Syllabus and Course Scheme
Academic year 2014-15

M.Sc. – Information Technology
UNIVERSITY OF KOTA
MBS Marg, Swami Vivekanand Nagar,
Kota - 324 005, Rajasthan, India
Website: uok.ac.in

M.Sc. (Information Technology) Exam. - 2015

Duration Course: 2 Years(Four Semesters)

Eligibility: Graduation in any stream (Under 10+2+3 Scheme) with
Minimum of 50% marks (45% for candidates belonging to the reserved category SC/ST/OBC).

Selection: Common Entrance Test conducted by University of Kota

Scheme of Examination and Course of Study
1. Number of papers and the maximum marks for each paper/practical are shown in the syllabus for the subject concerned. It will be necessary for a candidate to pass in the theory part as well as in the practical part (wherever prescribed) of a subject/Paper separately.

2. A candidate for a pass each of the Previous and the Final Examinations shall be required to obtain (i) at least 36% marks in the aggregate of all the papers prescribed for the examination and (ii) at least 36% marks in practical's/wherever prescribed at the examination, provided that if a candidate fails to secure at least 25% marks in each individual paper work. Wherever prescribed, he shall be deemed to have failed at the examination not withstanding his having obtained the minimum %age of marks required in the aggregate for the examination. No division will be awarded at the previous Examination. Division shall be awarded at the end of the

 Final Examination taken together, as noted below:

First Division	**60%**	**(On the aggregate marks taken**
Second Division	**48%**	**together the Prev. & Final Exam.)**

3. If a candidate clears any papers(s)/practical prescribed at the Examination after a continuous period of three years, then for the purpose of working out his division the minimum pass marks only viz. 25% (36% in the case of Practical) shall be taken into account in respect of such paper(s)/Practical(s)
4. A candidate failing at M.Sc. Previous examination may be provisionally admitted to the M.Sc. final class. Provided that he passes in atleast 50% papers as per Provision of 0.235 (i)
5. A candidate may be allowed grace marks in only one theory papers upto the extent of 1% of the total marks prescribed for that examination.

N.B. (i) Non Collegiate candidates are not eligible to appear in the examination where practical is involved.

Theory:
I. **Assignments:** 40% of the internal assessment marks for each theory paper will be awarded on the basis of performance in the assignments regularly given to the students, and its records.
II. **Internal Examination:** 40% of the total Internal Assessment marks for each theory paper will be awarded on the basis of performance in written examination conducted by the faculty, one at the end of fourth month and another at the end of eighth month.
III. **Seminar/Oral examination:** 10% of the total internal assessment marks for each paper will be awarded on the basis of performance either in a seminar or internal viva-voce.
IV. **Overall performance:** 10% of the total internal assessment marks will be awarded for each paper on the basis of performance and conduct in the classroom.

TEACHING AND EXAMINATION SCHEME FOR

M.Sc. (Previous) Information Technology Exam. -2015

Paper	Paper Name	Lecture Hrs./week	Tut.	Duration of Uni. Exam (In Hrs.)	Max. Marks
Paper 101	Problem Solving through C Programming	3	1	1	100
Paper 102	Introduction to Information Technology	3	1	1	100
Paper 103	Database Management System	3	1	1	100
Paper 104	Fundamentals of Operating Systems	3	1	1	100
Paper 105	Mathematical Foundation of Information Technology	3	1	1	100
	Total of Theory				500
Paper Name (Practicals)					
Paper 106	Programming Laboratory ('C',Window, MS-Office)			3	50
Paper 107	Programming Laboratory (DBMS, Operating System)			3	50
	Total of Practicals				100
	Grand Total (Theory + Practicals)				600

M.Sc. (Final) Information Technology Exam. - 2015

Paper	Paper Name	Lecture Hrs./week	Tut.	Duration of Uni. Exam (In Hrs.)	Max. Marks
Paper 201	Object Oriented Concepts and Technology	3	1	1	100
Paper 202	Computer Organization	3	1	1	100
Paper 203	Data Structure	3	1	1	100
Paper 204	Data Communication and Computer Networking	3	1	1	100
Paper 205	Visual Programming	3	1	1	100
	Total of Theory				500
Paper Name (Practicals)					
Paper 206	Programming Laboratory			3	50
Paper 207	Programme Laboratory (Internet and Web Technology)			3	50
	Total of Practicals				100
	Grand Total (Theory + Practicals)				600

M.Sc. (Previous)

INFORMATION TECHONOLOGY EXAM.- 2015

Paper 101- Problem Solving through C Programming

Time : 3 Hrs.   Max. Marks: 75

UNIT- I

Algorithm and algorithm development: Definition and properties of algorithm, flow chart symbols, example of simple algorithms. Program design, errors: syntax error and semantic error, debugging, program verification, testing, documentation and maintenance.
Variable names, data type and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, precedence and order of evaluation, standard input and output statements.

