Master of Computer Application

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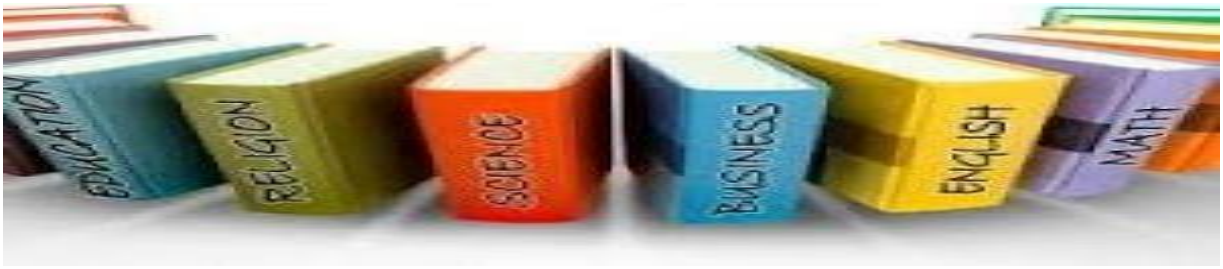

Programme Structure

Curriculum & Scheme of Examination

2015

AMITY UNIVERSITY
CHHATTISGARH

RAIPUR

MCA

Programme Structure

FIRST SEMESTER

Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
IFT4101	Introduction to IT	3	1	-	4
IFT4102	Computer Programming Using C Language	3	1	-	4
IFT4103	Graph Theory &Combinatorics	3	1	-	4
IFT4104	Financial Accounting	3	-	-	3
IFT4105	Computer Organization & Architecture	3	1	-	4
IFT4106	Mathematical Foundation to Computer Science	4	1	-	5
IFT4107	Computer Programming Using C Language Lab	-	-	2	1
Open Electives					5
CSS4151	Basics of Communication	1	-	-	1
BEH4151	Self Development and Interpersonal skills	1	-	-	1
LAN4151 LAN4152 LAN4153 LAN4154 LAN4155 LAN4156 LAN4157 LAN4158	Foreign Business Language - I French -I German -I Spanish -I Russian -I Chinese -I Portuguese –I Korean-I Japanese-I	3	-	-	3
	TOTAL				**30**

Syllabus – First Semester

INTRODUCTION TO IT

Course Code: IFT4101 **Credit Units: 04**

Course Objective:
This course is aimed to provide a fundamental understanding of computer science for the students in their early stages of academic career. Various computer nomenclatures regarding to hardware and software will be introduced for students to develop an in-depth realization of several subjects and their significant roles in the field. The syllabus includes the basic concepts of memory, processing units, Operating System, Computer Networks and Data Communications.

Course Contents:
Module I: Computer Basics & Input output units
Algorithms, A Simple Model of a Computer, Characteristic of a Computer, Problem Solving Using a Computer,
HTML, CSS, Style Sheet. Description of Computer Input Units, Other Input Methods, Computer Output Units

Module II: Computer Memory
Memory cells, Memory Organizations, Read only Memory, Physical devices used to construct Physical Memory, Hard Disks, Floppy Disks, CDROM

Module III: Primary Arithmetic
Addition, Subtraction, Signed Numbers, Two's Compliment, Addition & Subtraction using 2's Compliment Method, Multiple & Division of Binary Numbers. Floating point Representation, Arithmetic Operations with Normalized Floating Point Numbers.

Module IV: Introduction to Operating Systems
Why do we need Operating System. Batch Operating System, Multi Programming Operating System, Time Sharing Operating System. Personal Computer Operating System, Online and Real Time Systems.
Linux: An overview of Linux, Basic Linux elements, system features, software features. File Structure, File handling in Linux, installation of Linux, S/W requirements, Preliminary steps before installation, and specifics on hard drive repartitioning and booting a Linux system

Module V: Classification of Computer Systems
Analog, Digital, Types of Computers (Micro, Mini, Main Frame) Systems.

