Assignment Problem.

**UNIT - 2**

**14 hours**

**Divide-and-Conquer approaches:** Master Theorem, Binary Search, Merge Sort, Quick Sort.

**Decrease-and-Conquer approaches:** Introduction, Insertion Sort, Depth First Search and Breadth First Search

**UNIT – 3**

**14 hours**

**Transform –and-Conquer approaches:** Presorting, Gaussian Elimination, Heaps and Heap sort

**Greedy Technique:** Prim’s Algorithm, Kruskal’s Algorithm

**Backtracking:** n-Queens problem

**Reference Books:**

1. Anany Levitin: Introduction to The Design & Analysis of Algorithms, 2nd Edition, Pearson Education, 2007.
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran: Fundamentals of Computer Algorithms, 2nd Edition, Universities Press, 2007.
3. Thomas H. Cormen, Charles E. Leiserson, And Ronal L. Rivest, Clifford Stein: Introduction to Algorithms, 3rd Edition, PHI, 2010.

**SEMESTER 4**  
**Algorithmic LAB (MD282)**

PRACTICAL: 20 (EXAM) + 10 (IA)

Practical Hours: 14 Weeks x 3Hours/Week=42 Hours/ Semester.

**Part-A**

1. Program to search an element by sequential search method and estimate the time and space complexity
2. Program to search an element by binary search using divide and conquer
3. Program to traverse a give graph using Warshall algorithm
4. Implement 0/1 Knapsack problem using dynamic programming.
5. Program to find the minimum cost spanning tree using Kruskal's Algorithm.

**Part-B**

6. Program to find the minimum cost spanning tree using Prim's Algorithm.
7. Implement n-Queen's problem using Back Tracking.
8. Program to generate n random numbers and sort them using Quick Sort method (Divide and Conquer).
9. Program to find shortest path from one vertex to every vertices using Dijkstra's Algorithm (Dynamic Programming).
10. Program to implement Merge Sort Algorithm (Divide and Conquer).

## SEMESTER 5

### PAPER-5 OPERATING SYSTEMS AND SYSTEM SOFTWARE

#### ME280

THEORY: 80(EXAM) + 20 (IA)

Teaching Hours 14 Weeks X 3Hrs/ week =42 hrs/Semester (Theory).

#### UNIT-1

##### Introduction

**14 Hours**

Definition, Computer system components, User view, system view and system goals, Batch Systems, Multi programmed Systems, Time-Sharing Systems, Real-Time Systems, and System Components, Operating system services, System calls and system programs.

##### Process Management

Process Concept, process state diagram, process Control block, Process Scheduling- Scheduling queues, and scheduler.

Basic concepts, Preemptive and Non-preemptive Scheduling, Scheduling Criteria, Scheduling algorithms- FCFS, Shortest job first Priority scheduling, Round Robin Scheduling.

#### UNIT-II

**14 Hours**

##### Deadlocks

Deadlock- Characterization, Methods for Handling Deadlocks, Deadlock Prevention – Mutual Exclusion, hold and wait, no pre-emption, and circular wait. Deadlock Avoidance- Safe State, Bankers Algorithm, Deadlock Detection, Recovery from Deadlock.

##### Memory Management

Introduction, Logical versus physical address space, Dynamic Loading, Dynamic Linking, Swapping, Contiguous Allocation, Partitioned Memory Allocation, Paging, Segmentation, Segmentation with Paging.

### **UNIT-III**

#### **System Programming**

**14 Hours**

Assemblers – Basic Assembler Function – A simple SIC Assembler; Pass One, Pass Two Assembler Algorithm and Data Structures.

Compilers- Phases of Compilation (without Design),

Loaders and Linkers – Basic Loader Functions – Design of Absolute Loader, A Simple Bootstrap Loader, Machine Dependent Loader Features – Relocation, Program Linking.

