

PROGRAMME GUIDE

MASTER OF SCIENCE IN (COMPUTER SCIENCE) M.Sc.(CS)

***Scheme of Examination (CBCS/ELECTIVE)**

***Detailed Structure of Syllabus**



DR. C.V.RAMAN UNIVERSITY
KARGI ROAD, KOTA, BILASPUR, CHATTISGARH(C.G.)
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MASTER OF SCIENCE (COMPUTER SCIENCE)

Duration: 24 Months (2 Years)

Eligibility: B.Sc. (IT/CS/BCA), BE (CS/IT)

COURSE STRUCTURE OF MSC(CS) SEMESTER I													
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional		L	T	P	Subject wise Distribution
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Theory Group													
6IMMA101	Core Course	Discrete Mathematic Structure	100	50	17	20	08	30	12	4	-	-	4
6IMCS101	Core Course	Programming in C	100	50	17	20	08	30	12	4	-	-	4
6IMCS102	Core Course	Computer Organization & Architecture	100	50	17	20	08	30	12	4	-	-	4
6IMCS103	Core Course	Fundamentals of Computers & MS Office	100	50	17	20	08	30	12	4	-	-	4
Practical Group				Term End Practical Exam				Sessional					
6IMCS101	Practical	Programming in C	50	25	08	-	-	25	10	-	-	2	2
6IMCS103	Practical	Fundamentals of Computers & MS Office	50	25	08	-	-	25	10	-	-	2	2
Grand Total			500	-		-		-	-	-	-	-	20

Minimum Passing Marks are equivalent to Grade D L- Lectures T- Tutorials P- Practical

Major- Term End Theory Exam/ Practical Exam

Minor- Pre University Test

Sessional weightage – Attendance 50%, Three Class Tests/Assignments 50%





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w.e.f. July-2020-21

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COURSE STRUCTURE OF MSC (CS) SEMESTER II

COURSE STRUCTURE OF MSC (CS)SEMESTER II													
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional		L	T	P	Subject wise Distribution
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Theory Group													
6IMCS201	Ability Enhancement	Data Structures & Algorithms	100	50	17	20	08	30	12	4	-	-	4
6IMCS202	Core Course	Operating System	100	50	17	20	08	30	12	4	-	-	4
6IMCS203	Core Course	DBMS & SQL	100	50	17	20	08	30	12	4	-	-	4
6IMCS204	Core Course	Objects Oriented Programming with C++	100	50	17	20	08	30	12	4	-	-	4
Practical Group				Term End Practical Exam				Sessional					
6IMCS203	Practical	DBMS & SQL	50	25	08	-	-	25	10	-	-	2	2
6IMCS204	Practical	Objects Oriented Programming with C++	50	25	08	-	-	25	10	-	-	2	2
Skill Courses								Sessional					
6SCMIT 201	Skill Enhancement	Skill Enhancement Elective Course I	50	-	-	-	-	50	20	1	-	1	2
Grand Total			550	-		-		-	-	-	-	-	22

Minimum Passing Marks are equivalent to Grade D

Major- Term End Theory Exam / Practical Exam

Minor- Pre University Test

Sessional weightage - Attendance 50%, Three Class Tests/Assignments 50%

Skill Elective I - Any other course being offered in this semester as per the list given at the end of course structure.

L- Lectures T- Tutorials P- Practical

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(CS/IT)

COURSE STRUCTURE OF MSC (CS) SEMESTER III													
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional		L	T	P	Subject wise Distribution
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Theory Group													
6IMCS301	Ability Enhancement	Programming in Python	100	50	17	20	08	30	12	4	-	-	4
6IMCS302	Core Course	(A)Computer Networks with Windows NT, B. Artificial Intelligence and Expert System, C. Research Methodology	100	50	17	20	08	30	12	4	-	-	4
6IMCS303	Core Course	(A) Software Engg., (B)Multimedia Tools & Application, (C) Data Warehousing & Mining	100	50	17	20	08	30	12	4	-	-	4
6IMCS304	Core Course	JAVA Programming	100	50	17	20	08	30	12	4	-	-	4
Practical Group				Term EndPractical Exam				Sessional					
6IMCS301	Practical	Programming in Python	50	25	08	-	-	25	10	-	-	2	2
6IMCS304	Practical	JAVA Programming	50	25	08	-	-	25	10	-	-	2	2
Skill Courses								Sessional					
6SCMIT 301	Skill Enhancement	Skill Enhancement Elective Course II	50	-	-	-	-	50	20	1	-	1	2
Grand Total			550	-		-		-	-	-	-	-	22

Minimum Passing Marks are equivalent to Grade D L- Lectures T- Tutorials P- Practical Major- Term End Theory Exam/ Practical Exam

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Eligibility: B.Sc. (IT/CS/BCA), BE (CS/IT)

COURSE STRUCTURE OF MSC (CS) SEMESTER IV													
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional		L	T	P	Subject wise Distribution
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Theory Group													
61MCS402	Core Course	Compiler Design	100	50	17	20	08	30	12	4	-	-	4
61MCS403	Core Course	ASP.Net & C#	100	50	17	20	08	30	12	4	-	-	4
61MCS404	Core Course	Soft Computing	100	50	17	20	08	30	12	4	-	-	4
Practical Group				Term End Practical Exam				Sessional					
61MCS403	Practical	ASP.Net & C#	50	25	08	-	-	25	10	-	-	2	2
61MCS401	Practical	Major Project	150	75	25	-	-	75	30	-	-	4	4
Grand Total			500	-		-		-	-	-	-	-	18

Minimum Passing Marks are equivalent to Graded

Major- Term End Theory Exam / Practical Exam

Minor- Pre University Test

Sessional weightage – Attendance 50%, Three Class Tests/Assignments 50%

Compulsory Project/Dissertation with choice in any Disciplinary specific elective. Compulsory one paper presentation certificate in related discipline.

L- Lectures T- Tutorials P- Practical

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SKILL ENHANCEMENT ELECTIVE COURSES

Non-Technical			
Elective No.	Department/ Faculty Name		
	Faculty of Information Technology		
I	SCIT 201	Data Entry Operation	2(1+0+1)
II	SCIT 301	Multimedia	2(1+0+1)
III	SCIT 501	Web Designing with HTML	2(1+0+1)
IV	SCMIT 201	Web Development	2(1+0+1)
V	SCMIT 301	LINUX	2(1+0+1)
	Faculty of Management		
I	SMGT 201	Briefing and Presentation Skills	2(1+0+1)
II	SMGT 301	Resolving Conflicts and Negotiation Skills	2(1+0+1)
III	SMGT 802	Entrepreneurship Development	2(1+0+1)
	Faculty of Commerce		
I	SCOM 201	Tally ERP 9	2(1+0+1)
II	SCOM 302	Multimedia	2(1+0+1)
III	SCOM 803	Data Analyst	2(1+0+1)
	Faculty of Humanities		
I	SHBA 301	Pursuing Happiness	2(1+0+1)
II	SHBA302	Communication Skill and Personality Development	2(1+0+1)
III	SHMA301	Tourism in M.P	2(1+0+1)
	Faculty of Science		
I	SSBI 301	Mushroom Cultivation	2(1+0+1)
II	SSPH 301	House Hold Wiring	2(1+0+1)
III	SSPH 301	Basic Instrumentation	2(1+0+1)
IV	SSPH 301	DTP Operator	2(1+0+1)
V	SSCH 301	Graphic Designing	2(1+0+1)
	Faculty of Education		
I	SCBE 403	Understanding of ICTC (Information Communication Technology)	2(1+0+1)
II	SCPE 201	Yoga Education	2(1+0+1)

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PROGRAM OBJECTIVE:

The objective of the Program is to develop skilled manpower in the various areas of information technology like:

1. To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms. Students will demonstrate ability to conduct a research or applied Computer Science project, requiring writing and presentation skills which exemplify scholarly style in computer science.
2. To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
3. To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, design and implementation skills
4. To prepare graduates who will thrive to pursue life-long learning to fulfill their goals. Students will demonstrate a breadth of knowledge in computer science, as exemplified in the areas of systems, theory and software development.

Program Outcomes MSC

PROGRAM OUTCOMES MSC

1. An ability to use current techniques, skills, and tools necessary for computing practices.
2. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
3. An ability to apply design and development principles in the construction of software systems of varying complexity.

PROGRAM SPECIFIC OUTCOMES MSC

The objectives are that, upon completion, the students will have developed:

1. The ability to gather, organise and critically evaluate information needed to formulate and solve problems;
2. The ability to apply acquired knowledge effectively and efficiently to all work in the relevant areas of Engineering;
3. Skills in qualitative and quantitative oral and written communications designed to present essential scientific and technical concepts;
4. Abilities in observation, measurement and the design and conduct of experiments through practical experience in the laboratory;
5. The ability to display initiative and innovation, demonstrated in a major item of individual work;
6. The ability to work collaboratively with others through the development of team skills;
7. The ability to apply advanced techniques to problems at the frontiers of knowledge;
8. A range of professional and management skills;
9. A deep knowledge and advanced understanding in specialist areas;
10. An awareness of research methodology.




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SEMESTER- 1st

Course: M. Sc. CS

SUBJECT: DISCRETE MATHEMATIC STRUCTURE

Subject Code: 6IMMA101

Theory Max. Marks: 50

Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To understand the Use mathematically corrects terminology and notation.
2. To construct correct direct and indirect proofs.
3. To use division into cases in a proof.
4. To apply logical reasoning to solve a variety of problems.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	SET THEORY - Set and Subsets, Operations on Sets, Countable and Uncountable Sets, the Principle of Inc Inclusion-Exclusion, Derangements, Propositions.	Usage of ICT :-Power Points, PDF, Video lectures, Black board,
Unit – II	PERMUTATION, COMBINATIONS, DISCRETE PROBABILITIES - The rules of sum and product, Permutations, Combinations, Binomial and Multinomial Theorems, Combinations with Repetitions, Probability, Random Variables & Probability Distributions, Repeated Trials	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on Probability for Data Analysis.
Unit – III	RELATION AND FUNCTION- Cartesian (Cross) Product of Sets, Relation, Operation on Relations, Properties of Relation as Binary Relation on a Set, Two Important Relations, Partial Ordered Relation, Lattices, Functions - Mappings, Types of Functions, Cardinality of Set, Composition of Relation and Function, Composition of Function, Existence of Inverse Function (Mapping), Set Image/Preset Image of Function.	Usage of ICT :-Power Points, PDF, Video lectures, Black board,
Unit – IV	Graph - Directed Graphs, Graphs, Isomorphism, Subgraphs, Operations on Graphs, Walks and their classification, Connected and Disconnected Graphs, Euler circuits Euler trails, Planar and non-planar graphs.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group project to show use of graph theory in Computer Networks
Unit - V	Groups - Introduction, Necessary and sufficient Condition for any subset of a group to be subgroup, Partition of a Group, Characteristics of Cosets of a Subgroups, Normal Subgroups, Necessary and sufficient condition for any subgroup of group to be normal subgroup, Characteristics of Normal (Sub groups), Quotient groups, Concept of Homomorphism. Rings, Some special types of Rings, Elementary Properties of Rings, Sub rings, Results of Sub-rings of a ring, Standard Properties of ideals, Homomorphism of Rings, Properties of Homomorphism	Usage of ICT :-Power Points, PDF, Video lectures, Black board,

COURSE OUTCOME:

After study this student will be able to know about some fundamental mathematical concepts and terminology, how to use and analyse recursive definitions, how to count some different types of discrete structures, techniques for constructing mathematical proofs, illustrated by discrete mathematics examples.