Module VI: Introduction to Computer and Communication
Type of Communication among Computers, Need of computer Communication Network, Internet and World Wide Web, Characteristics of communication Channel, Physical Communication Media, Internet Addressing, DSI Model, Modes of Communication.

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	10	15	5	70

Text & References:
Text:
- Fundamentals of IT, Satish Jain, BPB Publication
- Fundamentals of Information Technology, D S Yadav, New Age Publication
- Computer Fundamentals, VRaja Raman

References:
- Computer Today, S. K. Basandra, Galgotia Publication

COMPUTER PROGRAMMING USING C LANGUAGE

Course Code: IFT4102 **Credit Units: 04**

Course Objective:
This course provides an introduction to ANCI C, focusing on the C programming. Feature, syntax, structure and implementation will be covered. Lab instructions will be included, which will provide straight understanding and excises of C. Functions, Array, Pointer and File System are the important contents of the syllabus.

Course Contents:
Module I: Introduction to C
Character Set, Identifier and Keywords, Data Types and Constants, Variables

Module II: Operators and Expressions
Arithmetic Operators, Unary Operators, Relational and Logical Operators, Assignment and Condition Operators, Library Functions.

Module III: Data Input/Output Functions
Description of getchar () FUNCTION, Description of putchar () Function, Description of scanf () Function, Description Of printf () Function, Description of Gets () Function, Description of Puts () Function

Module IV: Control Statements
Preliminaries, Branching With If Else Structure, Looping Statements (While, Do-While, For), Switch Statement, Break And Continue Statement.

Module V: Functions
Introduction to Functions, Necessity Of Functions, Defining and Accessing Functions, Prototype of a Function, Passing Arguments and Receiving Values from Functions, Call by Value and Call by Reference Functions.

Module VI: Array
Defining an Array, Processing an Array, Passing an Array to a Function, Multidimensional Arrays, Strings as a Special Case of a Character String.

Module VII: Pointers
Fundamentals of Pointers, Declaration of a Pointer Variable, Passing Pointers to a Function. Pointers and One Dimensional Array, Dynamic Memory Allocation, Operations on Pointers, Array of Pointers, Passing Functions to Other Functions.

Module VIII: Structure and Unions
Definition, Processing of Structure, typed of Statement as User Defined Variable, Structure and Pointers, Passing Structure to Functions.

Module IX: Data Files
Opening and Closing Data Files, Creating a Data File, Processing of Data File, Unformatted Data Files.

Examination Scheme:

Components	CT1	PR.	ATTD.	EE
Weightage (%)	10	15	5	70

Text & References:
Text:
- Programming in ANSI C, E Balaguruswamy, TMH
- Let Us C, Y. Kanetkar, BPB

References:
- The 'C' Programming Language, B.W. Kernighan & Ritchie, PHI
- Programming in 'C', Gottfried, TMH

GRAPH THEORY AND COMBINATORICS

Course Code:IFT4103Credit Units: 04

Course Objective:
We will study basic concepts in combinatorial graph theory and see how graphs serve as models for many standard problems, which have applications in science, business and industry. Syllabus includes mathematical logic, algebraic structure, graph, tree and Combinatorics.

Course Contents:

Module I: Mathematical Logic
Statements and notations, connectives, Conditional Statements, Compound Statements, Truth Tables, Statement Formula, Well Formed Formula, Equivalence of Formula, Tautology, Rules of inference.

Module II: Algebraic Structure
Lattices and Algebraic Systems, General properties, Semi Group, Monoid and group, Boolean algebra, Boolean function, Representation and Minimization of Boolean function, Applications of Boolean Algebra.

Module III: Graph Theory
Basic Terminology, Walks, paths, circuits, connectedness, Handshaking Lemma, Isomorphism, Sub graphs, and Union of Graphs, Reach ability, Eulerian Graph and Union of Graphs, Reachability, Eulerian Graph, Flurry's Algorithm, Shortest path problem, Chinese postman problem, Hamiltonian graph, Traveling Salesman Problem, Bipartite graphs.

