Shri Vaishnav Vidhyapeeth Vishvavidhyalaya, Indore

Shri Vaishnav Institute of Computer Applications

Name of the Program: M.Sc. in Computer Science

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teacher Assessment*	END SEM University Exam	Teacher Assessment*
MCAMA101	COMPULSORY	Mathematical Foundation of Computer Science	3	1	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
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*__Teacher Assessment__ shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Objectives:

- To introduce the students with the Discrete Mathematics, Probability and Statistics.

Course Outcome: After the successful completion of this course students will be able to

- understand and apply the fundamentals of the discrete mathematics.
- find probability of a random event.
- apply the techniques in the testing of quality of an item.

UNIT – I
Discrete Mathematics: Sets, Relations, Functions, Logic Operators, Truth Table, Normal Form, Boolean Algebra, Trees.

UNIT – II
Discrete Mathematics: Congruence and Equivalence Relations, Groups and Subgroups, Semi-group, Monoids examples and properties.

UNIT – III
Discrete Mathematics: Permutation and Combination, Pigeon Hole Principle, Principle of Exclusion and Inclusion, Ordinary and Exponential Generating Function, Recurrence Relation.

UNIT – IV
Probability: Axioms, Conditional probability, Bayes theorem, Random variable, Discrete RV-Binomial & Poisson RV, Continuous RV, Normal RV, Expectation, Mean and Variance

UNIT – V
Probability: Sample distribution, Testing of Hypothesis, Curve fitting-Method of the least square.

Text Books:
1. C. L. Liu, Elements of Discrete Mathematics, Tata McGraw-Hill
2. Trembly J. P. & Manohar P., Discrete Mathematical Structure with applications to computer science, McGraw-Hill
3. Ross S., A First course in Probability, Sixth edition, Pearson Education
4. Ross Sheldon, Introduction to Probability Model, Eighth edition, Elsvier, 2003
5. Trivedi K. S., Probability and Statistics with Reliability, Queuing and Computer Science Applications, Second edition, Wiley, 2002.

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MSCCS101	Compulsory	Computer Organization and Architecture	3	1	0	4	60	20	20	0	0

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Course Objectives:
- To create basic understanding of Computer System Organization.
- To understand basic concept of Computer System architecture.
- To understand internal working, structuring, and implementation of a computer system.

Course Outcomes: After completion of this syllabus students will be able

- To understand computer organization structure and behavior of a computer system.
- To understand how exactly all the units in the system are arranged and interconnected.
- To understand functionalities of a Computer System Architecture in terms of instructions, addressing modes and registers.
- To understand internal working, structuring, and implementation of a computer system.

UNIT - I
Digital Computer and it types, Configuration(functional units) of Computer System, basic Operational concepts, Capabilities, Limitations and applications of computers. Definitions of Hardware, Software and Firmware. Definitions of Dumb, Smart and Intelligent terminals.

Introduction of Number Systems like Binary, Octal and Hexadecimal number systems, Character Codes (BCD, ASCII, EBCDIC).

UNIT – II

Instruction formats, Instruction Cycle, Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Addressing modes, data transfer &Manipulation, I/O Organization, Bus Architecture. Digital logic circuits: digital computer Logic gates, Boolean Algebra and its examples, K-map simplification.

UNIT – III

Combinational circuit: Half Adder, Full Adder, concept of Flip-Flop. Digital components: integrated circuits, Decoders, Encoders, Multiplexer, De-multiplexers, Registers, Counters (synchronous& asynchronous), ALU, Micro Operation.

UNIT-IV

Memory Organization: introduction to Memory units, memory Hierarchy design and its characteristics, types of main memory (RAM/ROM chips), types of RAM and ROM, Auxiliary memory (Hard Disk Drive), Associative memory, Cache memory, Virtual Memory. Introduction to System Software: Assemblers, Compiler, Interpreters, Loading, linking and relocation; Functions of editors and debuggers.

UNIT-V

Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input- Output Processor and Serial Communication. I/O Controllers, Asynchronous data transfer. Concept of 8-bit micro Processor (8085) and 16-bit Micro Processor (8086)

Text Books:

1. David Patterson and John Hennessy, Computer Organization and Design: The Hardware/Software
Interface, RISC-V Edition, Morgan Kaufmann / Elsevier, 13th April 2017.
2. Stallings, Computer Organization & Architecture : Designing for performance, Tenth Edition, Pearson Education, 2016.