Text Books:

- “Engineering Mathematics”, S.S. SASTRY, Prentice Hall of India

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- Discrete Structure D.K. Jain Gwalior Shree Ram Prakashan

Reference Books:

- "Discrete Mathematical Structures Engineering Mathematics " Bernard Kolman, Robert C. Busby, Sharon Ross,
- Elements of Discrete Mathematics C L Liu & D P Mohapatra A Computer Oriented Approach
- Discrete Mathematics Lipschutz S., Lipson M. , Schaums , Tata Mc Graw Hill

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Training and Support in Institutions/universities Research Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Data structures implemented using sets with particular focus on efficient implementations of set operations. In database theory, the notion of a relational database is that of seeing a database as a relation over sets. In formal language theory, a language is a set of strings and the study of operations on languages is central. Some of these are the usual set operations of intersection, union and complement, while others are particular to sets of strings (language concatenation and Kleene star are well-known operations on languages). In programming language semantics, semantic domains are sets with structure.	No poverty, Quality Education, Decent Work and Economic Growth,	Can make simple software based on Discrete Maths .

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SEMESTER- 1st
Course: M. Sc. CS
SUBJECT: PROGRAMMING IN C

Subject Code: 6IMCS101
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To understand the basic knowledge of programming concepts.
- 2 To understand the C language & its concepts.
- 3 To understand the basic concept of programming and develop the programming skills.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Principles of Programming, Introduction to Programming, Program Concept, Characteristics of Programming, Stages in Program Development, Tips for Program Designing, Programming Aids, Algorithms, Notations, Design, Flowcharts, Symbols, Rules Programming Techniques and Logic, Introduction, Introduction to programming techniques, Top-down approach or technique, Bottom-up approach or technique, Unstructured technique of programming, Structured technique of programming, Modular technique of programming, Comparative study of programming techniques, Debugging, Syntax Errors, Logical Errors, Data Entry Errors, Linker Errors, Runtime Errors, Program Testing	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on C, Workshop on "Running C program on UNIX environment, Individual presentations on types of errors learned.
Unit – II	Introduction to 'C', Introduction, Structure of a C program, 'C' Tokens, Keywords, Identifiers, 'C' Constants, Variables in C, Data Types, Derived Data Types, Operators, Precedence and Associativity of operators, Hierarchy of operators at a glance, Expression & its Evolution, Type conversion in expressions, (Implicit and Explicit type conversion) Decision Making and Branching, Introduction, Sequential statements, Unformatted I/O functions, Formatted input using scanf() function, Formatted output using printf(), Branching statements, The if-else statement, The nested if-statement, The switch statement, Additional programs	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Looping Statements, Introduction, for-statement, while-statement, do-while statement, Difference between while-loop and do-while loop, Nested loops, Jumps in loops, Programming examples Arrays, Introduction, Single-dimensional arrays, Reading and writing single dimensional arrays, Examples of Complex Programs, Searching, Sorting, Two-dimensional arrays (Multi-dimensional arrays), Reading-writing two-dimensional arrays, Manipulation in two-dimensional arrays, Programming Examples Strings, Concepts of string, Strings in C language, String variable, Initializing strings, String input/output functions, Arrays of strings, String handling functions, Memory formatting	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group projects String Manipulations
Unit – IV	User Defined Functions, Introduction, Elements of user-defined functions, Categories of functions, Passing parameters to functions, Programming Examples, Arrays in functions, Nesting of Functions, Recursion, Command Line Arguments, Storage Classes Structure and Union, Introduction to structures, Structure and its definition, Structure declaration, Tagged Structure, Structure variables, Type-Defined Structure, Structure initialization, Accessing structures, Nested structures, Array of structures, Structures and functions, Sending individual members, Sending the whole structure, Passing structures through pointers,	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Quiz competition based on aptitude questions on C

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	Uses of structures, Union and its definition Pointers, Introduction, Pointer concepts, Pointer variable, Accessing variables through pointers, Pointer declaration and Definition, Initializing a pointer variable, Pointers to Pointers, Compatibility, Pointer applications, Pointers and other operators, Memory allocation functions, Memory map of C program, Memory management functions	
Unit - V	File Handling, Introduction to file handling, File system basics, Standard streams in C, File structure, FILE pointer, Opening and closing a file, File handling functions, File types, Text and Binary, Input /Output operations on file, Reading a character using getc(), Writing a character using putc(), Using feof(), Working with string using fputs() and fgets(), Using fprintf() and fscanf(), Using fread() and fwrite(), Direct Access file, fseek()	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group discussions on Use of Pointers

Practicals:

1. Write a program to swap the contents of two variables with & without using temporary variable.
2. Write a program to print the Fibonacci series up to a given numbers of terms.
3. Write a program to invert 3 x 3 matrixes.
4. Write a program multiply two matrices.
5. Write a program to create an odd magic square.
6. Write a program to find all capital letters in string.
7. Write a program to convert upper case letters to lower case & vice versa in a sentence of mixed cases.
8. Write a program to search a number in an array using the algorithm like sequential search etc.
9. Write a program to check whether a string is a palindrome or not.
10. Write a program to calculate factorial of a no through recursion.
11. Write a program to calculate roots to a quadratic equation.

COURSE OUTCOME:

After study this student will be able to know about the concepts of C Programming. Student will also know about how to design program.

Reference Books:

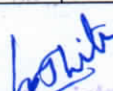
- , "Programming In C", E. Balaguruswamy TMH Publications
- "Programming With C", Gottfried, Schaum's Outline Series, TMH Publications
- "program design", Peter Juliff, PHI Publications
- "Let us c", Yashwantkanetkar,

Text Books:

- "Thinking In C", Mahapatra, PHI Publications
- "Introduction To Computers And Information Technology", Anurag Seetha, Ram Prasad & Sons, Bhopal.
- "Computers Today", S.K. Basandra, Galgotia Publications.

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Assistant Programmer, Software developer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	To create applications that will run on a wide variety of hardware platforms., Problem Solving	No, Poverty, Quality Education, Decent Work and Economic Growth, Industry Innovation and Infrastructure	Can teach and learn other computer languages.





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SEMESTER- 1st
Course: M. Sc. CS
SUBJECT: COMPUTER ORGANIZATION & ARCHITECTURE

Subject Code: 61MCS102
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To introduce basics of digital logic circuits design and Computer Organization.
2. To understand the Input-Output Organizations.
3. To understand the Memory Organization.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Digital Logic Circuits: Digital Computers. Logic Gates, Boolean Algebra, Map Simplification, Combination Circuits (i.e. Half-Adder). Flip-Flops (i.e. SR Flip Flops, D Flip-Flops, JK Flip-Flops, T Flip-Flops, Edge Triggered Flip-Flops, Execution Table), Sequential Circuits.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – II	Data Representation: Data Type (i.e. Number System. Octal and Hexadecimal Number, Decimal Representation, and Alphanumeric Representation), Complements, Fix Point Representation. Floating-Point Representation.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Basic Computer Organization and Design: Instruction Codes. Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instruction, Input-Output and Interrupt, Complete Computer Description Design of Basic Computer.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Case studies to understand organization of laptop like Dell, Lenovo etc.
Unit – IV	Central Processing Unit: Introduction, General Register, Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control Reduced Instruction Set Computer (RISC).	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group discussions on different applications of Stack. Group projects writing algorithm to convert infix to postfix notation
Unit - V	Input-Output Organization: Peripheral Devices (ASCII alphanumeric Characters), Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Access (DMA), Input-Output Processor (IOP).	Usage of ICT :-Power Points, PDF, Video lectures, Black board

COURSE OUTCOME-

After study this student will be able to know about digital logic circuits design and Computer Organization. Students will also be able to understand about the logic gates and different types of adders and subtractors.

Text Books:

- Computer System Design & Architecture- Heuring Jordan (A.W.L.)
- Computer System Architecture- M.Morris Mano, P.H.I.

Reference Books:

- Computer Organization & Architecture - William Stallings.
- Intel Microprocessors - Architecture, Programming & Interfacing-Barry. b Brey.
- Computer Organization ISRD Group Tata Mc Graw Hill

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Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Understand Computer hardware, arithmetic's, writing simple assembly programmes. Investigating, Analysing	NoPoverty, Quality Education, Decent Work and Economic Growth	Can start computer hardware assistance.

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SEMESTER- 1st

Course: M. Sc. CS

SUBJECT: FUNDAMENTALS OF COMPUTERS & MS OFFICE

Subject Code: 6IMCS103

Theory Max. Marks: 50

Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To understand the basic knowledge of computer
2. To understand the Number System
3. To understand the Computer Virus and Internet
4. To understand the concept of Storage devices.
5. To understand about software as well as hardware.
6. To understand the basic knowledge of MS Windows.
7. To understand the Office Packages.
8. To understand the MS Excel.
9. To understand the MS PowerPoint.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction - Introduction, Limitations of computers, Fundamental uses of computers, Types of Computers, Generations of Computers. Personal Computer - Introduction, Components of personal computers, Evolution of PCs. Boolean Algebra and Logic Gates - Introduction, Boolean Algebra And Operator, OR Operator, NOT Operator, Basic Postulates of Boolean Algebra, Basic Logic Gates. Number System - Introduction, Digital and Analog Operations, Binary Data, Binary Number System, Decimal Number System, Octal Number System, Hexadecimal Number System, Coding System.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group projects on Usage of Number system
Unit – II	Data Representation and Binary Arithmetic - Introduction, Bits, Nibbles, Bytes and Words, Data Representation, Coding system, Binary Arithmetic, Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division. Input Devices - Introduction, Input Device, Output Devices - Introduction, Output Devices, Soft Copy Vs Hard Copy Output, Monitor, Printers, Plotter. Central Processing Unit - Introduction, What is Central Processing Unit, Arithmetic And Logic Unit, Control Unit, Registers, Instruction set, Processor Speed. Storage Devices - Introduction, Storage and its needs, Primary Storage, Secondary Storage.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Basics of Software- Introduction, What Does Software Stand For ?, Needs of software, Types of software, Open Source Software, Operating System - Introduction, Operating System, Why an Operating System, Functions of Operating System, the Booting Process, Types of Reboot, Disk Operating System - Introduction, What is DOS?, Functions of DOS, Versions of DOS, DOS Commands , Important Internal Commands of DOS, Important External Commands of dos, Executable Vs Non-Executable Files In Dos Programming Languages - Introduction, Data, information And Knowledge, Characteristics of Information, What is a program?, What is a Programming language?, Programming approaches, Types of Programming Language.	Usage of ICT :-Power Points, PDF, Video lectures, Black board

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Unit – IV	Computer Virus - Introduction, Virus, History, Mechanism of virus, Types of Computer Virus, Related Concepts: Anti Virus Programs, Communication and IT - Introduction, Computer Network, Communication Process, Communication Types, Transmission Media, Wireless Media, Communication Channels/Media, Modem, Characteristics of a Modem, Types of Modem Networks - Introduction, Internet Vs Intranet, Types of Network, Topology, Types of Connectivity, Network Devices.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on Computer Networks, Group discussions on Internet Pros and Cons. Individual presentations on Network Devices.
Unit - V	Know the Windows Operating System - Introduction, What is Windows XP ?, Evolution of Windows Operating System, Features of Windows XP, What's New in Windows XP, Windows and Its Elements, Accessories, Files and Folders Microsoft Office Package – Introduction about MS Word ,Ms Excel, Ms PowerPoint.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on Data Analysis using Excel, Group activity to make PPT on latest topics.

