FACULTY OF EDUCATION
SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES
Outcome based Curriculum for
Post graduate Degree Courses in Master of Science
Department of Computer Science

Vision of the Departments :

To become a Center of Excellence in the computer sciences and information technology discipline with a strong research and teaching environment that adapts swiftly to the challenges of the 21st century.

Mission of the Departments:

- To encourage students to conduct student projects to develop their analytical and logical thinking.
- To conduct faculty training programs through invited talks or workshops.
- leading to careers as Computer and IT professionals in the widely diversified domains of industry, government and academia.
- To conduct outreach programs for the socially marginalized students.

Programme Educational Objectives (PEO's):

PEO1. To equip students with knowledge, abilities and insight in Computer and IT and related fields.

PEO2. Graduates will be able to outperform in technical/managerial roles ranging from problem analyzing, solving, designing, development to
production support in software industries as well as in R&D sectors.
PEO3. Graduates will be able to successfully pursue higher education/research in reput ed institutions within country or abroad.
PEO4. Graduates will have the ability to adapt, contribute and innovate advance technologies and systems in the key domains of Computer Science & Engineering.
PEO5. Graduates will be ethically and socially responsible solution providers/entrepreneurs in Computer Science disciplines.

POs of the Programme :

The M.Sc. Computer Science program's main objectives are
PO1 Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex problems.
PO2 Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3 Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO4 Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5 Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.
PO6 Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PROGRAM SPECIFIC OUTCOMES (PSOs) OF THE PROGRAMME:

On successful completion of the M.Sc. Computer Science program a student will
PSO1: Apply the knowledge of computer system and design principles in building the software and hardware components.
PSO2: Apply knowledge of layered network models, protocols, technologies and topologies as well as incorporating security policies for building network and internet based applications.
PSO3 : Apply the theoretical foundations of computer science in modelling and developing solutions to the complex and real world problems as well as designing and developing the application software systems along with the database design and management.
PSO4: Have sound knowledge of mathematical modeling, programming and computational techniques as required for employment in industry.

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Programme PO's and PSO's Mapping:

			PO 1	PO2	PO3	PO4	PO5	PO6		
S. No	**Program**	**Courses Category**							**PSO 1**	**PSO 2**
1	MSC (Computer Science)	Discrete mathematics structures	*		*	*	*		*	*
2		Programing in "c"	*		*	*	*		*	*
3		Computer organization & architecture			*	*	*			
4		Windows & pc soft	*		*	*	*		*	*
5		Data structure and algorithms	*	*	*	*	*		*	
6		Operating system	*		*	*	*			
7		Computer networks	*		*	*	*			
8		Java & html	*		*	*	*			
9		RDBMS Concepts & Oracle	*		*	*	*			
10		Multimedia Tools & Applications	*		*	*	*			
11		Software Engineering	*		*	*	*			
13		Unix Internals ,Shell Programming & Linux	*		*	*	*		*	*
14		Compiler design	*	*	*	*	*		*	
15		ASP.NET and C#	*		*	*	*		*	*
16		Artificially Intelligence	*	*	*	*	*		*	

Semester wise PO's and SPO's Mapping:

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Semester	Name of the Courses/POs(Basic, Core Electives, Projects, Internships etc.)	PO 1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2
Semester - I	Discrete mathematics structures	*		*	*	*		*	*
	Programing in "c"	*		*	*	*		*	*
	Computer organization & architecture	*		*	*	*			
	Windows & pc soft	*		*	*	*		*	*
Semester- - II	Data structure and algorithms	*		*	*	*		*	
	Operating system	*		*	*	*			
	Computer networks	*		*	*	*			
	Java & html	*		*	*	*		*	*
Semester- III	RDBMS Concepts & Oracle	*		*	*	*			
	Multimedia Tools & Applications	*		*	*	*			
	Software Engineering	*		*	*	*			
	Advanced Java Programming	*		*	*	*			
	INTERNSHIP	*		*	*	*			
Semster- IV	Unix Internals ,Shell Programming & Linux	*		*	*	*			
	Compiler design	*		*	*	*			
	ASP.NET and C#	*		*	*	*			
	Artificially Intelligence	*		*	*	*			

Structure of Programme: To fulfill the need of development of all the POs/ GAs, as per above mapping, the following semester wise programme structure are as under.

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[L= Lecture, T = Tutorials, P = Practical's & C = Credits]

Total Credits*= 160

Structure of Undergraduate Engineering program:

***Definition of Credit:**

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hours Practical (Lab)/week	1 Credit

Structure of Post graduate Master of Science (Computer Science) program:

S.No	Sem.No	Course Code	Course Name	Total Marks
	First			
1.		MCS-101	Discrete mathematics structures	100
2.		MCS-102	Programing in "c"	150
3.		MCS-103	Computer organization & architecture	100
4.		MCS-104	Windows & pc soft	150
	second			
5.		MCS201	Data structure and algorithms	150
6.		MCS202	Operating system	100
7.		MCS203	Computer networks	100
8.		MCS204	Java & html	150
	Third			
9.		MCS301	RDBMS Concepts & Oracle	150
10.		MCS302	Multimedia Tools & Applications	100
11.		MCS303	Software Engineering	150
12.		MCS304	Advanced Java Programming	100
13.		MCS306	INTERNSHIP	100
	Fourth			
14.		MCS401	Unix Internals ,Shell Programming & Linux	100
15.		MCS402	Compiler design	100
16.		MCS403	ASP.NET and C#	100
17.		MCS404	Artificially Intelligence	100
18.		MCS405	Practical A-Unix Internals ,Shell Programming & Linux	50
19.		MCS406	Practical B- ASP.NET and C	50

