SCHEME OF EXAMINATION

&

DETAILED SYLLABUS
(w. e. f. Academic Year 2010-2011)

For

MASTER OF COMPUTER APPLICATIONS (MCA) DEGREE

First Semester

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
KASHMERE GATE, DELHI - 110403
SCHEME OF EXAMINATIONS

Master of Computer Applications

FIRST SEMESTER EXAMINATION

Paper ID	Paper Code	Paper	L	T/P	Credit
044101	MCA 101	Fundamentals of IT	3	1	4
044103	MCA 103	Programming in C	3	1	4
044105	MCA 105	Discrete Mathematics	3	1	4
044107	MCA 107	Computer Organization	3	1	4
044109	MCA 109	Principles and Practices of Management	3	1	4
Practical					
044151	MCA 151	Fundamentals of IT Lab.	0	2	1
044153	MCA 153	Programming in C Lab	0	4	2
044155	MCA 155	Computer Organization Lab.	0	4	2
NUES					
044161	MCA 161	General Proficiency – I* (It is suggested to have Personality Development and Communication Skills - I Course)	0	2	1
		Total	**15**	**17**	**26**

* Non-University Examination System (NUES)

Code No.: MCA 101   **L T C**
Paper: Fundamentals of Information Technology   **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: This course is an introductory course in information technology. Topics include foundations in hardware, software, data and an overview of the use of information technology in organizations. Topics include basics of graphics, systems development, database design and networking. Upon completion of this course the student should be able to:
- *Describe the major components of information technology applications:*
- *Hardware, computer networks, software, data, processes, and people.*
- *Describe the different components of a computer network.*
- *Demonstrate an understanding of different types of networks.*
- *Define "Software Engineering".*
- *Demonstrate an understanding of the importance of algorithms in the development of IT applications.*
- *Discuss the role of databases in IT applications.*

PRE-REQUISITE:
- None

UNIT – I
Digital Signals and Logic gates, Number systems: Binary, octal and hexadecimal number systems, signed binary number, binary arithmetic, 2's complement arithmetic, Microprocessors: Introduction, System Bus, Architecture and operation of 8085 microprocessor and instruction set.
[No. of Hrs: 10]

UNIT – II
Introduction to software: Software types and Software Development activities (Requirement, Design (algorithm, flowchart, decision table and tree), Coding, Testing, Installation, Maintenance). Low and high level languages, assemblers, compilers, interpreters, linkers.
Introduction to Graphics primitives: Display Devices: Refresh Cathode Ray Tube, Raster Scan Display, Plasma Display, Liquid Crystal Display, Plotters, Printers, Keyboard, Trackball, Joystick, Mouse, Light Pen, Tablet and Digitizing Camera. External Storage devices.
[No. of Hrs: 12]

UNIT - III
Introduction to Operating system, Different types of operating systems and its working, DOS commands, File Structure and Storage, Introduction to process management: process, threads, scheduling and synchronization. Introduction to Database Management System and its types.
[No. of Hrs: 10]

UNIT – IV
Basic elements of a Communication System, Data transmission media, Digital and Analog Transmission, Network topologies, Network Types (LAN, WAN and MAN), Introduction to Communication protocols, Inter networking tools.   **[No. of Hrs: 10]**

TEXT BOOKS:
1. Alex Leon and Mathews Leon, "Fundamentals of Information Technology", Leon Techworld, 2007.
2. P. K. Sinha and Priti Sinha , "Computer Fundamentals", BPB Publications, 2007.
3. Malvino and Leach, "Digital Principles and Application", TMH, 1999.
4. Ramesh S. Gaonkar, "Microprocessor Architecture Programming and Application with 8085", PHI, 2001.

REFERENCES:
1. Alex Leon and Mathews Leon, "Introduction to Computers", Vikas Publishing House, 2007.
2. Norton Peter, "Introduction to computers", TMH, 4th Ed., 2006.
3. Simon Haykins, "Communication System", John Wiley & Sons, 2006.
4. B. Basaraj, "Digital Fundamentals", Vikas Publications, 1999.
5. V. Rajaraman, "Introduction to Information Technology", PHI, 2006.
6. V. Rajaraman, "Fundamentals of Computers", PHI, 5th Ed., 2006.
7. David Anfinson and Ken Quamme, "IT Essentials PC Hardware and Software Component on Guide", Pearson, 3rd Ed., 2008.

