

M.Sc. (IT)
2010-11 & 2011-2012 Sessions

	Theory Lectures per Week	Univ. Exam Marks	Int. Ass. Marks
Ist Year Semester-I			
MS-111 Introduction to Information Technology	5	80	20
MS-112 Computer Programming using C	5	80	20
MS-113 Computer Organization & Architecture	5	80	20
MS-114 Mathematical Foundation of Computer Science	5	80	20
MS-115 Operating Systems	5	80	20
MS-116 Programming Lab-I	8	80	20
Semester-II			
MS-121 Object Oriented programming Using C++	5	80	20
MS-122 Data & File Structures	5	80	20
MS-123 Visual Basic	5	80	20
MS-124 RDBMS & Oracle	5	80	20
MS-125 Programming Lab-II	8	80	20
MS-126 Programming Lab-III	8	80	20

The Project will involve development of application/System Software in Industrial/Commercial/Scientific Environment.

CONTINUOUS ASSESSMENT (THEORY PAPERS)

- | | | |
|----|--|--|
| 1. | Two or three tests out of which minimum two will be considered for assessment. | 60% of the marks allotted for Continuous Assessment. |
| 2. | Seminars/Assignments/Quizzes | 30% of the marks allotted for Continuous Assessment. |
| 3. | Attendance, class participation and behaviour | 10% of the marks allotted for Continuous Assessment. |

MS-111 Introduction to Information Technology

Maximum Marks: 80
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Computer Fundamentals: Block structure of a computer, characteristics of computers, problem solving with computers, generations of computers, classification of computers on the basis of capacity, purpose, and generation.
Number System: Decimal, hexadecimal, and octal systems, conversion from one system to the other.
Binary Arithmetic: Addition, subtraction and multiplication.

SECTION-B

Memory types: Magnetic core, RAM, ROM, Secondary, Cache, Input and Output Units : functional characteristics ;
Overview of storage devices : floppy disk, hard disk, compact disk, tape ; Printers : Impact, non-impact. Graphical I/O devices: Light pen, joystick, Mouse, Touch screen; OCR, OMR, MICR

SECTION-C

Computer languages: Machine language, assembly language, high level language, 4GL. Compiler, Interpreter, Assembler, System Software, Application Software.
Operating system: Functions of an operating system, Batch, multi-programming, time sharing, multi-processor, Multi-tasking.
Data Network and Communication: Network types, Transmission Modes, Network topologies,
Internet: Evolution of Internet, E-mail WWW, FTP, TELNET, IRC, Video Conferencing.

SECTION-D

Information Technology and Society : Applications of Information Technology in Railway, Airline, Banking, Insurance, Inventory Control, Hotel Management, Education, Mobile Phones, Information Kiosks, Weather Forecasting, Scientific Application,
E-Commerce: Meaning, its advantages & limitations, Types of E-Commerce.
Multimedia: Concepts, Components and Application, Entertainment Marketing.

References:

1. P. K. Sinha and P. Sinha, "Foundation of Computers", BPB.
2. D. H. Sanders, "Computers Today", McGraw Hill, 1988.
3. Satish Jain , " Information Technology", BPB 1999.
4. David Cyganski, John A. Orr, " Information Technology Inside and Outside" Pearson Education 2002.
5. V. Rajaraman, "Fundamentals of Computers" (2nd edition), Prentice Hall of India, New Delhi, 1996.
6. B. Ram, "Computer Fundamentals", Wiley, 1997.

MS-112 Computer Programming using C

Maximum Marks: 80
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Problem Solving with Computers, c character set, identifier, constants, variables, rules for defining variables, Data types, operators: arithmetic, relational, logical, comma, conditional, assignment, arithmetic expressions, input and output statements, assignment statements.

SECTION B

Decision statement: if, if ---else, nested if, switch statement, break statement, continue statement, go to statement.
Loops and control statements: While loop, for loop and do-while loop, nested loops
Arrays: one dimensional Array, multi dimensional arrays, array initialization.