Module IV: Trees
Introduction to trees, Rooted trees, path length in rooted trees, spanning trees, Fundamental circuits, spanning trees of a weighted graph, cut sets and cut vertices, Fundamental cutset, Minimum spanning tree.

Module V: Directed Graph
Directed graphs and connected ness, directed trees, Network Flows, Max Flow-MinCut Theorem, Matrix representation of a graph, Planar graphs: Combinational and Geometric Duals, Kuratowski"s graphs, Detection of planarity, thickness and crossing.

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	10	15	5	70

Text & References:

Text:
- Swapan Kumar Sarkar, A Text book on Discreet Mathematics.
- Discrete Mathematical Structures with Application to Computer Sciences, JP Trembly& Manohar, TMH.
- Elements of Discrete Mathematics, CL Lire, TMH

References:
- Discrete Mathematical Structures, Sernard Kolman and Others, PHI
- Applied Discrete Structures for Computer Science, Alen Doerr & Levasseur, Galgotia

FINANCIAL ACCOUNTING

Course Code: IFT4104Credit Units: 03

Course Objective:
This course is designed to provide a basic understanding of financial accounting, including introductory accounting theory, concepts, principles and procedures. Specific attention will be devoted to the preparation and understanding of the financial statements.

Course Contents:

Module I: Accounting
Principles, concepts and conventions, double entry system of accounting, introduction to basic books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance. Final Accounts: Trading, Profit and Loss accounts and Balance Sheet of sole proprietary concern (Without adjustments).

Module II: Financial Management
Meaning, scope and role, A brief study of functional areas of financial management. Introduction to Various FM Tools: Ratio Analysis, Fund flow statement & Cash flow statement. Introduction to Cost Accounting Nature, Importance & Basic Principles. Brief Introduction to methods of Costing & Elements of Cost, Unit Costing.

Module III: Computerized Accounting
Meaning & advantages, limitations of computerised accounting, manual accounting verses computerised accounting, Source documents, Balancing Accounts, Trial Balance & Final A/Cs in Computerised. Accounting. Modules of Computerised Accounting Systems. Developing computerised accounting systems, control & Audit in computerised accounting.

Module IV: Financial Systems
Business Systems, Production Control System, Inventory System, Payroll System

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	10	15	5	70

Text & References:

Text:
- Financial Accounting, P. C. Tulsian
- Principles A Book - Keeping, J.C. Katyal
- Financial Management, I.M. Pandey, Vikas Publications,
- Computerized Accounting, P.H. Bassett, BPB.

References:
- Financial Management, P.V. Kulkarni, Himalaya Publishing House.
- Management Accounting, Sharma, Gupta & Bhalla
- Business Computer Systems: Design, Programming & Maintenance, Charlotte Eudy McConn, PHI

COMPUTER ORGANIZATION AND ARCHITECTURE

Course Code: IFT4105 **Credit Units: 04**

Course Objective:
This course in an introduction to computer architecture and organization. We will cover topics in both the physical design of the computer (organization) and the logical design of the computer (architecture). We will also review digital logic, the development of integrated circuits, and cover selected topics in advanced technologies in this area.

Course Contents:
Module I: Digital Logic Fundamentals – Binary Arithmetic
Boolean Algebra: Basic Functions, Manipulating Boolean functions, K-Map, (SOP + POS) Basic Combinational Logic: Adder/Subtractor, Decoders, Encoders, Multiplexers, Memory, Basic Sequential Circuits: Flip-flops – S-R Flip Flop Conversions, Counters. (Synchronous + Asynchronous),

Module II: CPU Organization
Register organization**:** General register organization, Stack organization, Programmer visible register, Status and Control Register, Microoperations: Register transfer, bus and memory transfer, Arithmetic, Logic and Shift microoperation, Control Unit: Structure of CU, Hardwired Control Unit, Microprogrammed Control Unit. Introduction Format – Addressing Modes, Instruction cycle.

Module III: Computer Arithmetic
Addition and Subtraction, Multiplication Algorithms, Division Algorithms.