Code No.: MCA 103   **L T C**

Paper: Programming in C   **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVES *: After covering the core C in about 25 lectures the course shall aim to aquaint the students about advanced features of the language the following features are listed as suggested guideline for the teacher.*

- *Passing by value and pass by reference*
- *Difference between array names and pointers*
- *Allocating memory over the heap to two dimesional array (Matrices application could be taken as a case study)*
- *Pointer and pointer operations(Linked lists , doubly linked lists circular linked lists can be taken as a case study*
- *Pointers to functions and call back functions*
- *Bitwise operations and a case based upon these operations*
- *MACROs and their pitfalls*
- *Final case study could be an application making extensive handling of binary files.*

PRE-REQUISTE:

- Basic Programming

UNIT- I

Introduction: GCC, Using MAKE Utility, GDB, **C Basics:** History of C, Characteristics of C, C Program Structure, Variables, Defining Global Variables, Printing Out and Inputting Variables, Constants, Arithmetic Operations, Comparison Operators, Logical Operators, Order of Precedence, Conditionals (The if statement , The ? operator, The switch statement) Looping and Iteration (The for statement, The while statement, The do-while statement, break and continue) Arrays and Strings (Single and Multi-dimensional Arrays, Strings) Functions (Function Prototyping, passing parameters, returning values, recursion) Storage classes (auto, extern, static, register)   **[No. of Hrs. : 10 Hrs]**

UNIT-II

Further Data Types: Defining New Data Types, Structures, Unions, Type-Casting, Enumerated Types, Low Level Operators and Bit Fields (Bitwise Operators, Bit Fields)

Pointers: Pointers arithmetic and Arrays, const pointers, void pointers, near, far and huge pointers

Dynamic Memory Allocation and Dynamic Structures: (malloc, calloc and realloc; sizeof, free, introduction to Linked Lists and dynamic 2- dimensional arrays)

Advanced Pointer Topics: (Pointers to Pointers, Pointer to array, Array of pointers, Command line input, Pointers to a Function, Implementing Callbacks)   **[No. of Hrs. : 12 Hrs]**

UNIT -III

The C Preprocessor: (#define, #undef, #include, #if -- Conditional inclusion, Other Preprocessor Commands) **C, Linux and Standard Libraries:** (Advantages of using Linux with C, Using

Linux System Calls and Library Functions) Integer Functions, Random Number, String Conversion, Searching and Sorting: <stdlib.h> Mathematics: <math.h> (Math Functions, Math Constants), Input and Output (I/O):stdio.h Reporting Errors (perror(), errno, exit()) Streams (Predefined Streams, Redirection) Basic I/O (Formatted I/O, printf, scanf), String Handling: <string.h> (Basic String Handling Functions and safety issues, String Searching), Character conversions and testing: ctype.h, **Files** Character and Line Based I/O, Formatted I/O, Block I/O, File Positioning, Status Functions, Deletion and Renaming, Temporary Files

[No. of Hrs. : 11 Hrs]

UNIT -IV

File Accessibility and Directories (access, stat, chmod, chown …, chdir, chroot…), **Process Control**: (Running Linux Commands from C, fork(), the exec family, wait(), exit()), Thread creation-a simple implementation. **[No. of Hrs: 09 Hrs]**

TEXT BOOKS:
1. Yashwant Kanetkar, "Let us C", BPB Publications, 2002.
2. Mark Mitchell, Jeffrey Oldham, and Alex Samuel, "Advanced Linux Programming**",** New Riders Publishing, 2001.
3. B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PHI., 2000

REFERENECES:
1. Yashwant Kanetkar, "Pointers in C", BPB Publications, 2002.
2. Paul Deitel and Harvey Dietel, "How to Program", PHI, 6th Ed., 2010.
3. Behrouz A. Forouzan and Richard F. Gilberg, "Computer Science A Structured Programming Approach Using C", PHI, 3rd Ed., 2007.
4. Jeri R. Hanly and Elliot B. Koffman, "Problem Solving and Programming in C", Pearson, 5th Ed. 2007.
5. Rama N. Reddy and Carol A. Ziegler, "C Programming for Scientist and Engineers with Applications", Jones and Bartlet, 2010.

Code No. MCA 105   **L T C**
Paper: Discrete Mathematics   **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVES: This course covered the mathematical topics most directly related to computer science. Learning Outcome of this course is to prepare students to take courses related with Data Structure, Algorithm analysis and Cryptography. This course develops ability to write independent mathematical Proofs.