SECTION C

Pointers: Pointer data type, pointers and arrays, pointers and functions.
Functions: definition, declaration, function prototype, types of functions, call by value, call by reference, recursion, processing character strings.

SECTION D

Structures: Using structures, arrays of structures and arrays in structures, union
Files in C: Sequential files, random access files , Unformatted files, Text files, binary files.

Reference:

1. Kamthane, "Programming with ANSI and Turbo C", Pearson Education
2. Rajaraman, V, "Fundamentals of Computers", PHI
3. E. Balagurusamy, "Programming in C", Tata McGraw Hill.
4. Kanetkar, "Let Us C", BPB Publications.

MS-113 Computer Organisation and Architecture

Maximum Marks: 80
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10

short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Concepts about bits, bytes and word, Number System: Number conversions, Arithmetic operations, Integer and floating point representation.
Character codes (ASCII, EBCDIC, BCD, 8421, Excess-3). Boolean Algebra, K-maps.

SECTION B

Basic Gates, Combinational logic design: half-adder, full adder, parallel adder.
Sequential circuits: concept, flip-flops (D, RS, JK, JK-Master-Slave, T), counters (Ripple, Asynchronous, Synchronous, Decade, Mod-5),
Instruction codes, Instruction formats, Instruction cycle, Addressing modes.

SECTION C

Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit.
Control Memory: Design of control unit, Microprogrammed and Hardwired control unit (overview only), Features of RISC and CISC.

SECTION D

Memory organisation: memory hierarchy. Memory types: cache, associative and other types.
I/O organisation: I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA.

References:

1. M.M. Mano, "Computer System Architecture", Third Edition , Prentice-Hall of India, 2002.
2. A.S.Tannenbaum, "Structured Computer Organisation", Prentice- Hall of India, 1999
3. William Stallings, " Computer Organosation and Architecture", 6th edition, Pearson Education , 2002.

MS-114 Mathematical Foundation of Computer Science

Maximum Marks: 80
Minimum Pass Marks: 35%Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45**A) Instructions for paper-setter**

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Fundamentals of Set Theory : Sets and subsets, Operations on sets, Cartesian product of sets, Partitions, Inclusion-Exclusion principle.

Logic : Propositions and Logical Operations, Conditional statements, Mathematical Induction.

Counting : The Basic of counting, The Pigeonhole Principle,

Matrices and Determinants: Definition, Types, Addition, subtraction, Multiplication, Adjoint, Inverse, properties of determinants.

SECTION B

Relation: Relations and diagraph, n-ary relations and their properties, Equivalence relations.

Functions : One-to-one Functions, Onto Functions, Inverse and Composition of Functions

Growth of functions: Big-O Notation, Big-Omega and Big-Theta Notation.

SECTION C

Graphs: Introduction to Graph, Graph terminology, Representing graphs and Graph Isomorphism, Connectivity, Euler Paths and Circuits, Hamiltonian paths and circuits, Shortest Path Problems, Planar Graphs.

SECTION D

Recurrence Relations: Introduction, Order and Degree of Recurrence relation, Solution of linear recurrence relations, Homogeneous solution, particular solution, total solution, Generating functions.

Trees : Trees, Labelled Trees, Tree Searching, Undirected Trees, Minimum Spanning Trees.

Reference :-

1. Discrete Mathematics and its Applications, Rosen, K. H , TMH Publication.
2. Discrete Mathematical Structures. B. K. Kolman, R.C. Busby and Sharon Ross, PHI.
3. Discrete Mathematics, Richard Johnsonbaugh, Pearson Education.

MS-115 Operating System

Maximum Marks: 80
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

Section-A

Computers and Software: General Systems software, Resource Abstraction and sharing; Multiprogramming Systems, Batch, Timesharing systems and Real time systems. Using operating system: Resources, Processes, Threads and objects; Factors in operating system design, Basic functions, Implementation considerations.

Section-B

Device Management: I/O system organization, Direct I/O with polling, interrupt driven I/O, Memory mapped I/O, DMA; Buffering; Device Drivers. Processor Management: System view of processes and Resources, Initializing Operating system, Process address spaces, Abstraction, Hierarchy, Scheduling Mechanisms, Strategies, Strategy selection, Non preemptive and preemptive strategies.