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Scheme of Exanimation Master of Science (*Computer Science*)Academic Year 2019-20

I Semester

SUBJECT CODE	COMPULSORY/ OPTIONAL	SUBJECT NAME	THEORY						PRACTICAL		TOTAL	
			PAPER		CCE / INTERNAL		TOTAL MARKS		MAX	MIN	MAX	MIN
			MAX	MIN	MAX	MIN	MAX	MIN				
MCS-101	Compulsory	Discrete mathematics structures	70	25	30	11	100	36	0	0	100	36
MCS-102	Compulsory	Programing in "c"	70	25	30	11	100	36	50	18	150	36
MCS-103	Compulsory	Computer organization & architecture	70	25	30	11	100	36	0	0	100	36
MCS-104	Compulsory	Windows & pc soft	70	25	30	11	100	36	50	18	150	36
TOTAL			350		150		500				500	

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Semester-II

SUBJECT CODE	COMPULSORY/ OPTIONAL	SUBJECT NAME	THEORY						PRACTICAL		TOTAL	
			PAPER		CCE / INTERNAL		TOTAL MARKS		MAX	MIN	MAX	MIN
			MAX	MIN	MAX	MIN	MAX	MIN				
MCS201	Compulsory	Data structure and algorithms	70	25	30	11	100	36	50	18	150	36
MCS202	Compulsory	Operating system	70	25	30	11	100	36	0	0	100	36
MCS203	Compulsory	Computer networks	70	25	30	11	100	36	0	0	100	36
MCS204	Compulsory	Java & html	70	25	30	11	100	36	50	18	150	36
TOTAL			350		150		500				500	

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Semester-III

SUBJECT CODE	COMPULSORY/ OPTIONAL	SUBJECT NAME	THEORY						PRACTICAL		TOTAL	
			PAPER		CCE / INTERNAL		TOTAL MARKS		MAX	MIN	MAX	MIN
			MAX	MIN	MAX	MIN	MAX	MIN				
MCS301	COMPULSORY	RDBMS Concepts & Oracle	70	25	30	11	100	36	50	18	150	36
MCS302	COMPULSORY	Multimedia Tools & Applications	70	25	30	11	100	36	0	0	100	36
MCS303	COMPULSORY	Software Engineering	70	25	30	11	100	36	50	18	150	36
MCS304	COMPULSORY	Advanced Java Programming	70	25	30	11	100	36	0	0	100	36
MCS306	COMPULSORY	INTERNSHIP							100	36	100	36
TOTAL			350		150		500		200		600	

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Semester- IV

SUBJECT CODE	COMPULSORY/ OPTIONAL	SUBJECT NAME	THEORY						PRACTICAL		TOTAL	
			PAPER		CCE / INTERNAL		TOTAL MARKS		MAX	MIN	MAX	MIN
			MAX	MIN	MAX	MIN	MAX	MIN				
MCS401	Compulsory	Unix Internals ,Shell Programming & Linux	70	25	30	11	100	36	0	0	100	36
MCS402	Compulsory	Compiler design	70	25	30	11	100	36	0	0	100	36
MCS403	Compulsory	ASP.NET and C#	70	25	30	11	100	36	0	0	100	36
MCS404	Compulsory	Artificially Intelligence	70	25	30	11	100	36	0	0	100	36
MCS405	Compulsory	Practical A- Unix Internals ,Shell Programming & Linux							50	18	50	18
MCS406	Compulsory	Practical B- ASP.NET and C#							50	18	50	18
TOTAL			280		120		400		100		500	

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Course Content:

M.Sc. Computer Science Semester - I

MCS101 DISCRETE MATEMETICS STRUCTURES

MCS101	DISCRETE MATEMETICS STRUCTURES	4L:0T:0P	40 Hrs.	4 Hrs/Week

Objective :

The aim of the discrete mathematics is the study of mathematical structures that are fundamentally discrete rather than continuous. In contrast to real numbers that have the property of varying "smoothly", the objects studied in discrete mathematics – such as integers, graphs, and statements in logic do not vary smoothly in this way, but have distinct, separated values. Discrete mathematics therefore excludes topics in "continuous mathematics" such as calculus and analysis.

Outcomes:

- boolean algebra, the language that simplifies communication in the world of computers.
- formal logic, and will be able to reason/infer interesting outcomes; formally prove validity and soundness of a statement.
- mathematical structures (sets, relations, functions, sequences, series, graphs), and will be able to model real world situations mathematically.
- principles of counting and will be able to grasp patterns in data that follows fixed set of rules.
- growth of functions asymptotically.

Unit –I **6 Hrs**
Mathematical Logics: Introduction statement and notations, connective, normal forms, the theory of inference for the statement calculus, the predicate calculus.

Unit –II **6 Hrs**
Sct Theory: Basic concepts, reresm.tation of discrete structure. relafon 2.: ordering, functiors,nattral ntini)ers, recursion. recursion in mechanical theorem proving.