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3.Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, Sixth Edition, Tata McGraw Hill, 2012.

REFERENCES:

1. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
2. John L. Hennessey and David A. Patterson, Computer Architecture – A Quantitative Approach‖, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.
3. William Stallings, Computer Organization and Architecture – Designing for Performance, Eighth Edition, Pearson Education, 2010.

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MCA104	COMPULSORY	Computer Fundamentals and PC Software	2	0	2	3	60	20	20	30	20

Course Educational Objectives (CEOs)s: -

1. To provide the knowledge of using different software packages including word processor, electronic spreadsheet, presentation s/w.
2. To familiarize the students with the need and scope of the subject.
3. To explain how to integrate the data stored in word processor, spreadsheet etc.
4. To develop presentation skills using this software.
5. To develop an understanding of internet and its utility.

Course Outcome (COs)s: -Students will be able to
1. To create word documents and to format them using various tools available
2. To create tables and manipulate them
3. To use mail merge, labels
4. Creating spreadsheet for storing and managing data using functions
5. Format, print spreadsheet
6. Create power point presentation for different purposes using objects, multimedia animation.
7. To use of google docs, google sheet and google forms.

Unit–I Introduction to Computer Fundamentals: Introduction to Computer, Computer System Hardware, Computer Memory, Input and Output Devices, Software and its types. Windows Basics – Introduction to word processor and its types.

UNIT – II MS -word: Creating and Formatting Tables: Changing Row height, inserting columns, merging cells Calculations in a Table, Sorting Text, Toolbar using word art, Mail merge and macros. Creating charts. Defining Tabs: Tabs Dialog Box, enhancing a Document: Inserting page Breaks, Adding Border, Using Header and Footers in the Document.

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UNIT – III Spread sheet: Introduction, Definition. Screen parts of worksheet, entering information: Numbers, Formula, Editing Data in a cell, Using a Range with SUM, Moving and copying data, Inserting and Deleting Row and Columns in the worksheet, Using the format cells Dialog box. Functions and its classification.

UNIT – IV Presentation: Introduction, Slide show, Formatting, creating a Presentation, inserting clip Arts, Adding Objects, Applying Transitions, Animation effects, formatting and checking text, Modifying Visual elements, Preparing a complete presentation, Case studies.

Unit – V Internet: applications, URL, IP address, DNS, Web browser, SMTP, FTP, telnet, network securities.
Google add-ons: Google docs, Google sheet, Google form, Google Drive working and applications.

List of Experiments:
1. To open and practice of OS – Folder related operations, My-Computer, window explorer, Control Panel,
2. To create, save and editing of Text files using word processor.
3. Formatting and printing of document (setting of margins, size, orientation, different breaks etc. Checking of spelling and use of thesaurus
4. Creating, inserting tables, header, footers, hyperlink, different objects in a document.
5. Creating a mail merged documents, labels
6. Creating and manipulating spreadsheets. To create, save and editing of spreadsheets. Use of cell references, sorting and filtering data in a spreadsheet, using formulae.
7. Formatting and printing of spreadsheets (setting of margins, size, orientation, different breaks etc. What if analysis, mail merging.
8. Creating header, footers, hyperlink, different objects in a spreadsheet.
9. Creating different types of graphs and printing.
10. Creation, editing and formatting presentation slides.
11. Create presentation for different purposes using objects, animation.
12. Creation and manipulation of google docs.
13. Creation of Google sheets.
14. Creation of google forms.

Suggested Readings:
1. *Taxali R. K. "PC Software for Windows 98, Made Simple" TMH.*
2. *Saxena Sanjay, "MS Office 2000 "Vikas Publication House PVT LTD.*
3. *Busbby M. and Stultz R.A. "Microsoft Office 2000", BPB.*

4. Jain S., Geetha M. and Kratika, "Microsoft Office-2007", BPB
5. Microsoft Office – Complete Reference – BPB Publication.

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MSCCS105	COMPULSORY	Programming with C	4	0	4	6	60	20	20	30	20

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Course Educational Objectives (CEOs):

The languages that programmers use are constantly changing, and the popular languages of today will surely be replaced by new ones. The objective of this course is to provide students with a working knowledge of the basic principles underlying the design of all computer programming languages.