#### **Reference Books:**

1. Operating System Concepts – 5<sup>th</sup> edition by Abraham Silberschartz and Peter Galvin, McGraw Hill, 2000
2. System Programming – J J Donovan.
3. Operating System- Dhamdare.

**SEMESTER 5**  
**PAPER-6 Object Oriented Programming with C++**  
**ME282**

THEORY: 80(EXAM) + 20 (IA)

Teaching Hours 14 Weeks X 3Hrs/ week =42 hrs/Semester (Theory).

**Unit-1**

**14 Hours**

Introduction:- Programming Language generations, Object Oriented Paradigm, Basics of OOPs, Benefits, Applications of OOPs, Object Oriented Languages, Difference between OOPs and Procedure Oriented Programming, Introduction to C++, General Structure of a C++ program, cin and cout objects, Keywords, identifiers, Constants, variables, Data types in C++, Operators-scope resolution operator, Control structures: Conditional statements and Looping statements, Functions –function with default arguments, inline functions, function overloading, reference variables Arrays - Single and multidimensional arrays, arrays and functions, enumerated data types, pointers.

**Unit-2**

**14 Hours**

Object and Classes-Structure and Class, Defining a class, defining member functions, member function with object as arguments and argument as return type, array of objects, static member data and member function, friend function and friend class, Constructor and destructors-characteristics of constructor, constructor types-default, parameterized, copy and dynamic, constructor overloading, operator overloading, defining operator function, overloading unary, binary and relational operators, type conversion,

**Unit-3**

**14 Hours**

Inheritance-benefits of inheritance, types of inheritance, methods overriding, virtual functions

C++ Streams and File handling-Stream class, unformatted i/o operations, formatting of output-ios class functions and flags, manipulators, Files-File classes, file types, file functions, error handling in file operations, command line arguments, Templates in C++ - class templates, function templates, class and function templates with parameters.

**Reference Books**

1. Object Oriented Programming with C++ - M.T. Somashekara, D.S.Guru, H.S. Nagendraswamy, K.S. Manjunatha, PHI 2<sup>nd</sup> Edition
2. Object Oriented Programming with C++ - E. Balagurusamy, 4<sup>th</sup> Edition, Tata Mc Graw Hill Publication
3. Object Oriented Programming in C++ - Robert Lafore, 4<sup>th</sup> Edition, Pearson Education
4. Object-Oriented Programming with ANSI and Turbo C++.



**SEMESTER 5**  
**PAPER-7(a) C++ Lab (ME284)**

Practical Hours: 14 Weeks x 2Hours/Week=28 Hours/ Semester.

PRACTICALS: 40 (EXAM) + 10 (IA)

**1). To illustrate class with member function defined outside/inside the class:**

-To accept and print employee information – name, designation & basic salary

**2). To illustrate an array of objects:**

-To accept and print three employees information – name, designation & basic pay

**3) To illustrate the friend function:**

-Create a class to hold information for a customer about his SB account & Current account in a bank. Using friend function, find the total balance of both the accounts.

**4) To illustrate Constructors & Destructors:**

-Create a Bank database (which includes customer name, Account type, Account number & balance amount) using i) Constructors ii) destructors iii) default constructors v) input/output functions for 5 peoples.

**5) To illustrate operator overloading:**

-Program to concatenate & compare 2 strings by overloading + and == operators.

**6) To illustrate operator overloading:**

-Program to find the next date of given date by overloading ++ operator.

**7) To illustrate operator overloading:**

-Interactive Program to find sum, difference and product of two complex numbers by overloading +, -, \* operators.

**8) To illustrate inheritance:**

-Program to create a base class for stack and implement push and pop operations. Include derived class to check for stack criteria (stack is full and stack is empty) .

**9) To illustrate polymorphism:**

- To create a base class called **G-F** with **a, b & area** as its public members. Two new classes namely **Triangle & Rectangle** are inherited from the base class. The base class contains two member functions called **get()** & **display()** to read the data & print them. Develop an interactive program to accept dimensions and appropriate area.