Unit- III **6 Hrs**
A$_t$igebraic Structures: Introduction, algebraic system, semi groups and moroids, grammars & expressions and their compilation

Unit-IV

Litices and Boolean Algebra: introduction, lattices as partially ordered sets. boolean functie-.. representation and minimization of boPlean algebra.

Unit-V **6 Hrs**

Graph Theory: Introduction, basic concepts, storage represemation and manipulation of gaphs, sirivie precedence grammars.

Text Books:

-Discrete Mathematics- John Truss.
Discrete Mathematical Structures with applications to Computer Science
Oren blay & Manohar(TMH)

Teaching Learning Process

- Each topic to be explained with examples.
- Students to be involved in discussions and encouraged to ask questions.
- Students to be given homework/assignments.
- Students to be encouraged to give short presentations.
- Illustrate the concepts through CAS.

Assessment Methods

- Presentations and participation in discussions.
- Assignments and class tests.
- Mid-term examinations.
- End-term examinations.

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MCS 102 PROGRAMMING IN C

MCS102	PROGRAMMING IN C	4L:0T:0P	40 Hrs.	4 Hrs/Week

Objective

The course is oriented to those who want to advance structured and procedural programming understating and to improve C programming skills. The major objective is to provide students with understanding of code organization and functional hierarchical decomposition with using complex data types.

Learning Outcomes

- Understanding a functional hierarchical code organization.
- Ability to define and manage data structures based on problem subject domain.
- Ability to work with textual information, characters and strings.
- Ability to work with arrays of complex objects.
- Understanding a concept of object thinking within the framework of functional model.
- Understanding a concept of functional hierarchical code organization.
- Understanding a defensive programming concept. Ability to handle possible errors during program execution.

Unit-I **6 Hrs**

Derview of C, Feature of C. Stricture of Program, Variables, ExpressiDn.Identifiers_ Kenvcrds. Data Types, Constants. Opeatars: Arithmetic, Logical, Relating_. Cpriditional and Bit vise .0teral)rs, Precedence and Associativity of Operators, Types Conversion M Expression.

Unit-II **6 Hrs**

Basic Input/Output and Libray Functions Single Character Inpat[1]0.:Apt.r i.e..Getch( ), Getc1-2r( ). Getche( ), Putchar0, Formatted input-Ouut I.e. Print() and Scar.:1;), Libray Functions- CorKep, Mattel:tat:cal and Character Ftmcor.s. Control Structures- if Statemmt, if Else Statement, Nesttng of If.. ..... Else Statement, 'Else If Ladder, ? : Operator. Switch SIVement, Compound Statemerr, Loop Controls- For While, Do-Loops, Break Continue. Exit. Got3 Statement.

Unit-III **6 Hrs**

The Need of a Function, User Defined and Library Fundon, Prototype of a Function, Etnown Arcornent..Return Values aid Nesting of Function: Main( ). Cum:and Line Argtnnent. Reau-s:)n,

Coaling of Functions, Array as Function Argument, Scope and Life of Variables- Local and Glcoal

Unit-IV **6 Hrs**

Arrays- Single and Kiltidirtenonal Arrays,. Array Declaraf.on and Initialization of Arrays. Striig: Declaration. Initialization, Sring Functions. Structure and Lnion-Defining Structure. Declaraion of Ainteture Variable, Accessing Sructure Members, Nested Sructares. Array of Structures, St uct.:re gnment, Structure as Function Argument, Function That Re= Strtxture, Union.

Unit V **6 Hrs**

TheAnds Operators, Pointers Expressions, Poktters VIS Arrays, Pointer to FUrCtiMS, oning Returning Pointers. Dynamic Memory AlloCaon: Introduction, Malloc, Callao, Sized, Free, Functions, Bitwise Optrater..

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MCS103 – COMPUTER ORGANIZATION & ARCHITECTURE

MCS103	COMPUTER ORGANIZATION & ARCHITECTURE	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective:

This course is intended to teach the basics involved in data representation and digital logic circuits used in the computer system. This includes the general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design. This course will also expose students to the basic architecture of processing, memory and i/o organization in a computer system.

Learning Outcomes:

• Identify, understand and apply different number systems and codes.
• Understand the digital representation of data in a computer system.
• Understand the general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design.
• Understand computer arithmetic formulate and solve problems, understand the performance requirements of systems

UNIT-I **6 Hrs**

Digital Leg : Circuits: Digital Computers. Logic Gates, Boolean Algebra. Map Simplification, Combinat:on rcu i ts (i.e. Half-Adde•). Flier-F:ops (i.e. SR FlipFlops, D FEp-f_ops. JK Flip-Flops, T Flip-Flops.. EL-re Triggered Flip-Flops, Executicr. Table), Sequential Circuits.

UNIT-II **6 Hrs**

Data Represe:tation: Data Type (i.e. Number System. Octal and Hexadecimal Number, Decimal Representation and Alphanumeric Representaton). Complements, Fix Point Re7resernation. Floating-Point Represeniztion,

Unit-Ill **6 Hrs**

Basic Comaunr Organization and Design Ins-mu:don Codes. Computer Registers, Computer Instructions, Timing and Control, Instruction Cyc.e, Merncry Reference Instruction, Input-Output and Interrupt, Complete Con-puter Description Desigr. of Basic Computer.