Module IV: Input-Output Organization
I/O devices**:** Accessing, I/O interfaces, Asynchronous data transfer: Strobe control, handshaking, Modes of transfer: Programmed I/O, Interrupt-initiated I/O, DMA, Interrupts: types, interrupt hardware and priority I/O processors.

Module V: Memory Organization
Memory Hierarchy, Main memory:RAM and ROM, Memory Address Map, Auxiliary Memory: Mag tape, Mag Disk, RAID, Cache Memory: associative memory, Virtual Memory Concept

Module VI: Advance Topics
Reduced Instruction Set Computers: RISC Vs CISC, Pipelining: Parallel processing, arithmetic pipeline, Instruction pipeline, RISC pipeline.

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	10	15	5	70

Text & References:

- Computer System Architecture, M. Morris Mano, PHI
- Computer Organization and Architecture, W. Stalling,
- Structured computer Organization, Tanenbaum, PHI

MATHEMATICAL FOUNDATION TO COMPUTER SCIENCE

Course Code: IFT4106Credit Units: 05

Course Objective:
The aim of the course is to introduce the mathematical underpinnings of theoretical computer science and the theory of computation. Fundamental concepts in discreet mathematics with emphasis on their applications to computer science will be taught.

Course Contents:
Module I: Introduction
Relation: Type and compositions of relations, Pictorial representation of relations, closures of relations, Equivalence relations, Para Ordering relation. *Function*: Types, Composition of function, Recursively defined function, *Mathematical Induction:* Piano's axioms, Mathematical Induction, Discrete Numeric Function and Generating Functions
Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients, Asymptotic Behaviour of functions, *Algebraic Structures:* Properties, Semi Group, Monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets Permutation group, Homomorphism, Isomorphism and Automorphism of groups.

Module II: Propositional Logic
Preposition, First order logic, Basic Logical operations, Tautologies, Contradictions, Algebra of Proposition. Logical implications, Ordered set, Hasse diagram of partially ordered set, Consistent enumeration, Isomorphic ordered set, Well ordered set, Lattices, Properties of lattices, Bounded lattices and Complemented lattices.

Module III: Regular Expression
Introduction to defining language, Kleene Closure, Arithmetic expressions, Chomsky Hiearchy, Regular expressions, Generalization Transition graph, Conversion of regular expression to finite Automata, NFA, DFA, Conversion of NFA to DFA, Optimizing DFA, FA with output Moore machine, Mealy machine, Conversions.

Module IV: Non-regular language
Pumping Lemma, Myhill Nerode Theorem, Pushdown Automata and Introduction to Turing Machine and elementary applications to recognition of a language and computation of functions.

Module V: Combinatorics
Partitions, counting functions, number of partitions into odd or unequal parts. Necklaces, Euler's function, set of symmetries, enumeration in the odd and even cases.

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	10	15	5	70

Text & References:
Text:
- Liptschutz, Seymour, "Discrete Mathematics", TMH

References:
- Trembley, J.P & R. Manohar, "Discrete Mathematical Structures with Application to Computer Science", TMH
- Kenneth H. Rosen, "Discrete Mathematics and its applications", TMH
- Doerr Alan & Levasseur Kenneth, "Applied Discrete Structure for Computer Science". Galgotia Pub Pvt Ltd.
- Gersting, "Mathematical Structure for Computer Science", WH Freeman & M Macmillan.
- Kumar Rajendra, "Theory of Automata : Language and Computation", PPM
- Hopcroft J.E. Ullman J.D., "Introduction to Automata theory, Language and Computation", Narosa Publishing House, New Delhi
- C.L. Liu, "Elements of Discrete Mathematics", McGraw Hill.
- Peter Grossman, "Discrete Mathematics for Computer ", Palgrave Macmillian.