Practicals:

1. Creating, opening, closing, saving and editing a word Document..
2. Insertion of header and footer in the document.
3. Use of word art, spell check and work with Page layout.
4. Creation of a link between two files using Hyperlink.
5. E- mail-merge and providing protection of a document.
6. Creation of a letter/Application in different subjects.
7. How to insert, close, update and save a worksheet?
8. Creation of records in excels for students marks of five subjects and calculation of their average percentage using formulas.
9. Operation of data sorting in a worksheet.
10. Use of mathematical functions, date function and time function.
11. Define trig function with an operation on excel sheet.
12. Creation of new slide and duplicate slide in power point.
13. Steps of presentation and creation of presentation for the seminar in a topic.
14. Use of animation audio and clipart in power point presentation.
15. Changing backgrounds and adding slides in a presentation

COURSE OUTCOMES:-

- An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline.
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- An ability to analyze the local and global impact of computing on individuals, organizations, and society.
- Demonstrate the basic mechanics of creating Word documents ,presentation and excel calculation for office use.

Text Books:

- Computer Fundamental (3rd Ed) Sinha,P.K.
- Fundamental of Information Technology ShrivastavaCheton
- Fundamentals of Computers, Murthy,C.S.V. Delhi S. K. Kataria& Sons.
- MS office XP for Everyone, Saxena Sanjay, New Delhi Vikas Publication

Reference Books:

- Computer fundamental: V .Rajaraman; PHI
- Fundamental Of IT Leon and Leon Leon Tec World
- Fundamental of Computer Programming & Information Technology Sharma,G.& Singh G.Delhi S. K. Kataria& Sons

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Computer Operator, Office Assistant, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization,Consultant in Software firms,Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Learn basic's of Computer, Computations, Network, Internet and Programming Languages, Time, Management, Speaking, Cooperating, Presenting	No Poverty, Quality Education, Industry Innovation and Infrastructure.	Can start own Computer Assistance services.

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SEMESTER- 2nd
Course: M. Sc. CS
SUBJECT: DATA STRUCTURES & ALGORITHMS

Subject Code: 61MCS201
Theory Max. Marks:50
Theory Min. Marks:17

COURSE OBJECTIVE:

Student will be able

1. To understand the basic knowledge of data structure.
2. To understand the Abstract data type concepts.
3. To understand the Linked List & its Basic operations.
4. To understand the Basic Terminology of TREES.
5. To understand the Analysis of algorithm & Introduction to graphs.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Data Representation: Introduction. Linear List , Formula Based Representation. Linked In directing Addressing , Simulating Pointers. A Comparison, Applications, Convex Hull. Arrays and Matrices: Arrays, Matrices, Special Matrices- Sparse Matrices.	Video lectures, Black board , Visit to small companies, Workshop on application of Stack in String Processing, , Case studies of Sparse Matrix.,
Unit – II	Stacks: The Abstract Data Type, Derived Class and Inheritance, Formula Based Representation, Linked Representation, Applications. Queues: The Abstract Data Type, Formula Based Representation, Linked Representation, Application. Binary and Other Trees: Trees, Binary Trees, Properties, Representation, Common Binary Tree Operation, Binary Tree Traversal, the ADT Binary Tree, The Class Binary Tree, ADT And Class Extensions, Applications.	Usage of ICT :- Power Points, PDF , Video lectures, Black board , Group projects application of Recursion.
Unit – III	Priority Queues: Introduction, Linear List, Applications. Tournament Trees: Introduction, The ADT Winner Tree, The Class Winner Tree, Loser Tree Applications. Search Trees: Binary Search Tree, AVL Trees, Red-Black Tree, B- Tree Applications.	Usage of ICT :- Power Points, PDF , Video lectures, Black board , Workshop on applications of Graph in making computer Games,
Unit – IV	Graphs: Definitions, Applications, Properties, The ADTs Graph and Digraph, Representation of Network, Class Definition: Graph Iterators, Language Features, Graph Search Methods, Applications. The Greedy Method: Optimization Problem, The Greedy Method, Applications. Divide And Conquer: The Method, Application.	Usage of ICT :- Power Points, PDF , Video lectures, Black board,
Unit - V	Dynamic Programming: The Method, Applications. Backtracking: The Method, Applications. Branch and Bound: The Method, Applications.	Usage of ICT :- Power Points, PDF , Video lectures, Black board,

COURSE OUTCOME:

After study this student will be able to know about the concepts of Data Structure Using C++ Language, List & Its Operations Concept Of Tree, Algorithm & Graphs Design. Students will also know about the sorting and searching.

Text Books:

- Weiss- Data Structures & Algorithm Analysis in C++ (A.W.L.)

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- Data Structures, algorithms and Applications in C++ by Sahni (McGraw Hill)

Reference Books:

- Fundamentals Of Data Structure, By S. Sawhney & E. Horowitz
- Data Structure : By Trembley & Sorrenson
- Data Structure : By lipschuists (Schaum's Outline Series McGraw Hill Publication)
- Fundamentals Of Computer Algorithm: By Ellis Horowitz and Sartaj Sawhney

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Training and Support in Institutions/universities Research and Academics System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Logical reasoning, analysis of data, Organizing and Manipulating Data.	Quality Education, Decent Work and Economic Growth	Can start own Data handling company






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SEMESTER- 2nd

Course: M. Sc. CS

SUBJECT: OPERATING SYSTEM

Subject Code: 6IMCS202

Theory Max. Marks: 50

Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To develop the understanding of functioning of Operating System.
2. To understand the Process Concepts, process state & process control.
3. To understand the Critical Section Problem.
4. To understand the Contiguous Allocating, Paging.
5. To understand the Disk Scheduling, Disk Management.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Overview of the operating system: Evaluation of operating system. Classification of Operating System: Batch OS, Multiprogramming, Time Sharing, Real Time, Combination, Distributed OS Different Views of Operating System: Operating System as a Processor Manager, Memory manager, File Manager, Device Manager etc. System Services. System Calls. Hierarchical & Extended Machine View. Design and Implementation of OS. Functional Requirements. Implementation.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – II	File management: file concept, file types. File based system, disk based system, blocking file operations, creating, writing, reading, deleting, file access methods, file allocation methods- contiguous, dynamic, linked and indexed allocation performance of allocation methods under various size of files directory system single level two level structured, file protection mechanism layered file system.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Processor management process views, structure, state, process, control block multiprogramming levels of schedulers and scheduling algorithms, evaluation of various scheduling algorithms, multiple processor scheduling, process synchronization, synchronization mechanism, virtual processors, Interrupt mechanism, future trends in processor management.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Visit to Cyber Crime department
Unit – IV	Memory management: memory management schemes, contiguous allocation, single & partitioned (static & dynamic) segmentation, non-contiguous allocation, paging, virtual memory concepts, demand paging, performing page fault, page replacement algorithms, segmentation and paging, future trends in memory management, large main memories, storage hierarchies, hardware support of memory management.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Visit to Cyber Crime department of
Unit - V	Technique for device management, dedicated devices, shared devices, virtual devices, sequential access, direct access devices, channel and control unit, independent devices, operation, buffering, multiple paths, block multiplexing, device allocation consideration, i/o traffic controller, i/o scheduler, i/o device handlers, virtual devices, spooling system.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Visit to Cyber Crime department of


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COURSE OUTCOME:

- After Study This Student Will Be Able To Know About functioning of Operating System. To make students able to learn different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system.
- To provide students knowledge of memory management and deadlock handling algorithms.
- At the end of the course, students will be able to implement various algorithms required for management, scheduling, allocation and communication used in operating system.

Text Books:

- Operating System: Gary Nutt
- William Stallings
- Charles Crowley
- Pearson Education
- Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne

Reference Books:

- Operating System Concepts by Silberschatz & Galvin, Addison Wesley Publication 6th Edition.
- Operating System Concepts & Design by Milan Milenkovic, TMH Publication

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
System Admin, Technical support Engineer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Basics of OS and its working, Organizing and Planning, Analysing	No poverty, Quality Education, Decent Work and Economic Growth	Can start own Computer Assistance services.