Unit-IV **6 Hrs**

Central Prxessing Unit: Introduction, General Register, Organization, Stock Organization, Instruction Formats, Addressing M Data Reduced Instruction SO_ Computer (RIK!).

Unit-V **6 Hrs**

Input-Output 0.-.ganization: Peripheral Devices (ASCII alphanumeric Characters), Input-Output Interface;,1 Asynchroncus Data Transfer, Modes of Transt'er,?riority Inters t, Direct Access (DMA), Ittp442utput Processor OOP:

Text Book

1. Compw.:r System Design & Architecture- Hearing Jorann(A.W.L)
2. Comptrl.:r System Architecture- M.Mer: Marto, PH.f,,

Teaching Learning Process

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MCS104 – WINDOWS AND PC SOFTWARE

MCS104	**WINDOWS AND PC SOFTWARE**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective :

Making the students understand and learn the basics of computer how to operate it, to make familiar with the part and function of computer , its types , how to use computer in our day to day life , its characteristics, its usage , Limitations and benefits etc.and Understanding Word Processing and Spread Sheet.

Outcomes :

- Describe the usage of computers and why computers are essential components in business and society and education .
- Utilization the Operating system and working Internet Web resources and evaluate on-line e-business system.
- Solve common business problems using appropriate Information Technology applications and systems.
- Describe the working with the MS word and spreadsheet .
- Identify categories of programs, system software and applications. Organize and work with files and folders.
- Describe various types of networks network standards and communication software.

Unit-I **6 Hrs**

Introduction to MS-DOS: History zzad Versions of DOS, Funs:jainenzls of DOS, Booting *Process,* Internal and external DOS commands, creating and executing batch files.

Unit-II **6 Hrs**

Inter2alind External DOS Cornmandss Creating and Executir.g Bat:1 Files. Introduaion for Windows: Features of Windows. Hardware Requir=err fcr Running Version of WiAbliI. New Installation & tjp-gratlation. Origin of Windows, Part of Ikndci,vs Screen, Types and Acosoriess.

Unit-III **6 Hrs**

Introduction to word processing (MS Word) advantages of word processing, introduction & installation editing a file, using paragraph styles newspaper, style column, using macros. Advanced word processing, header & footer, formatting text setting up printer mail merge and other applications Mathematical calculations, table handling..

Unit-IV **6 Hrs**

Introduction to spread sheet (MS Excel) definition and advantages of electronic- worksheet working on spreadsheet, rand and related operations, setting saving and retrieving worksheet file, insetting, cells, printing_ a worksheet, erasing a worksheet, Graphs creation: types of graphs, creating a chart on chart sheet, 3D column charts, moving and changing the size of chart, printing the chart.

Unit-V **6 Hrs**

Introduction of MS Power Point Element of power point , exploring menus of power point, working with dialogue boxes adding file text and art and picture to slide printing sizes, view slides, outline slide sorter notes and sides show view, slide setup formatting and enlarging text slides with graphs.

Text Book

. PC software for windows and made simple by taxali (TMH)

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Assessment Methods

- Presentations and participation in discussions.
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M.Sc. Computer Science Semester - II

MCS201-DATA STRUCTURES AND ALGORITHMS

MCS201	**DATA STRUCTURES AND ALGORITHMS**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective :

- Be familiar with basic techniques of algorithm analysis
- Be familiar with writing recursive methods
- Master the implementation of linked data structures such as linked lists and binary trees

- Be familiar with advanced data structures such as balanced search trees, hash tables, priority queues and the disjoint set union/find data structure
- Be familiar with several sub-quadratic sorting algorithms including quicksort, mergesort and heapsort
- Be familiar with some graph algorithms such as shortest path and minimum spanning tree
- Master the standard data structure library of a major programming language (e.g. java.util in Java 5)
- Master analyzing problems and writing program solutions to problems using the above techniques

Course Outcomes:

CO1: develop programs using basic data structures: sets, lists, stacks, queues, trees, graphs and advanced data structures like balanced trees and skip lists.

CO2: understand the behaviour and application of advanced data structures like Tries, Prefix- and Suffix-trees.

CO3: identify best suited data structure for the problem at hand.

CO4: identify the programming constructs to optimize the performance of the data structure in different scenarios.

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Content :

Unit-I **6 Hrs**

Data Representation: Introduction. Linear List. Formula Based Representation. Linked Indirecting Addressing. Simulating Pointers. A Comparison. Applications. Convex Hull. Arrays And Matrices: Arrays, Matrices, Special Matrices- Sparse Matrices.

Unit-II **6 Hrs**

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.

Unit-III **6 Hrs**

Priority Queues: Introduction, Linear List, Applications. Tournament Trees: Introduction, The ADT Winner Tree, The Class Winner Tree, Loser Tree Applications. Search 'frees: Binary Search Tree, AVL Trees, Red-Black Tree, B- Tree Applications.

Unit-IV **6 Hrs**

Graphs: Definitions, Applications, Properties, The ADTs Graph and Digraph, Representation of Network, Class Definition: Graph lterators, Language Features, Graph Search Methods, Applications. The Greedy Method: Optimization Problem, The Greedy Method, Applications. Divide And Conquer: The Method, Application.