PRE-REQUISITE:
- Basic Mathematics

UNIT – I
Formal Logic: Statement, Symbolic Representation and Tautologies, Quantifiers, Predicates and validity, Normal forms. Propositional Logic, Predicate Logic. Direct Proof, Proof by Contraposition, Proof by exhaustive cases and proof by contradiction, principle of mathematical induction, principle of complete induction., pigeonhole principle, permutation and combination, pascal's triangles, binominal theorem. Sets, Subsets, power set, binary and unary operations on a set, set operations/set identities, fundamental counting principles, principle of inclusion and exclusion Relation, properties of binary relation, closures, partial ordering, equivalence relation, properties of function, composition of function, inverse.   **[No. of Hrs: 12]**

UNIT – II
Lattices: sub lattices, direct product, definition of Boolean algebra, properties, isomorphic structures (in particulars, structures with binary operations) sub algebra, direct product and homomorphism, Boolean function, Boolean expression, representation & minimization of Boolean function. Principle of Well Ordering Recursive definitions, solution methods for linear, first-order recurrence relations with constant coefficients.   **[No. of Hrs: 08]**

UNIT – III
GCD, LCM, Permutation function, composition of cycles. Fundamental Theorem of Arithmetic, primes, Congruence, Euler Phi function, Fermat's Little Theorem, Primality and Factoring, Simple Cryptosystems, RSA Cryptosystem. Groups, Group identity and uniqueness, inverse and its uniqueness, isomorphism and homomorphism, subgroups, Cosets and Lagrange's theorem, Permutation group and Cayley 's theorem (without proof), Error Correcting codes and groups, Normal subgroup and quotient groups.   **[No. of Hrs: 12]**

UNIT – IV
Graph Terminology, Isomorphism, Isomorphism as relations, Cut-Vertices, Planar graphs, Euler's formula (proof), four color problem and the chromatic number of a graph, Eu ler graphs, Hamiltonian graphs, five color theorem, Vertex Coloring, Edge Coloring. Trees terminology, in order, preorder & post order trees traversal algorithms, directed graphs, Computer representation of graphs.   **[No. of Hrs: 10]**

TEXT BOOKS:
1. Kenneth Bogart Clifford and Stein Robert Drysdale, "Discrete Mathematics for computer science" Springer, 2006.
2. J. P. Tremblay and R. Manohar, "Discrete Mathematical Structure with Application to Computer Science", TMH, New Delhi, 2000.
3. David J. Hunter "Essentials of Discrete Mathematics" Johns and Bertlett, 2008.
4. Kolman, Busby and Ross "Discrete Mathematical Structures" PHI/Pearson., 6th Ed., 2009.
5. D. S. Malik and M. K. Sen, "Discrete Mathematical Structures", Cengage Publication, 2006.
6. Swapan Kumar Sarkar, "Discrete Mathematics", S. Chand, 4th Ed., 2006.
7. Kenneth H. Rosen, "Discrete Mathematics & Applications", TMH, 6th Ed., 2007.

REFERENCES:
1. C. L. Liu, "Elements of Discrete Mathematics", McGraw Hill Book Company, 2nd Ed., 1985.
2. Vinay Kumar, "Discrete Mathematics", BPB Publications, 1998.
3. G. Haggard, J. Schlipf and S. Whitesides, "Discrete Mathematics for Computer Science", Thomson Learning, 2006.
4. J. L. Hein, "Discrete Structures, Logic and Computabili ty", Narosa, 3rd Ed., 2009.
5. Neal Koblitz, "A course in number theory and cryptography ", Springer – Verlag, 2nd Ed., 2004.
6. V. Shoup, "A Computational Introduction to Number Theory and Algebra", CUP, 2nd Ed., 2008.
7. S. Santha, "Discrete Mathematics with Combinatorics and Graph Theory", Cengage Learning, 2009.
8. T. Sengadir, "Discrete Mathematics and Combinationatorics", Pearson, 2009.
9. David J. Hunter, "Essentials of Discrete Mathematics", Jones and Bartlett, 2010.
10. Narsingh Deo, "Graph Theory", PHI, 24th Indian Print, 2003.

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: The main objective of the syllabus is to make students understand the relevance Computer Organization in the software oriented course. It aims at introducing basic digital concepts and then use them to explain details of computer organization.

PRE-REQUISITE:
- Basics of Digital Electronics
- Internal Components of the CPU

UNIT – I
Introduction and overview: Multiplexes, Demultiplexers, Decoders, Adders, Flip-flops : S-R, J-K, D, T, Master Slave and Edge triggered, Registers, shift registers, Bi-direction shift registers.
Register Transfer and Microoperation: Register transfer language, register transfer, bus and memory transfer, arithmetic microoperations, logic microoperations, shift microoperations.
[No. of Hrs: 12]

UNIT – II
Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing & control, instruction cycle, memory reference instructions, input-output and interrupts, design of basic computer, design of accumulator logic.
Microprogrammed Control Unit: Control memory, address sequencing.
Central Processing Unit: Introduction, general register organization, stack organization, instruction formats, addressing modes. **[No. of Hrs: 11]**

UNIT – III
Pipeline and Vector processing: Parallel Processing, pipelining, arithmetic pipeline, RISC Pipeline, Vector Processing, Array Processors.
Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of data transfer, priority interrupt, direct memory access, input-output processor.
[No. of Hrs: 10]

UNIT – IV
Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware.
Multiprocessors: Characteristics of multiprocessor, Interconnection Structure, Interprocessor Communication & Synchronization. **[No. of Hrs: 09]**

TEXT BOOKS:
1. Mano M, "Computer System and Architecture", Pearson, 3rd Ed., 2009
2. Stallings W, "Computer Organization & Architecture", PHI, 8th Ed., 2010.