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SEMESTER- 2nd
Course: M. Sc. CS
SUBJECT: DBMS & SQL

Subject Code: 6IMCS203
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To understand the basic knowledge of DBMS Concepts.
2. To understand the Database Design.
3. To understand the RELATIONAL DATA MODEL.
4. To understand the RELATIONAL DATABASE DESIGN.
5. To understand the Indexing & Hashing-Basic Concepts & Recovery System.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction to DBMS & RDBMS - Introduction to database, Introduction DBMS, Different database models, Structure of DBMS, RDBMS an introduction, Cod's law for RDBMS, Components of rdbms (kernel/data dictionary) Introduction to Oracle RDBMS and Client/Server Computing - Introduction to Oracle, The Features of Oracle 9i, The oracle product details, An introduction to client/server computing, Oracle and client/server computing Overview of Oracle Architecture - Oracle Architecture, Oracle Files, System and User Processes, Oracle Memory, System Database Object, Protecting Data	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on Oracle R Enterprise, Case studies of any DBMS
Unit – II	Introduction to SQL*PLUS -Introduction to SQL, Features of SQL, Components of SQL, Introduction to SQL*PLUS, Features of SQL*PLUS, Execution of SQL*PLUS, Important commands used in SQL*PLUS, Oracle Data-Types Working with Tables -Tables - An Introduction, Use Of Table In SQL, Viewing The Stored Data In Tables, Filtering Table Data, Updating Data, Deleting Data From Tables, Modifying The Structure Of Tables, Destroying A Table, A Few Other SQL Statements	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Individual
Unit – III	Data Constraints - Data Constraints, The Use of Data Constraints, The Types of Data Constraints, Defining Integrity Constraints By 'Alter Table', Removing Integrity Constraints, 'Null' Value Concept, 'Not Null' Constraint, Default Value Concept, 'User Constraints' Table Data Manipulation in SQL - Oracle Operators, Range Searching, Pattern Matching, LIKE 'IN' and 'NOT IN' Predicates, An Introduction to 'DUAL' Table, An Introduction to 'SYSDATE' Oracle Functions - Oracle Function, Function Types, Group Function, Scalar Function, Working With 'Date' in SQL, Grouping Of Data Of Different Tables In SQL Joins, Sub-Queries & Views - types of joins, use of sub-query, 'union' and clause, 'Intersect' Clause, Minus Clause, Concept of View, Types of View, Use of View.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group projects on Real time data. presentation on Integrity Constraints.
Unit – IV	User Accounts Management & Indexing - Creation of User Account, User Account Management, Granting Privileges, Revoking Privileges, Modifying Password, Closing User Account, Concept of Index, Creation of Index, Types of Index, Use of Index, Deleting Index Introduction to PL/SQL Programming - Introduction to PL/SQL, Advantages of PL/SQL, Differences between SQL and PL/SQL, PL/SQL Block Structure, PL/SQL Character set, Variable, Constant and Data type, Assignment Operator and the use of 'SELECT....INTO, PL/SQL Program, Control	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group projects real time database handling

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	Structure, The use of 'IF...THEN...ELSE...ENDIF', Iteration Control (The use of LOOP, WHILE, FOR), The use of 'GOTO Statement. Cursor - Cursor an Introduction, Types of Cursor, Features of Cursor, Implicit Cursor, Explicit Cursor, Application of for Loop with Cursor	
Unit - V	Exception Handling in PL/SQL - Exception Handling in PL/SQL, Built in Exception Handling, User Defined Exception Handling, The Raise Application-error Procedure. Oracle Transaction - Oracle Transaction, Commit Statement, Rollback Statement, Save point statement, Concept of lock, Types of locks, Levels of Locks, 'SELECT.....FOR UPDATE' Statement, Removing the Lock Procedures and Functions- Concept of Procedures and Functions, Advantages of Procedure and Function, Creation of Procedure and Function, Deleting Procedure and Function Database Triggers - Concept of Triggers, Types of Triggers, Creation of Triggers, Application of Triggers, Deleting Triggers	Usage of ICT :-Power Points, PDF, Video lectures, Black board

Practicals:

1. Write a query to implement Different types of DDL statements in SQL.
2. Write a query to implement Different types of DML statements in SQL.
3. Write a query to implement Different types of DQL statements in SQL.
4. Write a query to implement Different types of DCL statements in SQL.
5. Write a query to explore 'select' clause using where, order by, between, like, group-by, having etc.
6. Write a query to implement the concept of Joins in SQL.
7. Write a query to implement the concept of Indexes and views.
8. Write a query to implement the restrictions on the table.
9. Write a query to implement the concept of SubQuestionries.
10. Write a query to implement the structure of the table.

COURSE OUTCOME:

After study this student will be able to know about and concepts & fundamentals of DBMS, Concept of keys, RELATIONAL DATA MODEL & design. Student will also able to create table and implement commands.

Text Books:

- Database Systems : Concepts, Designs and Application Shio Kumar Singh
- Introduction to Database Management Systems Atul Kahate

Reference Books:

- "SQL, PL/SQL", Ivan BayrossBpb Publications"
- "The Oracle Cook Book", Liebschuty BPB Publication
- "Oracle A Beginners Guide". Michael Abbey, Michael J.Corey, TMH Publication
- Oracle Unleashed (Chapter 1, 2,3,4,5 and 9)

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Data administrator, database developer, database trainer, oracle engineer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Query processing, Database handling, Organizing and Planning Database, Handling data and query processing.	No poverty, Quality Education, Decent Work and Economic Growth, industry innovation and infrastructure	Can start own Data handling company.

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SEMESTER- 2nd

Course: M. Sc. CS

SUBJECT: OBJECTS ORIENTED PROGRAMMING WITH C++

Subject Code: 6IMCS204

Theory Max. Marks: 50

Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To understand the basic knowledge of opps with C++ language.
2. To understand the concept of data abstraction and encapsulation.
3. To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
4. To understand the Structure & classes concepts, data member.
5. To understand the Array, Pointers operations.
6. To understand the Function overloading & Operator Overloading.
7. To understand the Inheritance & C++ I/O system.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Overview of C++ - Overview of C++, Software crisis, Object oriented programming paradigm, Basic concepts of OOP, Advantages/Benefits of OOP, and Usage/applications of OOP C++ Environment, Program development environment, The language and the C++ language standards, Introduction to various C++ compilers, The C++ standard library, Prototype of main() function, i/o operator, manipulator, comments, data types Creating and Compiling C++ Programs - TURBO C++ IDE, Creating, compiling and running a C++ program using ide and through command line, Elements of C++ Language, Structure of a C++ program, C++ tokens, Type conversion in expressions	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on how to develop game using C++.
Unit – II	Decision Making and Branching - Introduction, Sequential statements, Mathematical Functions, Branching statements, looping Statements, Nested loops, Programming examples Arrays and Functions- Arrays, The meaning of an array, Single-dimensional arrays, Two-dimensional arrays (Multi-dimensional arrays), User Defined Functions, Elements of user-defined functions, Return values and their types, Function calls, Categories of functions, Passing parameters to functions, Recursion, Command Line Arguments, Storage Class Specifiers	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Classes and Objects - Classes, Structures and classes, Unions and classes, Friend function, Friend classes, Inline function, Scope resolution operator, Static class members, Static data members, Static member functions, Passing object to functions, Returning objects, Object assignment Array, Pointers, References and the Dynamic Allocation Operators - Array of objects, Pointer to object, Type checking in C++, The this pointer, Pointer to Derived Types, Pointer to class members, References, C++'s Dynamic Allocation Operators Constructors and Destructors - Introduction, Constructors, Default Constructor, Parameterized constructors, Copy Constructors, Multiple Constructors in a class, Constructors with default arguments, Default Arguments, Special Characteristics of Constructor functions, Destructors	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group discussions on types of Constructors.
Unit – IV	Function and Operator Overloading - Function overloading, Overloading Constructor Function, Finding the address of an overloaded function, Operator Overloading, Creating a Member Operator Function, Creating Prefix and Postfix forms of the increment (++) and decrement (--) operators	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group projects application of Operator

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	(Overloading Unary Operator), Overloading the Shorthand Operators (i.e. +=, == etc), Operator Overloading Restriction (Rules), Operator Overloading using friend function, Overloading new and delete operator, Overloading some special operators, Overloading [] (Subscripting) operator, Overloading() (Function Call) operator, Overloading Binary Arithmetic operators, Concatenating String, Overloading Comma (,) operator, Overloading the I/O operators	overloading.
Unit - V	<p>Inheritance - Introduction to inheritance, Features or Advantages of Inheritance, Type of Inheritance, Base Classes and Derived Classes, Base Class Access Control, Protected Members, Protected Base class Inheritance, Inheriting Multiple Base Classes, Constructors, Destructors and Inheritance, Passing Parameters to Base Class Constructors, Granting Access, Virtual Base Classes</p> <p>Polymorphism - Polymorphism, Types of Polymorphism, Virtual Functions and Polymorphism, Pure Virtual Functions, Early Vs Late Binding</p> <p>The C++ I/O System Basics - The C++ I/O System basics, C++ predefined streams, Formatting using the ios members, Clearing Format Flags, An Overloaded form of setf(), Examining the Formatted Flags, Using width(), Using precision(), Using fill(), Using Manipulators to format I/O, Creating your own Manipulators.</p>	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Quiz competition on aptitude question on C++,Project making competition using File handling in C++.

Practicals:

1. WAP to add, subtract, multiply and divide two numbers using concepts of C++.
2. WAP to show swapping of two numbers using C++.
3. WAP to calculate volume of cube, cylinder, rectangular box using three times functionoverloading in C++.
4. WAP using virtual function.
5. WAP using copy constructor.
6. WAP to show multiple inheritances.
7. WAP to find mean value of two numbers using friend function.
8. WAP using inline function.
9. WAP to demonstrate the use of Local Object, Static Object & Global Object using C ++.
10. WAP in C++ to demonstrate the creation and the use of dynamic object.
11. Derive the two classes son and daughter and, demonstrate polymorphism in action.

OUTCOME:

After Study This Student Will Be Able To Know About And Concepts ofOOPs with C++ Language, Classes. Student will be able to create Arrays Itsuses, Uses of function overloading, inheritance & C++I/O system.

Text Books:

- "Programming In C++", M Kumar TMH Publications
- "Object Oriented Programming With C++ ", R. Subburaj Vikas Publishing House, NewDelhi.isbn 81-259-1450-1
- "Object Oriented Programming C++ " R. Lafore

Reference Books:

- "C++ The Complete Reference " Herbert Schildt TMH Publication ISBN 0-07-463880-7
- "C++ ", E. Balaguruswamy, TMH Publication ISBN 0-07-462038-x
- "Object Oriented Programming with ANSI & Turbo C++", Ashok. N. Kamthane, Pearson EducationPublication, ISBN 81-7808-772-3

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Assistant programmer, software developer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	To create applications that will run on a wide variety of hardware platforms. Problem Solving	No poverty, Quality Education, Decent Work and Economic Growth, industry innovation and infrastructure	Can teach and learn other computer languages.