Unit-V **6 Hrs**

Dynamic Programming: The Method, Applications. Backtracking : The Method, Applications. Branch and Bound: The Method, Applications.

Suggested Reference Books:

1.Data Structure by Schaum Series

2.Data Structure by Tanenbaum

3.Data Structure using C++ by YashvantKani

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Assessment Methods

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MCS202 OPERATING SYSTEM

MCS202	**OPERATING SYSTEM**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective :

Making a computer system convenient to use i.e. hides details of Hardware resources from the programmer and provides him with a convenient interface of using computer system. It acts as an intermediary between hardware and software providing a high level interface to low level hardware and making it easier for the software to access the use of those resources. And Managing computer resources. This involves performing such tasks as keeping track of who is using which resource, granting resource requests, accounting for resource usage, and mediating conflicting requests from different programs and users.

Course Outcomes:

CO1: Analyze the structure of OS and basic architectural components involved in OS design

CO2: Analyze and design the applications to run in parallel either using process or thread models of different OS

CO3: Analyze the various device and resource management techniques for timesharing and distributed systems

CO4: Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system

CO5: Interpret the mechanisms adopted for file sharing in distributed Applications CO6: Conceptualize the components involved in designing a contemporary OS.

Content :

Unit — I **6 Hrs**

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.

Unit – II **6 Hrs**

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.

Unit – III **6 Hrs**

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.

Unit – IV **6 Hrs**

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.

Unit – V **6 Hrs**

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.

Textbooks & Reference Books:

1.Abraham Silberschatz and Peter Baer Galvin, ―Operating System Concepts, Addison-Wesley.

2.Andrew Tanenbaum, ―Modern Operating Systems, Prentice Hall.

3. Harvey M. Deitel, ―An introduction to Operating Systems, Addison-Wesley.

5.Milan Milankovic, ―Operating Systems, Concepts and Design, TMH

6.William Stallings, ―Operating Systems: Internal and Design Principles, 3rd Edition, PHI.

7.Gary Nutt, ―Operating Systems, A modern Approach, Third Edition, Addison Wesley, 2004

8.D.M. Dhamdhere, ―Operating Systems: A Concept Based Approach. Second Edition.

Teaching Learning Process

- Each topic to be explained with examples.
- Students to be involved in discussions and encouraged to ask questions.
- Students to be given homework/assignments.
- Students to be encouraged to give short presentations.
- Illustrate the concepts through CAS.

Assessment Methods

- Presentations and participation in discussions.
- Assignments and class tests.
- Mid-term examinations.
- End-term examinations.

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MCS203	**COMPUTER NETWORKS WITH WINDOWS NT**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective:

This course is to provide students with an overview of the concepts and fundamentals of data communication and computer networks. Topics to be covered include: data communication concepts and techniques in a layered network architecture, communications switching and routing, types of communication, network congestion, network topologies, network configuration and management, network model components, layered network models (OSI reference model, TCP/IP networking architecture) and their protocols, various types of networks (LAN, MAN, WAN and Wireless networks) and their protocols.

Outcoomes:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- 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.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Unit — I **6 Hrs**

Analog & digital signal. electronic spectrum, asynchronous & synchronous transmission. Ideal channel , band rate, baseband , broadband channel, multiplexer FDM. TDM , STDM, 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.

Unit – II **6 Hrs**

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 CCITTX.25, CCITT x11 ,token ring, token bus.

Unit – III **6 Hrs**

Fast Ethernet, FDDI token ring, wireless LAN, ATM network, principles of internetworking ,internet working 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.

Unit - IV **6 Hrs**

TELNET, FTP, SMTP, MINE,SNMP,UDP,URL(Unifonn Resource Locater) 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.

Unit – V **6 Hrs**

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.

Teaching Learning Process

- Each topic to be explained with examples.
- Students to be involved in discussions and encouraged to ask questions.
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Assessment Methods

- Presentations and participation in discussions.
- Assignments and class tests.
- Mid-term examinations.
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MCS 204- PROGRAMMING IN JAVA

MCS204	**PROGRAMMING IN JAVA**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective :

Java Programming is intended for software engineers, systems analysts, program managers and user support personnel who wish to learn the Java programming language. Experience with a high level language (C, MATLAB) is a prerequisite.
Knowledge of an object-oriented language (C++, C#, Ada) is helpful but not mandatory.

Outcomes:

- knowledge of the structure and model of the Java programming language, (knowledge)
- use the Java programming language for various programming technologies (understanding)
- develop software in the Java programming language, (application)
- evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
- propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)
- choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)

Unit — I **6 Hrs**

History and design features of JAVA. how Java works. basics of JAVA. Application and Applets. using the tools in JDK, javadoc, Java, jdb etc. Applets, Programming - Creating and executing Java applets. inserting applets in a web page. Java security.

Unit – II **6 Hrs**

Switching technique, message switching. circuit switching. packet switching. virtual circuit. transmission media. OSI reference model. IEEE stand ards. 802.3, 802.4, 802.5 ALOHA, SLOTTED ALLOHA, CSMA. CSMA/CD Bitmap CCITTX.25, CCITT x11 ,token ring, token bus. 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.

Unit – III **6 Hrs**

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.