Section-C

Basic Synchronization Principles: Interacting processes, Co-coordinating processes, Semaphores, Shared memory processors. Deadlock: Problem, Model, Prevention Avoidance, Detection and Recovery; Memory management: Basics, Allocation, Relocation, Manager Strategies, Virtual Memory: Address translation.

Section-D

File Management: Files, implementations, Directories Directory implementation. Protection and Security: Basics, Authentication, Authorization, Authorization implementation, Cryptology.

References:

1. Nutt. Gary: "Operating Systems" Addison Wesley Publication, 2000.
2. Silberschatz and Galvin, "Operating System Concepts", Sixth edition, Addison-Wesley publishing, Co., 1999.
3. Hansen, Per Brinch, "Operating System Principles", Prentice-Hall. 1984.
4. N. Haberman, "Introduction to Operating System Design", Galgotia Publication, 1986.
5. Hansen, Per Brich, "The Architecture of Concurrent Programs", PHI, 1978.
6. Shaw, "Logical Design of Operating System", PHI, 1978.

MS-116 Programming Lab-I

Maximum Marks: 100 *
Minimum Pass Marks: 35%

Max. Time: 3 Hrs.
Practical sessions to be conducted: 60-65

This laboratory course will mainly comprise of exercise based on subject MS-112 (Computer Programming Using C)

*Maximum Marks for Continuous Assessment: 20

Maximum Marks for University Examination : 80

MS-121 Object Oriented Programming Using C++

Maximum Marks: 80
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Evolution of OOP: Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms. Characteristics of Object Oriented Programming,

Introduction to C++: Identifier, Keywords, Constants,

Operators: Arithmetic, relational, logical, conditional and assignment. Size of operator, Operator precedence and associativity. Type conversion, Variable declaration, expressions, statements, manipulators. Input and output statements, stream I/O, Conditional and Iterative statements, breaking control statements.

SECTION B

Storage Classes, Arrays, Arrays as Character Strings, Structures, Unions, Bit fields, Enumerations and User defined types.

Pointers: Pointer Operations, Pointer Arithmetic, Pointers and Arrays, Multiple indirections, Pointer to functions. Functions: Prototyping, Definition and Call, Scope Rules. Parameter Passing: by value, by address and by reference, Functions returning references, Const functions, recursion, function overloading, Default Arguments, Const arguments, Pre-processor, Type casting.

SECTION C

Classes and Objects: Class Declaration and Class Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control. this pointer. Objects: Object as function arguments, array of objects, functions returning objects, Const member.

Static data members and Static member functions, Friend functions and Friend classes

Constructors: properties, types of constructors, Dynamic constructors, multiple constructors in classes.

Destructors: Properties, Virtual destructors. Destroying objects. Rules for constructors and destructors.

Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes, Scopes: Local, Global, Namespace and Class.

Inheritance: Defining derived classes, inheriting private members, single inheritance, types of derivation, function redefining, constructors in derived class, Types of inheritance, Types of base classes, Code Reusability.

SECTION D

Polymorphism: Methods of achieving polymorphic behavior.

Operator overloading: overloading binary operator, overloading unary operators, rules for operator overloading, operator overloading using friend function. Function overloading: early binding,

Polymorphism with pointers, virtual functions, late binding, pure virtual functions and abstract base class

Difference between function overloading, redefining, and overriding.

Templates: Generic Functions and Generic Classes, Overloading of template functions.

Exception Handling catching class types, handling derived class exceptions, catching exceptions, restricting exception, rethrowing exceptions, terminate and unexpected, uncaught exceptions.

Files and streams: Classes for file stream operations, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, I/O with multiple objects, error handling, sequential and random access file processing.