**SEMESTER 5**  
**PAPER-7(b) Web Designing (ME286)**

Practical Hours: 14 Weeks x 2Hours/Week=28 Hours/ Semester.

PRACTICALS: 40 (EXAM) + 10 (IA)

1. Create a Web Page using HTML text formatting tags
2. Create a Web Page to illustrate different types of lists
3. Create a student resume using HTML tags (with image tag).
4. Design a timetable using rowspan and colspan attributes.
5. Create two webpages, first page consisting of student details and second page consisting of educational information. Link both the pages.
6. Create a webpage to demonstrate Frames.
7. Create a web site consisting of multiple pages(College information, Course details, Marks details etc)

**PAPER-8**

**SEMESTER 6**  
**COMPUTER NETWORKS**  
**MF280**

THEORY: 80 (EXAM) + 20 (IA)

Number of Instruction Hours: 14 Weeks x 3 Hrs / Week = 42 Hrs /Semester (Theory).

**Unit 1:**

**14 HOURS**

Data Communication, Component and Basic Concepts –

- Introduction
- Characteristics – Delivery, Accuracy, Timeliness and Jitter
- Components – Message, Sender, Receiver, Transmission medium and protocol

Topology – Mesh, Star, Tree, Bus, Ring and Hybrid Topologies

Transmission modes – Simplex, Half Duplex, Full Duplex

Categories of networks – LAN, MAN, WAN

Network Components – Signal Transmission – Analog Signaling, concept of ASK, FSK, PSK, Digital Signaling, concept of Unipolar, Polar, Return-to-Zero(RZ), Biphasic, Manchester, Differential Manchester, Non-Return-to-Zero (NRZ), Bit Synchronization, Asynchronous Bit Synchronization and Synchronous Bit Synchronization, Baseband and Broadband Transmissions.

Guided Media – Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable

Unguided Media – Radio Wave Transmission Systems, Microwave Transmission Systems, Infrared Transmission Systems and Satellite Communication System.

**UNIT – II**

**14 HOURS**

The OSI Model – Functions of all the Seven Layers

Networking Devices – Functions and Applications of Hub, Switches, Bridges, Repeaters

Internetworking Devices – Functions and Applications of Routers and Gateways

IP Addressing – Dynamic IP Addressing, Static IP Addressing, Types of IP Addresses

Protocols – Overview only- TCP, UDP, IP, IPV4, IPV6, TCP/IP Suite, SMTP, POP3, SNMP, HTTP, FTP, DNS, ICMP IGMP, ARP, RARP, OSPF, BGP, ALOHA

**UNIT – III**

**14 HOURS**

Packet Switching Networks – Network Services and Internal Network Operations, Packet Network Topology, Datagrams and Virtual Circuits, Connectionless Packet Switching, Virtual Circuit Packet Switching.

Routing Concepts – Routing Tables, Dijkstra's Shortest Path Routing Algorithm, Congestion Control Algorithms-Leaky Bucket Algorithm.

Data Link Issues –Single bit error and Burst Error, concepts of Redundancy, Checksum, Single Bit Error correction and Hamming Code correction method.

**Reference Books**

1. Introduction to Data Communications and Networking by Behrouz Forouzan.
2. Computer Networks by Andrew S Tanenbaum.
3. Networking Essentials – Third Edition – Jeffrey S. Beasley, Piyasat Nilkaew

**SEMESTER 6**  
**Paper-9 Numerical Algorithms and Operation Research**  
**MF282**

THEORY: 80(EXAM) + 20 (IA)

Teaching Hours 14 Weeks X 3Hrs/ week =42 hrs/Semester (Theory).