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SEMESTER- 2nd
Course: M. Sc. CS
SUBJECT: WEB DEVELOPMENT

Subject Code: SCMIT 201
Theory Max. Marks:
Theory Min. Marks

COURSE OBJECTIVE:

1. To understand to develop web application using open source technologies.
2. To understand XML scripting language and deploying application on Apache Web Server.
3. To understand Web Server configuration.
4. To understand MySQL database deployment for web applications.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction and Web Development Strategies History of Web, Protocols governing Web, Creating Websites for individual and Corporate World, Cyber Laws, Web Applications, Writing Web Projects, Identification of Objects, Target Users, Web Team, Planning and Process Development.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – II	HTML, XML and Scripting List, Tables, Images, Forms, Frames, CSS Document type definition, XML schemes, Object Models, Presenting XML, Using XML Processors: DOM and SAX, Introduction to Java Script, Object in Java Script, Dynamic HTML with Java Script.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Java Beans and Web Servers Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API Introduction to Servlets, Lifecycle, JSDK, Servlet API, Servlet Packages: HTTP package, Working with Http request and response, Security Issues.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – IV	JSP Introduction to JSP, JSP processing, JSP Application Design, Tomcat Server, Implicit JSP objects, Conditional Processing, Declaring variables and methods, Error Handling and Debugging, Sharing data between JSP pages- Sharing Session and Application Data.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit - V	Database Connectivity, Database Programming using JDBC, Studying Javax.sql.*package, accessing a database from a JSP page, Application-specific Database Action, Developing Java Beans in a JSP page, introduction to Struts framework.	Usage of ICT :-Power Points, PDF, Video lectures, Black board

Practicals:

1. Implements Basic HTML Tags
 2. Implementation of Table Tag
 3. Implementation of FRAMES
 4. Design a form In HTML (Yahoo registration form)
 5. Validation of FORM Using Java Script.
 6. Program for exception handling using multiple catch statements and also create yourOwn exception.
 7. Program to create an applet of a moving banner.
 8. Program to create a chatting application
 9. Program to create a servlet in which user enters a name in edit box, after pressingsubmit Button the name will be displayed on the next page
 10. Program to create your own resume by using HTML
 11. Install a database (Mysql or Oracle).
- Create a table which should contain at least the following fields: name, Password,

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Email-id, phone number (these should hold the data from the registration form)
Practice 'JDBC' connectivity. Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the Submit button in the registration page (week2).

12. Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database

COURSE OUTCOME:

After study this student will be able to understand the concept of Web Application Design and implementation. They will be able to identify the reason and importance of web application development and design.

Text Books:

- Internet & Web Design A. Mansoor Pragya Publications.

Reference Books:

- Learn HTML in a weekend Steven E. Callihan, PHI
- Using HTML Lee Anne Phillips PHI
- SAMS Teach Yourself Javascript in 24 Hrs. Michael Moncur, TechMedia
- "Programming In Java", 2nd Edition, E. Balaguruswamy, TMH Publications ISBN 0-07-463542-5
- "Peter Norton Guide To Java Programming", Peter Norton, Techmedia Publications ISBN 81-87105-61-5
- JAVA, How to Program, Deitel&Deitel, PHI, Pearson

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Programmer, web developer, software engineer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Programming, analysis, logical reasoning, Organizing and Planning, Problem Solving	No poverty, Quality Education, Decent Work and Economic Growth, industry innovation and infrastructure	Can start own Programming company

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SEMESTER- 3rd
Course: M. Sc. CS
SUBJECT: PROGRAMMING IN PYTHON

Subject Code: 6IMCS301
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able-

Upon successfully completing this course, students will be able to "do something useful with Python".

- Identify/characterize/define a problem
- Design a program to solve the problem
- Create executable code
- Read most Python code
- Write basic unit tests

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction - History, Features, Setting up path, Working with Python, Basic Syntax, Variable and Data Types, Operator Conditional Statements - If, If-else , Nested if-else Looping - For, While, Nested loops Control Statements - Break , Continue, Pass	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – II	String Manipulation - Accessing Strings, Basic Operations, String slices, Function and Methods. Lists - Introduction , Accessing list, Operations, Working with lists, Function and Methods Tuple - Introduction , Accessing tuples, Operations, Working, Functions and Methods Dictionaries - Introduction , Accessing values in dictionaries, Working with dictionaries, Properties, Functions - Defining a function , Calling a function, Types of functions, Function Arguments, Anonymous, functions, Global and local variables Modules - Importing module, Math module, Random module, Packages, Composition	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – III	Input-Output - Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Functions Exception Handling - Exception, Exception Handling, Except clause, Try ,finally clause, User Defined Exceptions.	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – IV	Advance Python - OOPs concept,Class and object, Attributes , Inheritance , Overloading , Overriding , Data hiding , Regular expressions- Match function, Search function , Matching VS Searching , Modifiers , Patterns CGI - Introduction , Architecture , CGI environment variable , GET and POST methods , Cookies , File upload.	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit - V	Database - Introduction, Connections , Executing queries , Transactions , Handling error,, Networking - Networking Socket ,Socket Module, , Methods , Client and server , Internet modules,, Multithreading-- Thread ,, Starting a thread , ,threading module , Synchronizing threads , Multithreaded Priority Queue,, GUI Programming - Introduction , Tkinter programming , Tkinter widgets.	Usage of ICT :- Power Points,PDF , Video lectures,Black board

Practicals:

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1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file.

COURSE OUTCOME:

Upon completion of the course, students will be able to:

- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python.

Text Books:

Python Programming: An Introduction to Computer Science John Zelle

Reference Books:

- The Python Tutorial (<https://docs.python.org/3/tutorial/>): This is the official tutorial from the Python website. No more authoritative source is available.
- Code Academy Python Track (<http://www.codecademy.com/tracks/python>): Often cited as a great resource, this site offers an entertaining and engaging approach and in-browser work.
- Learn Python the Hard Way (<http://learnpythonthehardway.org/book/>): Solid and gradual. This course offers a great foundation for folks who have never programmed in any language before.
- Core Python Programming (<http://corepython.com/>): Only available as a dead trees version, but if you like to have book to hold in your hands anyway, this is the best textbook style introduction out there. It starts from the beginning, but gets into the full language. Published in 2009, but still in print, with updated appendixes available for new language features. In the third edition, "the contents have been cleaned up and retrofitted w/Python 3 examples paired w/their 2.x friends."
- Dive Into Python 3 (<http://www.diveinto.org/python3/>): This book offers an introduction to Python aimed at the student who has experience programming in another language.
- Python for You and Me (<http://pymbook.readthedocs.org/en/latest/>): Simple and clear. This is a great book for absolute newcomers, or to keep as a quick reference as you get used to the language. The latest version is Python 3.
- Think Python (<http://greenteapress.com/thinkpython/>): Methodical and complete. This book offers a very "computer science"-style introduction to Python. It is really an intro to Python in the service of Computer Science, though, so while helpful for the absolute newcomer, it isn't quite as "pythonic" as it might be.
- Python 101/Fluent Python (<http://shop.oreilly.com/product/0636920032519.do>): All python3, and focused on getting the advanced details right. Good place to go once you've got the basics down.

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Programmer, software engineer, software developer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Ability to plan and project-manage, Debugging Time management, Learning new skills as required Problem Solving	No poverty, Quality Education, Decent Work and Economic Growth, industry innovation and infrastructure	Can start own application developing company.

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SEMESTER- 3rd

Course: M. Sc. CS

SUBJECT: A. COMPUTER NETWORKS WITH WINDOWS NT

Subject Code: 6IMCS302A

Theory Max. Marks: 50

Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To understand the fundamental concepts of computer networking.
2. To understand the basic taxonomy and terminology of the computer networking area.
3. To understand the advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. To understand the various transition method.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Analog & digital signal.electronic spectrum, asynchronous & synchronous transmission. Ideal channel, band rate, baseband, broadband channel, multiplexer FDM.TDM , STDN, carrier modulation. AM, FM, PCM. PWM, SWM, encoding schemes, the needs and importance of networking, type of networks, server based , peer based, hybrid, layered architecture, LAN topology, network adopted card, logical topology, modem.	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – II	Switching technique, message switching. circuit switching. Packet switching.Virtual circuit.Transmission media.OSI reference model.IEEE standards. 802.3, 802.4, 802.5 ALOHA, SLOTTED ALLOHA, CSMA. CSMA/CD Bitmap CCITT X.25, CCITT x11, token ring, token bus.	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – III	Fast Ethernet, FDDI token ring, wireless LAN, ATM network, principles of internetworking , internetworking devices, bridge, routers ,gateways, repeater, routing algorithms, distance vector routing, shortest path routing, broadcast routing, multicast routing, ICP/IP protocol, IPV6 addressing, congestion control, traffic shaping.	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – IV	TELNET, FTP, SMTP, MINE,SNMP,UDP,URL(Uniform Resource Locator) THTTP source routing bridge, transport bridge, ISDN channel, ISDN services, base band ISDN, broadband ISDN. Different switches, PBX network, network securing application of cryptography to security, data encryption transposition cipher, substitution cipher, PSA algorithms.	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit - V	Introduction to Windows NT, various features, differences with other windows environment and other OS, Windows NT workstations versus server. Kernel and its subsystems. Security Models: system level restrictions, server application security, domain group access.	Usage of ICT :- Power Points,PDF , Video lectures,Black board

COURSE OUTCOME:

After study this student will be able to know about

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.
4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

Text Books:

- "Data Communication Prakash C Gupta,
- "Local Area Networks", S.K.Basandra& S. Jaiswal, Galgotia Publications

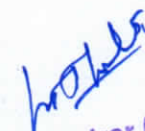
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Reference Books:

- "Networking Essentials: Study Guide MCSE", James Chellis Charles Perkins, Matthew Strebe Second Edition, BPB Publications.
- MCSE Windows 2000 Network Infrastructure Design
- "Computer Network" Andrew & Tanenbaum,
- "Data and Computer Communication" William Stallings,

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Network administrator, network service provider, network engineer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Computer networking, maintenance of network, implementation of Network, Organizing and Planning Networks	No poverty, Quality Education, Decent Work and Economic Growth	Can start own Computer Network assistance




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SEMESTER- 3rd

Course: M. Sc. CS

SUBJECT: B. ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

Subject Code: 6IMCS302B

Theory Max. Marks: 50

Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able-

- To understanding the importance of AI and puzzle problem.
- To understanding the Search Techniques.
- To understanding the Symbolic and Statistical Reasoning.
- To understanding the frames and Structural Knowledge Representation.
- To understanding the expert system life cycle.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction to Artificial Intelligence-Overview and definition of AI, Importance of AI, Early work in AI, General issues in AI, Problems of AI, AI Techniques, Scope and Application areas of AI. Knowledge Representation and Logic-Introduction and Importance of Knowledge, Characteristics of Knowledge, Explicit and Implicit Knowledge, Declarative or Procedural knowledge, Internal vs. External Knowledge, Mappings and Knowledge representation Methods, Issues in Knowledge representation, Important Attributes, Relationship among attributes, Granularity of representation, Representing set of objects, Finding the Suitable structure.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on AI
Unit – II	Knowledge Representation Using Rules- Representing Knowledge Using Rules, Procedural V/S Declarative Knowledge, Logic Programming, Forward and Backward Reasoning, Matching, Indexing, Matching with Variable, Complex and Approximate Matching, Conflict Resolution, Control Knowledge. Structural Knowledge Representation-Weak Slot and filter structures, Semantic nets, Intersection search, Non-binary predicates Representation, Essential distinctions, Partitioned semantic nets, Semantic nets to Frames, Frames, Frames as sets and instances, Additional ways of relating classes to each other, Slots and full-fledged objects, Property Inheritance algorithm, Languages for Frame, Strong slot and filter structures, Conceptual Dependency, Scripts, CYC.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on KDD
Unit – III	Problem Solving and Search-State Space Search for problem solving, Production System, Search and Control Strategies, Breadth First Search, Depth First Search, Heuristic Search, Production System Characteristics, Problem characteristics, Some other Control Strategies, Uniform cost search, Depth-limited search, Iterative deepening search, Adversarial Search, Two agent Games, The Minimax procedure, Example Problems, -Puzzle Problem and Playing Chess, Traveling Salesman Problem, Tic-Tac-Toc Problem, Water Jug Problem. Heuristic Search Techniques- Introduction, A General Graph Searching Algorithm, Generate and Test, Hill Climbing Search, Best First Search and A* algorithm, Admissibility of A*, Monotone or Consistency Condition, Problem Reduction, AND-OR TREE, Constraint Satisfaction, Cryptarithmic Problem.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – IV	Symbolic and Statistical Reasoning- Symbolic Reasoning Under Uncertainty, Introduction to Reasoning, Nonmonotonic Reasoning and its Logics, Implementation Issues, Implementation: Depth – First Search, Implementation: Breadth – First Search, Statistical Reasoning, Symbolic Verses Statistical Reasoning. NLP : Natural Language Processing- Introduction, Computational linguistics, Problems of NLP, NLP Steps, Syntactic processing, Grammars, parsers, One or many Interpretations, Parsing techniques, Transition networks and	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on NLP