References:

1. Herbert Schildt, "The Complete Reference C++", Tata McGraw-Hill, 2001.
2. Deitel and Deitel, "C++ How to Program", Pearson Education, 2001
3. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications, 1994.
4. Bjarne Strastrup, "The C++ Programming Language", Addison-Wesley Publication Co., 2001.
5. Stanley B. Lippman, Josee Lajoie, "C++ Primer", Pearson Education, 2002
6. E. Balagurusamy, " Object Oriented Programming with C++", Tata McGraw-Hill, 2001

MS-122 DATA & FILE STRUCTURES

Maximum Marks: 80
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

Section A

Data Structure: Introduction to data structure and algorithm

Algorithm analysis: Time space trade off algorithms and Big O notation

Arrays: Introduction, one dimensional and multidimensional arrays, memory representation of arrays, operations on arrays, sparse arrays and sparse matrices and their implementation, Advantages and limitation of arrays.

Stacks:

Introduction; Operation on stacks; Implementation of stacks

Application of stacks: matching parenthesis, evaluation of arithmetic expressions, conversion from infix to postfix, recursion.

Queues:

Introduction, operation on queues, circular queue, memory representation of queues, dequeues, priority queues, application of queues.

Section-B

Linked List:

Introduction; operation on linked list, circular linked list, doubly linked list, header linked list, implementation of linked list, application of linked lists.

Trees:

Introduction; Binary Tree; Threaded Binary Trees; Binary Search Tree; Balanced Trees; B-Trees; Heap

Section-C

Graphs: Introduction

Graph: Graph terminology

Memory Representation of Graphs: adjacency matrix representation of graphs, adjacency list or linked representation of graphs

Operations performed on graphs

Application of graphs

Sorting: Selection Sort, Insertion Sort, Merge Sort, Bucket Sort, Radix Sort, Quick Sort and Heap Sort

Hashing: Hashing techniques; Collision resolution; Deleting items from a hash table; Application of hashing

Section-D

File Organization: Introduction

External Storage Device: **Sequential Access Storage Device (SASD)**, **Direct Access Storage Device (DASD)**

Sequential File Organization: processing sequential files, operations on sequential files, advantages and disadvantages of sequential file organization

Direct File Organization: introduction, processing of direct files, advantages and disadvantages of direct organization

Indexed Sequential Organization: introduction, processing of indexed sequential files, advantages and disadvantages of indexed sequential organization

References:

1. A. Tanenbaum, Y. Lanhgsam and A.J. Augenstein, "Data Structures Using C", Prentice Hall of India, 1990
2. Loomis, "Data and File Structures",
3. Seymour Lipschultz, "Theory and Practice of Data Structures", McGraw-Hill, 1988.
4. E. Horowitz and S. Sahni, "Data Structures with Pascal", Galgotia, 3rd Edition, 1991.
5. Robert Sedgewick, "Algorithms in C", Pearson Education.
6. M. J. Folk, B. Zoellick, G Riccardi, "File Structures", Pearson Education.

MS-123 Visual Basic

Maximum Marks: 80
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction to Visual Basic: - Creating User Interfaces with Windows Common Controls, Creating Menus for Programs, Advance Design Features, Working with Collections, Creating Classes in a Program, Working with Active Data Objects.

SECTION B

Working with forms, drawing with VB, Multiple document interface, basic Active X controls, advanced active X controls. Extending the Capabilities of Visual Basic: - Declaring and using External Functions, Creating ActiveX Control with Visual Basic
Communicating with Other Programs: - Using ActiveX Server, Creating ActiveX Client Applications.

SECTION C

Integrating Visual Basic with the Internet: - Writing Internet Application with Visual Basic, Web Browsing objects, using document object, Active Server Pages, using web browser controls, using history objects.

SECTION D

Creating Database Applications: - Accessing Data with Data Control
Using visual data manager, validating data, selected data with SQL, advanced data bound controls, active data objects, ADO data objects.

References:

1. Visual Basic 6.0 No Experienced Required by BPB Publication
2. Mastering Visual basic 6.0 by BPB Publications
3. Mastering Visual Basic 6.0 by Petroustos.
4. Visual Basic 6 Complete by Sybex.
5. Mastering Database Programming with Visual Basic 6 by Petroustos

MS-12 RDBMS & Oracle

Maximum Marks: 80
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 40-45

A) Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 20% marks each. Section E will have 5-10 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Traditional File Processing System: Characteristics, Limitations.