REFERENCES:
1. Malvino, "Digital Computer Electronics: An Introduction to Microcomputers", McGraw Hill, 1993.

2. Hayes, J. P. "Computer Architecture and Organization", McGraw Hill, 1998.
3. Andrew S. Tanenbaum, "Structured Computer Organization", PHI, 5th Ed., 2006.
4. P. V. S Rao, "Computer System Architecture", PHI, 5th Ed., 2009.
5. Anthony J. Dos Reis, "Assembly Language and Computer Architecture using C++ and Java", Cengage Learning, 2004.

Code No.: MCA 109   **L T C**
Paper: Principles and Practices of Management   **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

OBJECTIVE: The purpose of this course is to expose the student to the basic concepts of management in order to aid the student in understanding how an organization functions, and in understanding the complexity and wide variety of issues managers face in today's business firms.

PRE-REQUISITE:
- None

UNIT – I
Management: Concept, Nature, Importance; Management: Art and Science, Management As a Profession, Management Vs. Administration, Management Skills, Levels of Management, Characteristics of Quality Managers. Evolution of Management: Early contributions, Taylor and Scientific Management, Fayol's Administrative Management, Bureaucracy, Hawthorne Experiments and Human Relations, Social System Approach, Decision Theory Approach. Business Ethics and Social Responsibility: Concept, Shift to Ethics, Tools of Ethics
[No. of Hrs : 11]

UNIT – II
Introduction to Functions of Management, Planning: Nature, Scope, Objectives and Significance of Planning, Types of Planning, Process of Planning, Barriers to Effective Planning, Planning Premises and Forecasting, Key to Planning, Decision Making.
Organizing: Concept, Organization Theories, Forms of Organizational Structure, Combining Jobs: Departmentation, Span of Control, Delegation of Authority, Authority & Responsibility, Organizational Design. **[No. of Hrs.: 10]**

UNIT – III
Staffing: Concept, System Approach, Manpower Planning, Job Design, Recruitment & Selection, Training & Development, Performance Appraisal, Directing: Concept, Direction and Supervision, Motivation: Concept, Motivation and Performance, Theories Of Motivation, Approaches for Improving Motivation, Pay and Job Performance, Quality of Work Life, Morale Building.
[No. of Hrs.: 10]

UNIT – IV
Leadership: The Core of Leadership: Influence, Functions of Leaders, Leadership Style, Leadership Development.Communication: Communication Process, Importance of Communication, Communication Channels, Barriers to Communication. Controlling: Concept, Types of Control, Methods: Pre-control: Concurrent Control: Post-control, An Integrated Control System, The Quality Concept Factors affecting Quality, Developing a Quality Control System, Total Quality Control, Pre-control of Inputs, Concurrent Control of Operations. Post Control of Outputs. Change and Development: Model for Managing Change, Forces for Change, Need for Change, Alternative Change Techniques, New Trends in Organisational Change. **[No. of Hrs.: 11]**

TEXT BOOKS:
1. Stoner, Freeman and Gilbert Jr., "Management", PHI, 6th Ed.
2. Koontz , "Principles of Management", Tata Mc Graw Hill, 1st Ed., 2008.
3. Robbins and Coulter, "Management", PHI, 8th Ed.

REFERNCES:
1. Robbins S. P. and Decenzo David, "A. - Fundamentals of Management: Essential Concepts and Applications", Pearson Education, 5th Ed.
2. Hillier Frederick S. and Hillier Mark S. - Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets, Tata Mc Graw Hill, 2nd Ed., 2008.
3. Weihrich Heinz and Koontz Harold, "Management: A Global and Entrepreneurial Perspective", Mc Graw Hill, 12th Ed., 2008.
4. R. Satya Raju and A. Parthasarathy, "Management Text and Classes", PHI, 2nd Ed., 2009.

There will be following Practical:

1. Fundamentals of IT Lab   **MCA 111**
2. Problem Solving Using C Lab   **MCA 113**
3. Computer Organization Lab   **MCA 115**

Code No. : MCA 161
Paper: General Proficiency – I*

It is suggested to have a fundamental course on Personality Development and Communication Skills – I in this semester.

This paper is under Non University Examination system its detail content will be decided by the respective Institute, under approval of the coordination committee based on the requirement of individual institution.

*Non University Examination Scheme (NUES)

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.