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	augmented transition net, Unification Grammar, Semantic analysis, Semantic grammars, Case grammars, Conceptual parsing, Semantic interpretation, Discourse & pragmatic processing, Focus use in understanding, Modeling beliefs, Use of goals and plans for understanding, Acts of speech, Postulates of conversation.	
Unit - V	Expert system- Introduction, Need and Justification, Benefits of using ES, Characteristics, Applications, Building blocks of Expert system, Knowledge Base, Inference Engine, User Interface, Expert System Life Cycle, Representing and Using Domain Knowledge, Knowledge Engineering and Acquisition, Expert System Tools, Expert System Shells, Case Study: Mycin & Dendral, Rule Based Systems, Learning Procedure. PROLOG: AI Programming Language- Introduction, Data Types & Structures: Atom, Variables, Lists, Prolog Syntax and Programming, Prolog Objects and Methods, Objects & Relationships using Trees and Lists, Facts, rules, Relationships and queries, 'IS' Operator & Singleton Variable, 'CUT' Operator.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on EXPERT SYSTEM

COURSE OUTCOME:

After study this student will be able to know about the AI with search algorithm and expert system with life cycle.

Text Books:

- Artificial Intelligence, Rich E and Knight K, TMH, New Delhi
- Artificial Intelligence Elaine Rich and Kevin Knight and Shivashankar B. Nair

Reference Books:

- Principles of Artificial Intelligence Nils J. Nilsson
- Introduction to Artificial Intelligence & Expert Systems Dan W. Patterson

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Research Analysts, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Planning, Management, Approach to become professional researcher	No poverty, Quality Education, Decent Work and Economic Growth,	Can start own Programming company.

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SEMESTER- 3rd
Course: M. Sc. CS
SUBJECT: C. RESEARCH METHODOLOGY

Subject Code: 61MCS302C
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

The students will be able to understand the principles of research and enable students to link the research process with theories of their specialist areas.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Fundamentals of Research, Introduction, Scope and Significance of Research, Types of Research, Research Process, Introduction, Research Process, Research Process/Plan, Steps involved in Preparing Market Research Plan or Designing a Research, What are the Criteria or Characteristics of a Good Research?, Scientific Method in Research, Introduction, Process and Logic in Scientific Research, Characteristics of Scientific Method, Distinction between Scientific and Unscientific Method	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – II	Problems In Research, Introduction, Identifying Research Problem, Sources for Problem Identification, Self Questioning by Researcher while Defining the Problem, Concepts, Constructs, Theoretical Framework, Objectivity in Research, Hypothesis, Introduction, Meaning of Hypothesis, Formulation of Research Design.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Concept of Measurement, Meaning of Measurement, Errors in Measurement, Techniques of Measurement, Sample Questionnaire Items for Attitude Measurement, Scaling Techniques, Introduction, Types of Scale, Scale Construction Techniques, Sampling Design, Introduction, Meaning and Concepts of Sample, Steps in Sampling, Criteria for Good Sample, Types of Sample Design, Distinction between Probability Sample and Non-probability Sample,	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – IV	Data Collection, Introduction, Types of Data-Sources, Miscellaneous Secondary Data, Tools for Data Collection.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit - V	Report Writing, Introduction, Significance of Report Writing, Steps in Report Writing, Layout of Report, Types of Reports, Executive Summary, Mechanics of Writing Reports, Precautions for Writing Report, Norms for using Tables, Charts and Diagrams, Graphs, Norms for Using Index and Bibliography. Oral Presentation, Introduction, Nature of an Oral Presentation, Guidelines, Checklist for Oral Presentation.	Usage of ICT :-Power Points, PDF, Video lectures, Black board

COURSE OUTCOME:

After completing this course the students should be able to understand the principles of research and enable students to link the research process with theories of their specialist area.

Text Books:

- Research Methodology (H) Baghel D.C SBPB

Reference Books:

- Research Methodology : C.R Kothari (New Age International)
- Research Methodology : H.R Ramanath(Himalaya Publication House)
- Research Methodology : Vohra(Omega Publication)
- Research Methodology :KohaliLaxminarayan (Y.K Publication)

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Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Able to become a researcher	No poverty, Quality Education, Decent Work and Economic Growth,	Can start own research agency and research project.

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SEMESTER- 3rd
Course: M. Sc. CS
SUBJECT: A. SOFTWARE ENGG.

Subject Code: 6IMCS303A
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able-

1. To understanding the concepts and methods required for the construction of large software intensive systems.
2. To develop a broad understanding of the discipline of software engineering.
3. To understanding the detailed knowledge of techniques for the analysis and design of complex software intensive systems.
4. To understanding the techniques in an appropriate engineering and management context.
5. To understanding the brief account of associated professional and legal issues.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	The Software problem, Software Engineering problem, Software Engineering approach—phased development process, project management and matrices. Software processes – Processes, Projects, Components, and Characteristics. Software Development process – process step specification, waterfall model, prototyping, iterative enhancement, spiral model.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on Software Engineering Tools
Unit – II	Software Requirement Analysis and Specification—Software Requirements, Problem Analysis, Requirement Specification, Validation, Metrics.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Individual presentation
Unit – III	Planning a Software project – Cost Estimation, Project Scheduling, Staffing and personnel planning, Software Configuration management plans, Quality Assurance plans, Project Monitoring Plans, Risk Management.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group discussions
Unit – IV	Software Design – Design Principles, Module level concepts, Design Notation and Specification, Structured Design Methodology, Verification. Coding - Programming Practice, Verification and Metrics.	Usage of ICT :-Power Points, PDF, Video lectures, Black board,
Unit - V	Software Testing – Testing fundamentals, Functional testing, Structural testing, Testing process. Software Quality Assurance (SQA): Software Reviews, Software Quality factors, SQA activities, Formal Technical Reviews, SQA Approach. Software Configuration Management – Configuration Identification, Change Control, Status Accounting and Auditing.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on Software Testing, Group projects on CASE

COURSE OUTCOME:

Carry out an evaluation and selection of projects against strategic, technical and economic criteria and use a variety of cost benefit evaluation techniques for choosing among competing project proposals. Approach project planning in an organized step by step manner and select an appropriate process model produce an activity plan for a project.

Identify project risks, monitor and track project deadlines and produce a workplan and resource schedule.

Plan the evaluation of a proposal or a product and manage people in software environments. Understand the importance of teamwork and quality management in software project management. Apply these project management tools and techniques in a diversity of fields such as new product and process development, construction, information technology, health care, and applied research.

Text Books:

- Software Engineering Pankaj Jalote
- “Software Engineering: A Practitioner’s Approach” Pressma

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- “Software Engineering” K KAggarwal

Reference Books:

- “Fundamentals of Software Engineering” by Mall B
- Software Testing: Principles and Practice Gopalaswamy and Srinivasan, 817758121x.Publisher, Pearson Education India. ISBN, 817758121x.
- Software Testing Tools: Covering WinRunner, Silk Test , LoadRunner, JMeter andTestDirector with case Dr. K.V.K.K. Prasad, ISBN: 8177225324, Wiley Dreamtech, List Price: Rs. 279.00
- Basics of Software Project Management – NIIT,, Prentice Hall of India, ISBN 81-203-2490-0
- Software Project Management Bob Hughes & mike Cotterell, Tata McGraw Hill, ISBN – 0-07-061985-9

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
System analyst, system administrator, system designer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Approach to become professional software developer, Professionalism.	No poverty, Quality Education, Decent Work and Economic Growth, industry innovation and infrastructure	Can start own Programming company.

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SEMESTER- 3rd

Course: M. Sc. CS

SUBJECT: B. MULTIMEDIA TOOLS & APPLICATION

Subject Code: 6IMCS303B

Theory Max. Marks: 50

Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able-

1. To understand the multimedia communication standards and compression techniques.
2. To understand the foundation knowledge of multimedia computing, e.g. media characteristics, compression standards, multimedia representation, data formats, multimedia technology development.
3. To understand the programming training in multimedia computing, multimedia system design and implementations. To learn the Multimedia communication across the networks.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction of Multimedia - Introduction of Multimedia, Meaning of Multimedia, What is Multimedia. Identifying Multimedia Elements, Text, Images, Sound/Audio, Animation, Video, Areas of use for Multimedia.	Usage of ICT :- Power Points, PDF, Video lectures, Black board
Unit – II	Multimedia Input Devices - Introduction, Input Device, Typing Input Devices, Pointing Input Devices, Scanning Input Devices, Audio Visual Input Devices Multimedia Output Devices - Introduction, Output Devices, Soft Copy Vs Hard Copy Output, Monitor, Printers, Plotter.	Usage of ICT :- Power Points, PDF, Video lectures, Black board, Case studies, Group discussions, Group projects, Individual presentation
Unit – III	TEXT - Concept of Plain and formatted text, Advanced text formatting, Using Various Text Effect, Using text preparation tools and standard software, Conversion to and from of various text formats; Object Images - Importance of Graphics in Multimedia, Vector and Raster Graphics, Various Attributes of Images, Various Image File Formats. Processing Images with Common Software Tools - Overview of Photoshop, Resizing Images and Size Guide, Modify Color and effects, Layers, Text Editing, Converting an Image to Black and White, Restoring Old Photographs.	Usage of ICT :- Power Points, PDF, Video lectures, Black board, Visit to small companies, Workshop on Advance Animation Technique.
Unit – IV	SOUND - Sound and its Attributes, Mono V/s Stereo Sound, Sound and its Effect in Multimedia, Analog V/s Digital Sound, Sound Standards on PC, Capturing and Editing Sound on PC, Overview and using some Sound Recording, Sound Editing Software, Various Sound File Formats on PC, WAV, MP3, MP4. Animation - BASIC OF ANIMATION, Three Basic Types of Animation, Uses of animation in multimedia, Effects of Resolutions, Image Size on Quality and Storage.	Usage of ICT :- Power Points, PDF, Video lectures, Black board
Unit - V	Video - BASICS OF VIDEO, Analog and Digital Video, How to use Video on PC; Introduction to Graphics Accelerator Cards, Introduction to DirectX, Introduction to AV/DV and IEEE1394 Cards, Brief note on Various Video Standards, Introduction to Video Capturing Media & Instruments, Introduction to Digital Video Compression Techniques, Introduction to Various Digital Video file formats Video Editing & Movie Making Tool - Brief Introduction to Video Editing and Movie Making Tools, Movie Making Tools, QuickTime Video Editing Tool, Video for Windows.	Usage of ICT :- Power Points, PDF, Video lectures, Black board

COURSE OUTCOME:

After study this student will be able to

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- To understand about various latest interactive multimedia devices, the basic concepts about images and image formats.
- To understand about data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts about animation.
- To develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications surrounding the emergence of multimedia technology.