Database: Definition, Composition. **DBMS:** Definition, Characteristics, Advantages over Traditional File Processing System, Implication of Database Approach. Users of Database, DBA and his Responsibilities.

Database Schema and Instance. DBMS Architecture, Data Independence, Mapping between different levels.

Database Languages. Database Utilities. Types of keys. E-R model: Concepts, Entities and Entity Set, Attributes, Mapping Constraints, E-R Diagram, Weak Entity Sets, Strong Entity Sets, Aggregation, Generalization, Converting ER Diagrams to Tables. Overview of Network and Hierarchical Model and their differences. Object Oriented Data Model: Abstraction, Encapsulation, Inheritance and Persistence.

Object Relational Model, Differences between OODB and ORDB.

SECTION B

Relational Data Model: Concepts, Constraints,

Relational Algebra: Basic Operations, Additional Operations.

Relational Calculus: Tuple and Domain Relational Calculus.

Database Design: Functional Dependency, Decomposition, Problems of Bad Database Design, Normalization, Multivalued Dependency, Join Dependency and Higher Normal Forms, Database Design Process.

SECTION C

Database Protection: Integrity, **Database Concurrency:** Problems of Concurrent Databases, Methods of handling Concurrency, Locking, Time Stamping and Multi version, Two Phase Locking Protocol, Data Recovery, Two Phase Commit Protocol, Data Security.

Distributed Databases: Concepts, Structure, Tradeoffs in Distributed Databases,

Methods of Data Distribution: Fragmentation, Replication.

Overview of Deductive Databases, Data Warehousing and OLAP, and Data Mining, Multimedia Databases, Temporal Database, Spatial Database, Mobile Databases, Client/Server Architecture

SECTION D

Technical Introduction to Oracle: Structure of Oracle, Background Processes.

Data Objects: Tables, Views, Synonyms, Indexes, Snapshots, Sequences, Creation and Manipulation of Data Objects. **SQL Queries.** Applying Integrity Constraints. Functions, Procedures and Packages. Using Cursors and Triggers.

References:

1. Elmasry, Navathe, "Fundamentals of Database System", Pearson Education.
2. "Oracle SQL Complete Reference", Tata McGrawHill.
3. T. Connolly, C Begg, "Database Systems", Pearson Education.
4. R. Ramakrishanan, J. Gehrke, "Database Management Systems", McGraw Hill.
5. Henry F. Korth, A Silberschhatz, "Database Concepts," Tata McGraw Hill.
6. C.J. Date , " An Introduction to Database Systems", Pearson Education.
7. M. T. Ozsu, P Valduriez, "Principles of Distributed Database Systems", Pearson Education.
8. Naveen Parkash, "Introduction to Database Management", Tata McGraw Hill.
9. Bobrowski, "Client Server Architecture and Introduction to Oracle 7".
10. Jeffrey D. Ullman, " Principles of Database Systems," 2nd Edition, Galgotia Pub. Pvt. Ltd.

MS-125 Programming Lab-II

Maximum Marks: 100 *
Minimum Pass Marks:35%

Max. Time: 3 Hrs.
Practical sessions to be conducted: 60-65

This laboratory course will mainly comprise of exercise based on subject MS-121 (Object Oriented Programming Using C++) and MS-122(Data and File Structures).

*Maximum Marks for Continuous Assessment: 20

Maximum Marks for University Examination : 80

MS-126 Programming Lab-III

Maximum Marks: 100 *
Minimum Pass Marks: 35%

Max. Time: 3 Hrs.
Practical sessions to be conducted: 60-65

This laboratory course will mainly comprise of exercise based on subjects MS-123 (Visual Basic) and MS-124 (RDBMS & Oracle).

*Maximum Marks for Continuous Assessment: 20

Maximum Marks for University Examination : 80