**UNIT 1**

**14 Hours**

**Computer Arithmetic:** Floating point representation of numbers, arithmetic operations with normalization, consequences of normalized floating point representation of numbers, Errors in numbers

**Finding the roots of an equation:** Iterative method: Introduction, Beginning an iterative method, Bisection method, Newton Raphson method, Regula Falsi method. Comparison of Iterative methods, Order of Convergence of Newton Raphson Method and Secant Method.

**Ordinary differential equations:** Euler's method, Taylor series method, Range Kutta II and IV order methods.

**UNIT-2**

**14 Hours**

**Numerical Integration:** Simpson's 1/3 and 3/8 rule, Trapezoidal rule.

**Solving simultaneous linear equations:** Introduction, Gauss Elimination method, pivoting, ill conditioned equations, Gauss Jordan method, and Gauss-Seidel iterative method. Comparison of direct and iterative methods.

**Operation Research** -Definition of the term Operation Research – Nature , Management Application , Modeling , Principles of modeling , features , Different Phases , scope. Advantages and Limitations of O.R. General method for solving O.R models and Role of O.R in decision making.

**UNIT-3**

**14 Hours**

Some important definitions – Solutions to LPP, Feasible Solution, Basic Solutions, Basic Feasible Solution, Optimum Basic Feasible Solution, Unbounded Solution. Assumptions in LPP, Limitations of LPP, Applications of LPP and advantages of LPP

Standard Linear Programming – Formulation of a Linear Programming Solving L.P.P. by Graphical Method Problem and Simplex Method.

Transportation Problems – Method of finding initial basic feasible solution to

Transportation problem-North West Corner, Least Cost Method and Vogel's Method.

Method of finding initial basic feasible solution to Assignment Problem using Hungarian Method.

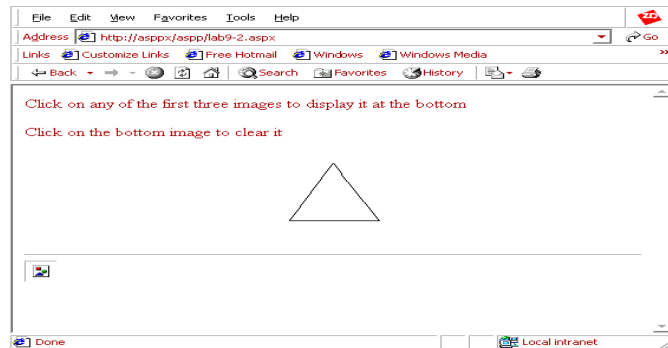
**Reference Books:**

1. Computer Oriented Numerical Methods by Rajaraman. V.
2. "Operation Research", by S.D.Sharma Kedarnath Ramnath Publishers 16<sup>th</sup> edition 2010
3. Numerical Methods by S.S. Sastry.

## Paper-10(a) DOT (.)NET Lab (MF284)

### ASP.NET LAB CYCLE

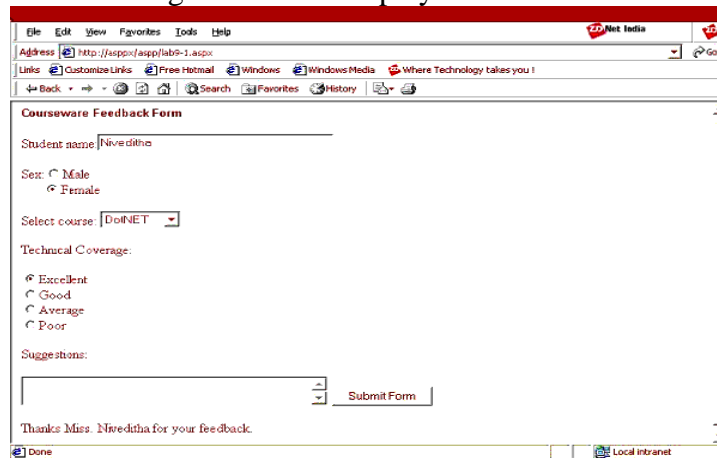
- 1) Write a program to display three images in a line. When any one of the images is clicked, it must be displayed below. On clicking the displayed image it must be cleared. The screen must look as in the figure given below:



- 2) Write a program that displays a button in green color and it should change into yellow when the mouse moves over it.