UNIT- II

Control Flow: Statements and blocks, if-else, nested if, switch, looping statement: while, for, dowhile, break and continue, go-to and labels.
Arrays : declarations, integer and character array, reading and writing an array, one and two dimensional array, operations on arrays.

UNIT – III

Functions and Program Structure: Basics of function, function definition and declaration, external variables, scope rules, header files, static variables, register variables, block structure, initialization, recursion, the C preprocessor.
Pointer : Pointers and addresses, pointers and function arguments, address arithmetic. Character pointers, pointers to pointers, Pointers to functions.

UNIT - IV

Structures: Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, typedef, unions.

UNIT - V

File Handling: access methods , different file operations and functions, concept of text & Binary files, file I/O, command line argument, Formatted file input and output.

Text / Reference Books

1. Deendayalu R., Computer science Volume I and II, Second Edition,Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Rajaraman V., Fundamentals of computers, Second Edition, Prentice Hall of India Private Limited, New Delhi.
3. Kernighan B.W. and Ritchie D.M., The C Programming Language, Prentice Hall of India Private Limited, New Delhi.
1. Dromey R., How to solve it by computers. Prentice Hall of India Private Limited, New Delhi.
2. Programming with C, E. Balaguruswamy, PHI

Paper 102- Introduction to Information Technology

Time : 3 Hrs.   **Max. Marks: 75**

UNIT - I

Computer Basics: A Simple Model of a Computer, Characteristics of Computers, Problem-solving Using Computers, Algorithms.

Data Representation: Representation of Characters in computers, Representation of Integers, Representation of Fractions, Hexadecimal Representation of Numbers, Decimal to Binary Conversion, Error-detecting codes.

Input & Output Devices: Description of Input Units, Other Input Methods, Output Units.

UNIT - II

Computer Memory: Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices Used to Construct Memories, Magnetic Hard Disk, floppy Disk Drives, Compact Disk, Read Only Memory, Magnetic Tape Drives.

Processor: Structure of Instructions, Description of a Processor, A Machine Language Program.

UNIT - III

Binary Arithmetic: Binary Addition, Binary Subtraction, Signed Numbers, Two's Complement Representation of Numbers, Addition/Subtraction of Numbers in 2's Complement Notation, Binary Multiplication, Binary Division, Floating Point Representation of Numbers, Arithmetic Operations with Normalized Floating Point Numbers.

Computer Architecture: Interconnection of Units, Processor to Memory communication, I/O to Processor Communication, Interrupt Structures, Multiprogramming, Processor Features, Virtual Memory.

UNIT-IV

Software Concepts: Types of Software, Software: Qualities & Attributes, Programming Languages: types and differences

Operating Systems: Definition, O.S. functions and O.S. types : brief introduction. A Brief History of: Linux, MS-DOS, Windows Operating System.

UNIT - V

Computer Generation & Classifications: First, Second, Third, Fourth and Fifth Generation, Classification of computers, Concept of Distributed and parallel computers.

Internet: Network, World Wide Web, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Introduction to Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services, Intranet and Extranet, how to connect with internet.

Text / Reference Books

1. "Computer fundamental", P.K.Sinha BPB Publications.
2. Fundamentals of Computers, V. Rajaraman, 3rd Edition, PHI Publications
3. Essentials of Computer & Network Technology, Nasib S. Gill, Khanna Publications.
4. Fundamentals of Information Technology, Deepak Bharihoke, Excel Books.
5. Information Technology by Reena Dadhich and R.C. Poonia, Vardhman Publications, 2009.

Paper 103- Database Management System

Time : 3 Hrs.   Max. Marks: 75

Unit –I

Introduction : Purpose of the data base system, data abstraction, data model, data independence, data definition language, data manipulation language, data base administrator, data base users, overall structure.

Unit –II

ER Model : entities, mapping constrains, keys, E-R diagram, reducing E-R diagrams to tables, generation, aggregation, design of an E-R database scheme.

Unit –III

Relational Model : The catalog, base tables and views. Relational Data Objects **-** Domains and Relations: Domains, relations, kinds of relations, relations and predicates, relational databases.
Relational Data Integrity - Candidate keys and related matters: Candidate keys. Primary and alternate keys. Foreign keys, foreign key rules, nulls. Candidate keys and nulls, foreign key and nulls.

Unit –IV

The SQL Language: Data definition, retrieval and update operations. Table expressions, conditional expressions, embedded SQL.
Views: Introduction, what are views for, data definition, data manipulation, SQL support.

Unit –V

File and system structure : overall system structure, file organisation, logical and physical file organization, sequential and random, hierarchical, inverted, multi list, indexing and hashing, B-tree index files.