COMPUTER PROGRAMMING USING C LANGUAGE LAB

Course Code: IFT4107 Credit Units: 01

Course Contents:

1. Write a program to read 3 numbers x, y, z. Use conditional statement and evaluate values of variables a, b and c. Perform the sum with 2 set of variable. Check the sum for equality and print the sum.
2. Write a program to shift input data by 2 bits left and right.
3. Write a program to use bitwise "&" operator between 2 integer and display the result.
4. Write a program to input 6 numbers and find the biggest and smallest using nested if.
5. Write a program to enter a year and find the number of:
    a. Minutes
    b. Hours
    c. Days
    d. Months
    e. Seconds
6. Write a program to find the sum of even and odd numbers using switch, if, if..else, nested if between 1 and 20.
7. Write a program to find the numbers between 1 and 100 that are not divisible by 2, 3 and 5.
8. Write a program to enter a character (alphabetical) and display its position and its corresponding ASCII value.
9. Write a program to simulate a digital clock.
10. Write a program to find sum of digits of any number.
11. Write a program to print the series:
    a. $x - x^3/3! + x^5/5! - x^7/7!..... x^n/n!$
    b. $1 + x^2/2! - x^3/3! + x^4/4!..... x^n/n!$
12. Write a program to generate the following figures:

a.
```
    *
  * * *
* * * *
  * * *
    *
```

b.
```
    *
  * * *
* * * * *
```

c.
```
1
12
123
1234
12345
```

d.
```
    1
  121
 12321
1234321
123454321
```

e.
```
1
12
123
1234
12345
1234
123
12
1
```

f.
```
654321
54321
4321
321
21
1
```

g.
```
543212345
5432 2345
543   345
54     45
5       5
```

h.
```
  z
 yzy
xyzyx
 yzy
  z
```

i. Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll.....

13. Write a program to find the factorial of a given number.
14. Write a program to obtain the sum of the diagonal elements of matrices.
15. Write function to add, subtract, multiply & divide two complex numbers (x+iy) & (a+ib).
16. Write a program to find the roots of a quadratic equation with each condition.
17. Write a program to find numbers between 7 and 100 which is exactly divisible by 4 and is divisible by either 5 or 6.
18. Write a program to convert:
    a. Binary to Decimal
    b. Decimal to Binary
    c. Binary to Hexadecimal
19. Write a program to perform Arithmetic operation on an array i.e. Addition, Subtraction, Multiplication and Division and store the result in another array.

20. Write a program to perform following string operation: with string functions & without string functions
    a. Reverse a string
    b. Concatinate 2 string – strcat()
    c. Compare 2 string – strcmp(), strcmpi()
21. Write a program to detect the occurrence of a number in a string.
22. Write a program to accept a string up to 15 character, and display the position of a character in a separate line.
23. Write a program to display and count the number of vowels in a string.
24. Write a program to generate a palindrome.
25. Write a program to add to pointer addresses of a pointer variable.
26. Write a program to find the factorial of a number using recursion.
27. Write a program to perform different arithmetic operations using pointers
28. Write a program to obtain prime factors of any integer number using functions i.e. 24 -> 2, 2, 2, & 3.
29. Write a program to find the sum of 5 digit number:
    a. Without using recursion
    b. With using recursion.
30. Write a program to obtain Fibonacci series by using recursion.
31. Write a program to create, display, modify and append a file (sequential file).
32. Write a program to copy the content of one file to another.
33. Write a program to calculate space in a file (number of blank spaces and not the file size).
34. Write a program to print out the lines from a file that have 50 or more characters in them.
35. Write a program to extract the content from a file and print them. The user should be able to specify the starting position from where the extraction should begin and the number of characters to be extracted.
36. Write a program to create a structure to accept Firstname, Middlename, Lastname of a person. Display the initials of first and the middle name separated by "." i.e.
    Input – Krishna Kumar Singh
    Output – K.K. Singh
    Now create a main structure that will contain name, age, salary of an employee.
37. Write a program to call sum() function recursively and perform sum of 1 to 5 numbers. (instead of using the sum() function use the main() function itself to perform the above operation)
38. Write a program to find the larger of the two numbers using macro with arg.
39. Write a program to count the number of character, word and lines in a text file whose name is supplied in the command line.
40. Write a program to arrange a list by using any sorting method.

Examination Scheme:

IA				**EE**	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.