Text Books:

- Principles of Multimedia Ranjan Parekh
- Multimedia Systems Design Prabhat K. Andleigh & Kiran Thakrar
- Comdex: Multimedia and Web Design Course Kit with CD by Vikas Gupta

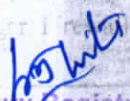
Reference Books:

1. Multimedia: Making It Work (4th Edition) – Tay Vaughan, Tata McGraw Hills.
2. Multimedia In Action – James E Shuman – Vikas Publishing House.
3. Multimedia Basics – Volume – 1 Technology, Andreas Holzinger, Firewall Media (Laxmi Publications Pvt. Ltd) New Delhi.

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Training and Support in, Institutions/universities Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors Application, Customization and Development, Start own venture	Strengthening imagination power, Organizing and Planning, Problem Solving	Quality Education, Decent Work and Economic Growth	Can start own Programming company.






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SEMESTER- 3rd

Course: M. Sc. CS

SUBJECT: C. DATA WAREHOUSING & MINING

Subject Code: 6IMCS303C

Theory Max. Marks : 50

Theory Min. Marks : 17

COURSE OBJECTIVE:

Students will be able

1. To understand the scope and necessity of Data Mining & Warehousing for the society.
2. To understand the designing of Data Warehousing so that it can be able to solve the root problems.
3. To understand various tools of Data Mining and their techniques to solve the real time problems.
4. To develop ability to design various algorithms based on data mining tools.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Need for strategic information, Decision support system, Knowledge discovery & decision making, need for data warehouse, definitions of Data warehousing and data mining, common characteristics of Data warehouse, Data Marts, Metadata, Operational versus analytical databases, trends and planning of Data warehousing.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on data warehousing
Unit – II	Defining business requirements, Data modeling strategy, Fact tables, dimensions, Star schema and other schemas, Multi dimensional data models, Data Cube presentation of fact tables, using the Data warehouse, Designing tools for Data warehouse, OLAP models and operations.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Architectural components, Infrastructure: Operational & Physical, Extraction, Transformation and Loading, Components of an Oracle Data warehouse, Data Transformation Functions, DBA responsibilities, Capacity Planning.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – IV	Implementation of Data warehouse, Physical design: steps, considerations, physical storage, indexing, Performance Optimization, Data warehouse deployment activities, Data security, backup and recovery concepts, Data warehouse Maintenance.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit - V	Basics of data mining, related concepts, Data mining techniques, Data Mining Algorithms - Classification, Clustering, and Association rules, Knowledge Discovery in databases (KDD) Process, Introduction to Web Mining.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on data mining techniques

COURSE OUTCOME:

After study this student will be able to know about the

1. Process raw data to make it suitable for various data mining algorithms.
2. Discover and measure interesting patterns from different kinds of databases.
3. Apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data.

Text Books:

- Data Mining Techniques, Arun.K.Pujari, University Press
- Data Mining Technique & Trend, N.P Gopalan, PHI
- Introduction to Data Mining, Tan, Pearson

Reference Books:

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- Data Warehousing Fundamentals, by Paulraj Ponnian, John Wiley.
- Data warehousing with oracle by Sima Yazdani – Shirley s. Wong
- Data Mining Concepts and Techniques, Han Kamber, Morgan Kaufmann
- Introduction to Business Intelligence and Data Warehousing, PHI
- The Data Warehouse Lifecycle toolkit, Ralph Kimball, John Wiley.

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Go for Higher studies Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development Start own venture	Data analysis	Entrepreneurship Opportunities:-Can start own Programming company. Employability skill: Organizing and Planning, Problem Solving	Quality Education Decent Work and Economic Growth

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SEMESTER- 3rd
Course: M. Sc. CS
SUBJECT: JAVA PROGRAMMING

Subject Code: 6IMCS304
Theory Max. Marks: 50
Theory Min. Marks 17

COURSE OBJECTIVE:

Student will be able

1. To understand the general concepts pertaining to the Internet and World Wide Web.
2. To have a good working knowledge of HTML, CSS and JavaScript and the principles of website design.
3. To know different Web Designing Tools, how web hosting and publishing done
4. To understand JavaScript, Electronic Commerce, Electronic Payment System and electronic security.
5. To understanding the JAVA environment.
6. To understand the basic concept of oops with java techniques.
7. To understand the Classes and its parts of programming
8. To understand the Applets and other concept of java.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	History and design features of JAVA.how Java works. Basics of JAVA.Application and Applets.using the tools in JDK, javadoc, Java, jdbc etc. Applets Programming - Creating and executing Java applets. Inserting applets in a web page.Java security.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on basic concept of java
Unit – II	JAVA Language- keywords.Constants, Variables and Data types. Operators and statements: Break, continue, and return. Array.String and String Buffer Classes, Wrapper Classes. Classes, Objects and Methods: Defining a class, adding variables and methods, creating Objects, constructors, class inheritance.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Inheritance, basic types, using super, multi level hierarchy. abstract and final classes, object class, packages and interfaces, packages. Exception Handling, Fundamentals, exception types, uncaught exceptions, throws, throw, try -catch, final, built in exceptions, creating your own exceptions.	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Group discussions on Inheritance
Unit – IV	JAVA ENTERPRISE APPLICATIONS JNI - Servlets - Java Server Pages - JDBC - Session beans - Entity beans - Programming and deploying enterprise Java Beans - Java transactions. RELATED JAVA TECHNIQUES	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit - V	Graphics Java Media Frame work - 3D graphics - Internationalization - Case study - Deploying n-tier application, E- commerce applications.	Usage of ICT :-Power Points, PDF, Video lectures, Black board

Practicals:

1. Write a Java Program to Display message on computer screen.
2. Write a Java Program to develop a class for Rational numbers
3. Design a Date class in Java
4. Write a Java Program to design an interface for Stack ADT and implement Stack ADT using both Array and Linked List.
5. To develop a vehicle class hierarchy in Java to demonstrate the concept of polymorphism
6. Design a Date class in Java .
7. To write a Java Program to randomly generate objects and write them into a file using concept of Object Serialization
8. Develop a scientific calculator using event-driven programming paradigm of Java.

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9. To write a multi-threaded Java program to print all numbers below 100,000 that are both prime and Fibonacci number
10. To develop a Java Program that supports multithreaded echo server and a GUI client.
11. To implement a calculator using GUI Environment with the help of javax.swing package.

COURSE OUTCOME:

- Students will complete software projects comprised of an object-oriented design, implementation, and test plan.
- Designs will demonstrate the use of good object-oriented design principles including encapsulation and information hiding.
- The implementation will demonstrate the use of a variety of basic control structures including selection and repetition; classes and objects in a tiered architecture (user interface, controller, and application logic layers); primitive and reference data types including composition; basic AWT components; file-based I/O; and one-dimensional arrays.
- Test plans will include test cases demonstrating both black box and glass box testing strategies.

Text Books:

- Java Programming by Kamal Prakashan

Reference Books:

- Programming Java 2nd Edition E. balagurusvamy, TMH Publications.
- Peter Norton Quid E To Java Programming Peter Norton, Techmedia Publications.
- "Java How to program", Deitel & Deitel, Prentice Hall, 4th Edition, 2000.
- "Core Java Vol 1 and Vol 2", Gary Cornell and Cay S. Horstmann, Sun Microsystems Press, 1999.
- "Developing Java Enterprise Applications", Stephen Asbury, Scott R. Weiner, Wiley, 1998.

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Programmer, web developer, software engineer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Programming, analysis, logical reasoning, Organizing and Planning, Problem Solving	No poverty, Quality Education, Decent Work and Economic Growth, industry innovation and infrastructure	Can start own Programming company





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SEMESTER- 3rd
Course: M. Sc. CS
SUBJECT: LINUX

Subject Code: SCMIT 301
Theory Max. Marks:
Theory Min. Marks

COURSE OBJECTIVE:

Student will be able

1. To introduce the internals of Linux Operating System.
2. To develop, debug and implement Shell program.
3. To understand System administration.
4. To understand configuration of Proxy Server.
5. To Installation, configuration and managing a simple LAN within an organization using Linux.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction to the kernel:- Architecture of the Unix, the buffer cache, Internal representation of files:- inode, accessing blocks, releasing blocks, structure of regular files, conversion of path name to an inode, inode assignment to new file, allocation of disk-block.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – II	System calls for the file systems:- OPEN, READ, WRITE, CLOSE, PIPES:- the pipe system call opening a named pipes, reading and writing pipes, closing pipes, DUP, LINK, UNLINK, system call for TIME and CLOCK.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	The structure of processes:- process states and transitions. Layout of system memory, the context of a process, saving the context of the process. Manipulation of the process address space. Process Control: - Process creation, signals, Process termination, awaiting process termination, the user id of a process, changing the size of the process,	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – IV	Shell Programming:- Study of different types of Shell like C Shell, Bourne Shell etc. Shell variable, Shell Script. Shell Command. Looping and Making choices:- For Loop, While and Until, passing Arguments to Scripts. Programming in different shells.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit - V	LINUX File systems Hierarchy, editors, common Linux command, Mounting & Un-mounting CD- ROM, Floppy Disk, Different access permission, Backup & Restoring, Network Configuration command Ipconfig, hostname, Telnet.	Usage of ICT :-Power Points, PDF, Video lectures, Black board

Practicals:

1. Write a shell script to find factorial of a given integer.
2. Write a shell script to list all of the directory files in a directory.
3. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
4. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
5. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
6. Shell script to display the period for which a given user has been working in system.
7. Aim to compute gross salary of an employee, accordingly to rule given below.
If basic salary is <15000 then HRA =10% of basic and DA =90% of basic
If basic salary is >=15000 then HRA =500 and DA =98% of basic.
8. Write an awk script to find out total number of books sold in each discipline as well as total book sold using associate array down table as given
electrical 34 electrical 80
mechanical 67 computers 43
mechanical 65 civil 198
computers 64.
9. Create a script file called file properties that reads a file name entered and output its properties

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10. Write a shell script using expr command to read in a string and display a suitable message if it does not have at least 10 characters.