Unit - IV **6 Hrs**

Multithreading Fundamentals, Java Thread model: priorities, synchronization, messaging, thread class, Runnable interface, Interthread communication, suspending, resuming and stoping threads. Input/Output- Basics - Streams, Byte and Character, Streams, predefined streams, Reading and writing from console and files using standard Java Pkkages Java Package (lang,util, io) Networking-Basics, networking classes and interfaces, using java.net package, doing TCP/IP and Datagram Programming.

Unit – V **6 Hrs**

AWT Classes, Event Handling and swing classes, AWT Programming, Working with windows, Graphics and text, Using AWT controls, Layout managers and menus, Handling image, animation, sound and video. Event Handling-Different mechanism, the Delegation Event Model, Event Classes, Event Listener interfaces, Adapter and Inner Classes. Java swing applet, icons and labels, text fields, buttons, combo boxes, tabbed and scroll panes, trees, tables.

Teaching Learning Process

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- Illustrate the concepts through CAS.

Assessment Methods

- Presentations and participation in discussions.
- Assignments and class tests.
- Mid-term examinations.
- End-term examinations.

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M.Sc. Computer Science Semester - III

MCS301 RDBMS Concept & Oracle

MCS301	**RDBMS Concept & Oracle**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective :

The main objectives of database management system are data availability, data integrity, data security, and data independence. It also refers to how data can be drawn from different sources, different types and different formats.

Course Outcomes:

On completion of this course, the student will be able to:

CO1: understand basic database concepts, including the structure and operation of the relational data model.

CO2: apply logical database design principles, including E-R/EE-R diagrams, conversion of ER diagrams to relations.

CO3: understand the concepts of integrity constraints, relational algebra, relational domain & tuple calculus, data normalization.

CO4: construct simple and moderately advanced database queries using Structured Query Language (SQL).

CO5: understand the concept of a database transaction including concurrency control, backup and recovery, and data object locking.

CO6: design and implement database projects.

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UNIT-I **6 Hrs**

Relational model- storage organizations for relations. Relations, relational algebra, relational calculus, functional dependencies,, multivalued dependencies, and normalization, relational query language functional dependencies, good & bad decomposition, anomalies as a database: a consequences of bad design, universal relation, normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF relational, algebra, structured query language (SQL), using MS access, implementing SQL functions integrity indexing, view using MS access.

UNIT-II **6 Hrs**

Degree of data abstraction, the database life cycle (DBLC): Initial study of the database study of the database, database design, implementation and lading, testing and evaluation operation maintain ACE Evaluation.

UNIT-III **6 Hrs**

Centralized Verses decentralized Design, What is A transaction? Concurrency control (locking Methods, Time stamping method .optimistic method) DDBMS (Distributed database management System) Advantage and Disadvantage .Homogeneous and heterogeneous DBMS, Distributed database transparency Features. Level of Data and Process Distribution: SPSD (Single site Processing .Single site Data), MPSD (Multiple site processing, single site data) MPMD (Multiple site processing, multiple site data)

UNIT-IV **6 Hrs**

System, client / server: Architecture and Implementation issues, client /Server system, what is client/servers? The forces that Drive client/ server.

UNIT-V **6 Hrs**

(DSS) Decision Support system: Operational data vs. decision support Data, The DSS Database Requirements. The data warehouse: The evaluation of data warehouse, rules for data warehouse. Online analytical processing (OLAP) OLAP architecture relational, OLAP and and comparison, data mining.

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REFRENCE BOOKS:

1. An introduction to Database system (sixth edition) by c.j.Date

2. Database system (3rd edition) Galghotiya publication (p) Ltd, by Peter rob garlos coronel

3. An introduction to database systems by Bipin C.Desai

Teaching Learning Process

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- Illustrate the concepts through CAS.

Assessment Methods

- Presentations and participation in discussions.
- Assignments and class tests.
- Mid-term examinations.
- End-term examinations.

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MCS302 Multimedia Tools and Applications

MCS302	**Multimedia Tools and Applications**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective :

To provide students with knowledge in fundamentals of multimedia, e.g. compression standards, data formats, media characteristics, storage and transmission requirements; To provide students with knowledge of a wide spectrum of multimedia information processing techniques;.To train students with the ability to apply the knowledge in multimedia system and application development; To equip students with the ability to appreciate new and innovative solutions of multimedia systems and applications.

Outcomes:

- understand the various characteristics of different media;
- understand the requirements and techniques of processing multimedia;
- generalize the knowledge and skills in problem solving involving multimedia databases.
- conduct case study in multimedia applications.

UNIT-I **6 Hrs**

Multimedia: needs and areas of use, development platforms to multimedia-DOS, windows, Linux identifying multimedia elements-text images, sound Animation and video, making simple multimedia with PowerPoint.

TEXT: concepts of plain & formatted text, RTF & HTML text using common text preparation tools, conservation to and from various text formats, using standard software. Objects linking and embedding concepts, basics of font design, overview of some to editing and designing tools, understanding & using various tools effects.

UNIT-II **6 Hrs**

importance of graphics in multimedia, vector and graphics, images capturing methods - scanner, digital camera and various attributes of images- size , color depth etc. Various important file format- BMP, DIB, EPS, CIF, PEX, PIC, JPG, TGA, PNG, TIF format- their features and limitations, graphics file form conversions, processing images with common software tools such as photo shop, paint shop pro, coral draw etc. Effect in multimedia, analog v/s digital sound. Basics of digital sounds-sampling. Frequency sound Dolby channals sound on PC, sound standards on PC, capturing editing sound on PC, overview and using someone sound record editing software. Overview of various sound file formats on WAV, MP3, MP4, Ogg, Vorbose etc.