Text / Reference Books

1. Date C.J., Database Systems, Addision Wesley.
2. Korth, Database Systems Concepts, McGraw Hill.
3. Database Management System, Ramakrishna, Gehkre, McGraw – Hill
6. Database management systems, Leon alexis, leon Mathews, "Vikash publication
7. Database system, Rob, coronel, 7th edition, Congage Learning.3. Gerald V Post, "Database Management Systems", Tata McGraw Hill.
4. Leon and Leon, "SQL", Tata McGraw Hill Pub. Co. Ltd.
5. Ivan Bayross, "Database Technologies", Sybex Computer Books Inc.
6. Abbey and Corey, "Oracle 8i", Tata McGraw Hill Pub. Co.Ltd.
7. Occardi, "Relational Database", BPB Publication.

Paper 104- Fundamentals of Operating Systems

Time : 3 Hrs.   **Max. Marks: 75**

Unit I

Introduction: Definition of an operating system, Mainframe, desktop, single user & multi user OS distributed, real-time and handheld OS.

Unit II

Operating System Structures: System components, operating system services, system calls, systems programs, system structure, virtual machines.

Unit – III

Process Management: criteria, scheduling algorithms, algorithm evaluation.
Process Synchronization: The critical section problem, semaphores, classical problems of synchronization.

Unit IV

Memory Management: Swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.

Unit V

Virtual Memory: Demand paging, page replacement, allocation of frames, thrashing.

Text / Reference Books

1. Silberschatz G.G., Operating System Concepts, John Wiley & Sons Inc.
2. Modern Operating Systems, Andrew S. Tanenbum, Pearson Edition, 2nd edition, 2004.
3. Operating Systems, Gary Nutt, Pearson Education, 3rd Edition, 2004.
4. Operating Systems, Harvey M. Dietal, Pearson Education, 3rd edition, 2004.
5. Fundamentals of Operating Systems, A.M. (1979).

Paper 105-Mathematical Foundation of Information Technology

Max Marks: 100   **Duration: 3 Hrs.**   **Min.Marks: 36**

Note: Question paper contains ten questions in all. Attempt any five questions. All questions carry equal marks.

Unit – I

Number systems : natural numbers, integers, rational numbers, real numbers, complex numbers, arithmetic modulo a positive integer (binary, octal, decimal and hexadecimal number systems), radix r representation of integers, representing negative and rational numbers, floating point notation. Binary Arithmetic, 2's complement arithmetic, conversion of numbers from one of binary/octal/decimal/hexadecimal number system to other number systems, Codes (Natural BCD, Excess-3, Gray, Octal, Hexadecimal, Alphanumeric-EBCDIC and ASCII), Error codes.

Unit – II

Logic and Proofs: Proposition, Conjunction, Disjunction, Negation, Compound proposition, Condition, Propositions (Hypothesis, Conclusion, necessary and sufficient condition and Logical equivalence, De Morgan's laws, quantifiers, Universally quantified statement, generalized De Morgan's Laws for Logic.

Unit – III

Component of mathematical system (axiom, definitions, undefined terms, theorm, leema and corollary), proofs (direct proofs, Indirect Proofs, proof by contrapositive), valid argument, deductive reasoning, modus ponens (rules of inference), universal instantiation, universal generalization, existential instantiation, universal generalization resolution, principle of mathematical induction, structural induction.

Unit – IV

Sets, Venn diagrams, ordered pairs, sequences and string, relation (reflexive, symmetric, anti-symmetric, transitive, partial order), inverse relation and composition of relations, relational database, functions (injective, surjective, bijective), composition of functions, restriction and function overriding, function spaces, lambda notation for functions, lambda calculus, equivalence relations, interpretation using digraphs, cardinal, countable and uncountable sets, infinite cardinal numbers, Russell's paradox:, operations on cardinals, laws of cardinal arithmetic.

Unit – V

Graph theory undirected graph, digraph, weighted graph, similarity graphs, paths and cycles, Hamiltonian cycles, shortest path algorithm, isomorphism of graphs, planar graphs. Trees, characterization of trees, spanning trees, breadth first search and depth first search method, tninimal spanning trees, binary trees, tree traversals, decision tree and the minimum time for sorting, isomorphism of trees.

Text / Reference Books

1. C.L. Liu: Elements of Discrete Mathematics, Tata McGraw hill Publishing Company Ltd. 2000
2. Richard Johnsonbaugh-Discrete Mathematics, Pearson Education, Asia, 2001.
3. John Truss: Discrete Mathematics for computer Scientists, Pearson Education, Asia. 2001.
4. Robert, J. Mc. Eliece: Introduction to Discrete Mathematics, Tata McGraw Hill, India.

Practical

Paper 106 Programming Laboratory -1   **Max Marks**   **50**
            ('c', Window, MS-Office)
Paper 107 Programming Laboratory -2   **Max Marks**   **50**
            (DBMS, Operating System)