11. Write a shell script that reports the logging in of a specified user within one minute after he/she logs in. The script automatically terminates if the specified user does not login during a specified period of time.

COURSE OUTCOME:

After Study This Student Will Be Able To Know About Basic Features, Different flavors of Linux. Advantages, Installing. Student will know about Processes in Linux, Shell programming & Gnome graphical interfaces.




Text Books:

- Linux Bible by Christopher Negus
- Linux Concepts & Applications by Amit K. Mishra
- BPB Linux Course (H) by BPB

Reference Books:

- The Design of Unix Operating system by Maurice Bach
- Advanced Unix- A Programmer Guide by Stephen Prata.
- The Complete Reference Linux by Richard Petersen

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
System Admin, Technical support Engineer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Open Source Technologies, Networking and IT infrastructure. Basics of OS and its working, Organizing and Planning, Analysing	Quality Education, Decent Work and Economic Growth,	Can start own Computer Assistance services.


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SEMESTER- 4th
Course: M. Sc. CS
SUBJECT: COMPILER DESIGN

Subject Code: 6IMCS402
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able

1. To understand the general concepts pertaining to the Compiler Design.
2. To have a good working knowledge of Parsers.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Automata Introduction to Finite Automata, Structure Representation, Automata and Complexity, Alphabets, String, Language Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, An Application.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – II	Introduction To Compiler, Overview of Compilation, Process, Typical Compiler Structure, Implementing A Compiler. Programming Language Grammars, Elements of A Formal Language Grammar, Derivation, Reduction & Syntax Trees, Ambiguity Regular Grammar & Regular Expression – Context Free Grammar.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – III	Scanning & Parsing Techniques – The Scanner, Regular Grammar and Fsa, Top Down Parsing, Parsing Algorithm, Top Down Parsing Without Backtracking, Predictive Parsers, Bottom Up Parsing, Parsing, Lr Parsers, Shift Reduce Parsing .	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit – IV	Symbol Table Organization, Memory Allocation – Static & Dynamic Memory Allocation, Compilation Control Transfer, Procedure Calls, Conditional Execution, Iteration Control Construct.	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit - V	Lexical Syntax Errors, Semantic, Major Issues In Optimization, Optimizing, Transformations, Local Optimization, Program Flow Analysis, Global Optimization.	Usage of ICT :-Power Points, PDF, Video lectures, Black board


COURSE OUTCOME:

Text Books:

- “Crafting a Compiler with C”, C. N. Fisher and R. J. LeBlanc Pearson Education, 2000.
- “Modern Compiler Design”, David Galles, Pearson Education Asia, 2007.
- “Advanced Compiler Design & Implementation”, Steven S. Muchnick, Morgan Kaufmann Publishers, 2000.

Reference Books:

- Introduction To Automata Theory, Language And Computation - John E - Hopcroft, Rajeev Motwani, Jeffery D. Ullman 2nd Edition
- Compiler Construction Principles & Practice – D.M. Dhamdhare 2nd Edition
- Principles Of Compiler Design – Alfred V. Aho, Jeffery D. Ullman
- Compilers Principles, Techniques And Tools – Alfred V. Aho, Ravi Sethi, Jeffery D. Ullman
- “Compilers- Principles, Techniques, and Tools”, Alfred V. Aho, Ravi Sethi, Jeffery D. Ullman, Pearson Education Asia, 2007.


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Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors,	Able to design compiler software	No poverty, Quality Education, Decent Work and Economic Growth,	Can start own Programming company.

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SEMESTER- 4th
Course: M. Sc. CS
SUBJECT: ASP.NET & C#

Subject Code: : 6IMCS403
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

Student will be able-

1. To understand the basic concepts of object-oriented programming and build skills to develop modern software programs using the language Visual Basic. The course is also suitable for students with prior programming experience who wish to strengthen their knowledge in the area of object-oriented design and programming with Windows.
2. To understand the analyze program requirements
3. To understand the design/develop programs with GUI interfaces
4. To understand the code programs and develop interface using Visual Basic .Net
5. To understand the perform tests, resolve defects and revise existing code.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Overview of ASP.NET framework, Understanding ASP.NET Controls, Applications Web servers, installation of IIS. Web forms, web form controls - server controls, client controls, web forms & HTML, Adding controls to a web form ,Buttons, Text Box , Labels, Checkbox, Radio Buttons, List Box, etc. Running a web Application, creating a multiform web project:	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – II	Form Validation: Client side validation, server Side validation. Validation Controls: Required Field Comparison Range. Calendar control. Ad rotator Control, Internet Explorer Control. State management- View state, Session state, Application state,	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – III	Architecture of ADO.NET, Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class. Command Class, Data Adapter Class, Dataset Class. Display data on data bound Controls and Data Grid. Database Accessing on web applications: Data Binding concept with web, creating data grid, Binding standard web server controls. Display data on web form using Data bound controls.	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit – IV	Writing datasets to XML, Reading datasets with XML. Web services: Introduction, Remote method call using XML, SOAP, web service description language, building & consuming a web service, Web Application deployment.	Usage of ICT :- Power Points,PDF , Video lectures,Black board
Unit - V	Overview of C#, C# and .NET, similarities & differences from JAVA, Structure of C# program. Language features: Type system, boxing and unboxing, flow controls, classes, interfaces, Serialization, Delegates, and Reflection.	Usage of ICT :- Power Points,PDF , Video lectures,Black board

Practicals:

1. Working with call backs and delegates in C#.
2. Program to display the addition using the windows application.
3. Creating a Windows Service with C#
4. Using Reflection in C#
5. Sending Mail and SMTP Mail and C#
6. Write a program working with Page using ASP.Net.
7. Write a program working with forms using ASP.NET.

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8. Write a program using RequiredFieldValidator in ASP.NET.
9. Write a program using Login Form in ASP.NET.
10. Write a program using Checkbox List in ASP.NET.

COURSE OUTCOME:

- After the completion of the course, students are expected to:
 - To design web applications using ASP.NET .
 - Successful students will be able to use ASP.NET controls in webapplications.
 - Successful students will be able to debug and deploy ASP.NET webapplications.
 - Successful students will be able to create database driven ASP.NET webapplications and web services.

Text Books:

- C# programming – Wrox publication
- C# programming Black Book by Matt telles

Reference Books:

- VB.NET Black Book by stevenholzner –dreamtech
- ASP.NET Unleashed

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Programmer, software engineer, software developer, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Ability to plan and project-manage, Debugging Time management, Learning new skills as required Problem Solving	No poverty, Quality Education, Decent Work and Economic Growth, industrybca innovation and infrastructure	Can start own application developing company.





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SEMESTER- 4th
Course: M. Sc. CS
SUBJECT: SOFT COMPUTING

Subject Code: : 6IMCS404
Theory Max. Marks: 50
Theory Min. Marks 17

COURSE OBJECTIVE:

Students will be able-

Fundamental concepts used in Soft computing. The concepts of Fuzzy logic (FL) will be covered first, followed by Artificial Neural Networks (ANNs) and optimization techniques using Genetic Algorithm (GA). Applications of Soft Computing techniques to solve a number of real life problems will be covered to have hands on practices. In summary, this course will provide exposure to theory as well as practical systems and software used in soft computing.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction- What is soft computing, important soft computing techniques	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on soft computing
Unit – II	Artificial Neural Network :Biological neural network Vs Artificial neural network, Neuron Model and Neural Network Architectures, ANN terminologies, ANN benefits, Supervised learning network :Error back propagation network, Perceptron learning (single layer only), Unsupervised learning network :Kohonen self organizing feature maps (SOM)	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on ANN
Unit – III	Fuzzy Logic-Crisp set Vs Fuzzy set, Operations on Fuzzy sets, Fuzzy relation, Membership function, Fuzzy arithmetic and Fuzzy measures	Usage of ICT :-Power Points, PDF, Video lectures, Black board, Workshop on fuzzy system
Unit – IV	Genetic Algorithm – Introduction, representations of GA by binary and real-valued numbers, Genetic Operators and Parameters: Selection, crossover, mutation, elitism, Genetic Algorithms in Problem Solving	Usage of ICT :-Power Points, PDF, Video lectures, Black board
Unit - V	Swarm Intelligence: Meaning, Particle Swarm Optimization: basics, terminology, problem solving using PSO.	Usage of ICT :-Power Points, PDF, Video lectures, Black board,

COURSE OUTCOME:

Fuzzy logic and its applications.

- Artificial neural networks and its applications.
- Solving single-objective optimization problems using GAs.
- Solving multi-objective optimization problems using Evolutionary algorithms (MOEAs).
- Applications of Soft computing to solve problems in varieties of application domains.

Text Books:

- Soft Computing and Intelligent Systems: Theory & Applications, N.K. Sinha & M. M. Gupta (Eds), Academic Press, 2000.
- Principles of soft computing, S.N. Shivanandan and S.N. Deepa Wiley India publication, First Indian edition, 2008.

Reference Books:

- A Comprehensive Foundation to Neural Networks, Simon Haykins, Prentice Hall
- Fuzzy Sets and Fuzzy Logic: Theory and Applications, G. J. Klir, and B. Yuan, PHI learning, 2011.
- Fuzzy Logic and Fuzzy Decision Making: Concepts and Applications, Dr. G. Canon, Galgotia Publication.
- Genetic Algorithms in Search, Optimization, and Machine Learning, D. E. Goldberg, Addison-Wesley, 1989.

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- :Neuro-Fuzzy and soft computing :A computational Approach to learning and machine intelligence ,Jang,Sun and Mizutani PHI learning ,2011.

Job Opportunities	Employability Skill Developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Research Analysts, Training and Support in Institutions/universities, Research and Academics, System Analyst in State and Central Research organization, Consultant in Software firms, Quality Assurance and Testing in Public and Private sectors, Application Customization and Development, Start own venture	Planning, Management, Approach to become professional researcher	No poverty, Quality Education, Decent Work and Economic Growth,	Can start own Programming company.

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SEMESTER- 4th
Course: M. Sc. CS
SUBJECT: MAJOR PROJECT

Subject Code: 61MCS401
Theory Max. Marks: 75
Theory Min. Marks 25

COURSE OBJECTIVE:

All the candidates of **M.Sc. -CS** are required to submit a project-report based on the work done by him/her during the project period. A detailed Viva shall be conducted by an external examiner based on the project report. Students are advised to see the detailed project related guidelines on the website of CVRU. (www.cvrु.ac.in) under Project Guidelines for student section.

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Project-report based on
external examiner's report
available on the website of CVRU.