Animation basics of animation, principle and use of animation multimedia, effects of resolutions, pixel depth, images size on quality and storage. Overview of 2-D and 3-D animation techniques software -animation pro, 3D studio & paint shop pro animation. Animation some web - features and limitations, creating simple animations for the web using GIF Animator and flash.

UNIT-III **6 Hrs**

Video basics of video- analog and digital video. How to use video on PC. Introduction to graphics acceleration cards, Direct X introduction to OAV/DV and IEEE1394 cards, digitization of analog video to digital video. Interlacing and non-interlacing, brief note on various video standards-NTSC, PAL, SECAM, HDIV, introduction to video capturing media & instrument- video disk DVCAM, camcorder, introduction to digital video compression techniques and various file formats-AVI, MPEG, MOVE Real video.

Brief introduction to video editing and movie making tools-quick time video for windows and adobe premier.

UNIT-IV **6 Hrs**

Authoring tools for CD based multimedia, types of multimedia authoring tools key factor of selecting CD based multimedia authoring tools planning and distribution of a multimedia projects multimedia development team & skills reequipments, stages in designing & producing multimedia products for CD. Testing of product, distribution of multimedia product, various formats of CD and DVDs.

UNIT-V

Multimedia on the web, Bandwidth relationship, broadband technologies, text on the web- dynamic and embedded from technology , Audio on the web- real audio and MP3, MP4 , audio support in HTML graphics -HTML safe color palate, interlaced and non interlaced model, graphics support in HTML, image map video on web- streaming video, real video, MPEG and viral reality on the web.

Teaching Learning Process

- Each topic to be explained with examples.
- Students to be involved in discussions and encouraged to ask questions.
- Students to be given homework/assignments.
- Students to be encouraged to give short presentations.
- Illustrate the concepts through CAS.

Assessment Methods

- Presentations and participation in discussions.
- Assignments and class tests.
- Mid-term examinations.
- End-term examinations.

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MCS303 Software Engineering

MCS303	**Software Engineering**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objectives:

The program's goal is to provide a professionally guided education in software engineering that prepares graduates to transition into a broad range of career options: industry, government, computing graduate program, and professional education.

Outcomes:s

- Be agile software developers with a comprehensive set of skills appropriate to the needs of the dynamic global computing-based society.
- Capable of team and organizational leadership in computing project settings, and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.
- Acquire skills and knowledge to advance their career, including continually upgrading professional, communication, analytic, and technical skills.

UNIT-I **6 Hrs**

The software problem, software engineering problem, software engineering approach-phased development process, project management and matrices. Software processes - processes, projects, components, characteristics. Software development process - process step specification, waterfall model, prototyping, iterative enhancement, spiral model.

UNIT-II **6 Hrs**

Software Requirment analysis and specification- software requirements, problem analysis, requirement specification, validation, metrics.

UNIT-III **6 Hrs**

Planning a software project - cost estimation, project scheduling, staffing and personnel planning, software configuration management plans, quality assurance plans, project monitoring plans, risk management.

UNIT-IV **6 Hrs**

Software design - design principles, module level concepts, design notation and specification, structure design methodology, verification, coding - programming practice, verification and metrics.

UNIT-V **6 Hrs**

Software Testing: Testing fundamentals, functional testing, structural testing, testing process.

Software quality Assurance (SQA): Software reviews, software quality factor, SQA activities, formal technical reviews. SQA approach software configuration management -configuration identification, change control , status Accounting and auditing.

Teaching Learning Process

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Assessment Methods

- Presentations and participation in discussions.
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Keywords: resolvent set and spectrum. Spectral properties of bounded linear operators. Spectral mapping theorem for polyonmials. Spectral radius of a bounded linear operator on a complex banach space. compact linear operators.

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MCS304 Advanced JAVA Programming

MCS304	**Advanced JAVA Programming**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective:

Using Graphics, Animations and Multithreading for designing Simulation and Game based applications. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.Design and develop Web applications,Designing Enterprise based applications by encapsulating an application's business logic. Designing applications using pre-built frameworks.

Learning Outcomes:

- learn the Internet Programming, using Java Applets
- create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings
- apply event handling on AWT and Swing components.
- learn to access database through Java programs, using Java Data Base Connectivity (JDBC)
- create dynamic web pages, using Servlets and JSP.
- make a resusable software component, using Java Bean.
- invoke the remote methods in an application using Remote Method Invocation (RMI)

UNIT-I **6 Hrs**

Java Basic Review: Java streaming-networking - event handling - multi heading - byte code interpretation - customizing application- data structures- collection classes.

UNIT-II **6 Hrs**

Distribution computing: Custom sockets - remote method invocation - activation - object serialization - distributed garbage - collection - RMI - HOP - interface definition language - CORBA - JINI overview.

UNIT-III **6 Hrs**

Java Beans and Swing: Bean concepts - events in bean box - bean customization - persistence - application - deployment using swing - advanced swing techniques - JAR file handling.