- 3) Write a program to display the following feedback form.

The different options for the list box must be ASP-XML, DotNET, JavaPro and Unix, C, C++. When the Submit Form button is clicked after entering the data, a message as seen in the last line of the above figure must be displayed.



4) Write a program containing the following controls:

- A ListBox
- A Button
- An Image
- A Label

The listbox is used to list items available in a store. When the user clicks on an item in the listbox, its image is displayed in the image control. When the user clicks the button, the cost of the selected item is displayed in the control.

5) Write a program that binds the properties **ID**, **Name**, **Price** and **Qty** of a page to the following values:

ID: 10

Name: Wheat

Price: 14.25

Qty: 1000

6) Create a RadioButtonList that displays the names of some flowers in two columns. Bind a label to the RadioButtonList so that when the user selects an option from the list and clicks on a button, the label displays the flower selected by the user.

## **Paper-10(b) Numerical Algorithms Lab (MF286)**

Practical Hours: 14 Weeks x 2Hours/Week=28 Hours/ Semester.

PRACTICAL: 40 (EXAM) + 10 (IA)

1. Program to solve the given equation by using Bisection method.
2. Program to solve the given equation by using Regula Falsi method.
3. Program to solve the given equation by using Newton Raphson method.
4. Program to solve the given differential equation by using Rungekutta's II order method.
5. Program to solve the given differential equation by using Rungekutta's IV order method.
6. Program to integrate the given function by using Trapezoidal method.
7. Program to integrate the given function by using Simpson's 1/3 rule.
8. Program to integrate the given function by using Simpson's 3/8 rule.
9. Program to solve the set of simultaneous equations using the Guass Elimination method.
10. Program to solve the set of simultaneous equations using Guass Jordon method.
11. Program to solve the set of simultaneous equations using Guass Seidal iterative method.

## **Scheme of Evaluation for I, II, III and IV SEMESTER**

### **Pattern of Question Paper**

**Theory:**

Answer any 2 full questions (Each question carries 10 Marks) from each part

**PART A**

- 1
- 2
- 3.

**PART B**

- 1
- 2
- 3.

**PART C**

- 1
- 2
- 3.

*Note: Part-A from First unit, Part-B from second unit and Part-C from Third unit.  
Each question may split such as 4+6 or 2+8 or 5+5 or 3+7, if required.*

**Practical:**

There will be two questions from two different parts. A candidate has to prepare procedures for both the questions covering both the parts. Student will be asked to execute one of them of examiner's choice

Procedure Development: 08 Marks.

Implementation + Results + Viva = 04 + 04 + 04 = 12 Marks.



## V and VI SEMESTER

### **THEORY: 80 MARKS (EXAM)**

*Answer any 2 full questions (Each question carries 10 Marks) from each Part (A, B and C) and Part D is compulsory.*

#### **PART A**

- 1
- 2
- 3.

#### **PART B**

- 1
- 2
- 3.

#### **PART C**

- 1
- 2
- 3.

*Note: Part-A from First unit, Part-B from second unit and Part-C from Third unit. Each question may split such as 4+6 or 2+8 or 5+5 or 3+7, if required.*

#### **PART - D**

1. Answer any five questions (each carries 4 marks)
  - (i)
  - (ii)
  - (iii)
  - (iv)
  - (v)
  - (vi)

Note: *(i) And (ii) from first unit  
(iii) And (iv) from second unit  
(v) And (vi) from third unit*

**PRACTICALS:**

There will be two questions. A candidate has to prepare procedures for both the questions and execute any one of examiner's choice

Procedure Development – 10x2=20 Marks

Implementation- 10x1=10 Marks.

Viva =10 Marks