Course Outcome (COs)s: Students completing this course should be able to quickly learn to effectively use new computer programming languages. In particular, after taking this course students should be able to do the following:

- Design an algorithmic solution for a given problem.
- Draw flowcharts for the solution.
- To write a maintainable C program for a given algorithm.
- To Write well documented and indented program according to coding standards..
- Debug a given program.
- To Execute the C program.

UNIT 1:-Programming fundamentals: Algorithm development, techniques of problem solving, flow-chart, decision table, structured programming concepts; top-down design, development of

efficient program; program correctness; debugging and testing of programs, algorithm for searching, sorting (exchange and insertion), merging of ordered lists.

UNIT 2:- Programming in C: Introduction to C, features of C , IDE of C Data type, constants and variable; structure of a C program,, Compilation & execution of C program., Identifiers, Operators: Arithmetic, Logical, Relational, Conditional and Bitwise operators, Precedence and associatively of operators, Types conversion in expression , Library Functions , Control structures- If Statement, If…….Else Statement, Nesting Of If ……..Else Statement, Else If Ladder, ? : Switch Statement, Compound Statement, Loop Controls – For, While, Do-While Loops, Break Continue, Exit, Goto Statement

UNIT 3:- Array- Representation of single and multidimensional arrays; sparse arrays - lower and upper triangular matrices and Tri-diagonal matrices Array as function arguments.
String : Declaration, Initialization, String Functions
Functions:- top-down approach of problem solving, modular programming and functions, standard library of c functions, prototype of a function:, return type, function call, block structure, passing arguments to a function: call by reference, call by value, recursive functions, arrays as function arguments

UNIT 4:- Structures and Unions structure variables, initialization, structure assignment, nested structure, structures and functions, structures and arrays: arrays of structures, structures containing arrays, unions Pointer-The & and * Operators, Pointers expressions, Pointers V/s Arrays, Pointer to functions, Function returning pointers.

UNIT 5:- File management-Defining, Opening a File & Closing a File, Text file, Binary file, Functions for File Handling: fopen, fclose, gets, puts, fprint, fscanf, getw, putw, fputs, fgets,fread, fwrite, Random access to files: fseek, ftell, rewind, file name as Command Line Argument.

TEXT BOOKS:-
* Programming in c by e. balagurusamy, tmh publications
* Programming with c by gottfried, schaumsoutlie series, tmh publications
* Thinking in c by mahapatra, phi publications
* Kenneth, A. : C problem solving and programming, Prentice Hall.

- Gottfried, B. : Theory and problems of Programming in C, Schaum Series.
- Kerninghan&Ritchie : The Programming Language, PHI.

List of Experiments:

1. Define an algorithm and flowchart. Draw algorithm and flow chart for a program that converts an input Fahrenheit degree into Celsius equivalent
2. Write an algorithm and a C program to find the greatest among three numbers.
3. WAP to print an input string in lower case, upper case and mixed case using library function.
4. WAP a C program to reserve an input number.
5. Draw a flow chart to find prime number from 1 to 100.
6. Write a C program to obtain the sum of first n terms of the following series: $X - X^3/3! + X^5/5! - X^7/7! + \ldots$
7. WAP to calculate factorial of a number using different loops.
8. WAP to calculate factorial of a number using recursion.
9. WAP in C to generate Fibonacci series.
10. WAP in C to generate Pascal triangle.
11. WAP in C to swap value and address of two variables.
12. WAP in C to search a given element in an array using linear and binary search.
13. WAP to sort an integer array in ascending and descending order according to user's choice.
14. Write a menu driven program to perform matrix addition, subtraction and multiplication.
15. Write a program to sum diagonal elements of two matrices.
16. WAP a C program to reverse a string by recursion.
17. WAP using structure in C to generate student mark-sheet for 3 students with student details name, course, and semester and with marks in 5 subjects, assume max mark in each subject as 100 and passing marks as 35.
18. WAP display contents of a file on screen, also display character count.
19. WAP to read data from file using fscanf().
20. WAP to add two numbers using command line arguments.
21. Write a program to copy contents of file c:\test.txt to c:\test1.txt

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