UNIT-IV **6 Hrs**

Java Enterprise applications Jni - Services - java server pages - JDBC - session beans - entity beans - programming and deploying enterprise java beans - java transactions RELATED JAVA TECHNIQUES.

UNIT-V **6 Hrs**

Graphics java media frame work - 3 D graphics - internationalization case study - deploying application, E-commerce applications.

REFRENCE BOOKS:

Deitel & Deitel "Java how to program" Prentice Hall. 4th edition 2000.

Gary Cornell and Cay S. Horsmann. "Java Vol 1 and vol 2" Sun Microsystems Press, 1999.

Stephen Asbury, Scott R. Weiner, "Developing Java Enterprise Application" 1998.

Teaching Learning Process

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Assessment Methods

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M.Sc. Computer Science Semester - IV

MCS401 Unix Internals ,Shell Programming & Linux

MCS401	**Unix Internals ,Shell Programming & Linux**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective:

This course is designed as a beginners guide to the Unix operating systems which have long been popular in academic contexts. The course covers the most basic and frequently used Unix / Linux commands and introduces the proper use of UNIX commands, maintain files, manage processes, and code UNIX shell scripts. Most of the built-in shell commands are introduced together with the main program control structures.

Course Outcomes

At the end of the course, students shall be able to :

CO1 : Discuss the architecture, networking and basic commands of UNIX . (Understand)

CO2 : Implement various file processing commands used in UNIX. (Apply)

CO3 : Apply Regular expression to perform pattern matching using utilities like grep,sed and awk. (Apply)

CO4 : Construct various shell scripts for simple applications. (Apply)

CO5 : Explain the process management using system calls UNIX environment .

UNIT-I **6 Hrs**

Introduction to the kernel: Architecture of the Unix , the buffer cache, internal representation of files :inode,accessing blocks , releasing box ,structure of regular file ,conversion of path name to an inode ,inode assignment to new file , allocation disk block .

UNIT-II **6 Hrs**

System calls for the file system: OPEN,READ,WRITE , CLOSE ,PIPES,the pipe system call opening a named pipes , reading and writing pipes ,closing pipes ,DUP,LINK,UNLINK,system calls for TIME and CLOCK.

UNIT-III **6 Hrs**

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.

UNIT –IV **6 Hrs**

Shell programming : study of different types of shell like C Shell ,Bourne shell etc.shell variable shell script ,shell commands. Looping and making choices : for loop, while and until , passing argumrnts to scripts.Programming in different shells.

UNIT –V **6 Hrs**

LINUX file system hierarchy ,editors , common linux command, mounting & Un mounting CD-ROM ,floppy disk ,different access permission , backup & restoring , network congiguration command Ipconfig,hostname ,telnet.

Book:

1. The design of Unix operating system by Maurice Bach
2. Advanced unix by Steaphen prata
3. Linux Bible by Christopher Negus

Teaching Learning Process

- Each topic to be explained with examples.
- Students to be involved in discussions and encouraged to ask questions.
- Students to be given homework/assignments.
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Assessment Methods

- Presentations and participation in discussions.
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- Mid-term examinations.
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MCS402 Compiler design

MCS402	**Compiler design**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objectives:

Compiler Design will teach students about fundamental concepts and techniques used for developing a simple language compiler. Focusing on both the theoretical and practical, we will use a new language to explore the lexical, syntactic and semantic structures of languages in general, and how to use these structures to implement a demonstrative compiler. This will include the examination of intermediate code states, machine code optimization techniques and support for advanced language features.

Outcome-

After completion of this course each student will implement a compiler for a small programming language.

UNIT-I **6 Hrs**

Paper- Automata Introduction to finite automata ,structure representation, automata and complexity, alphabets ,strings ,language informal picture of finite automata ,deterministic finite automata , nondeterministic finite automata ,an application.

UNIT-II **6 Hrs**

Introduction to compiler ,overview of compilation , process, typical compiler stricter ,implementing a compiler . programming language grammars,elements of a formal language grammar, derivation reduction & syntax trees ambiguity regular grammer & regular expression context free grammer.

UNIT-III **6 Hrs**

Scanning & parsing technique – the scanner , regular grammar and Fsa ,top down parsing ,parsing algorithm top down parsing without backtracking , predictive parser , bottom up parsing , parsing ,Lr parsers , shift reduce parsing .

UNIT-IV **6 Hrs**

Symbol table organization , memory allocation – static and dynamic memory allocation, compilation control transfer procedure calls, conditional execution ,iteration control construct.

UNIT-V **6 Hrs**

Lexical syntax errors, semantic , major Issue in optimization , optimizing , transformation ,local optimization , program flow analysis, global optimization .

Books :

1. Introduction to automata theory
2. Compiler construction principles & practice
3. Principles of compiler design

Teaching Learning Process

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Assessment Methods

- Presentations and participation in discussions.
- Assignments and class tests.
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MCS403 ASP.NET and C#

MCS403	ASP.NET and C#	4L:0T:0P	40 Hrs.	4 Hrs/Week

Objective:

This course is designed to provide the knowledge of Dot Net Frameworks along with ASP.Net and C# Learning.

Outcomes:

After completion of the course the student will be able to use the features of Dot Net Framework along with the features of ASP. NET & C#.

UNIT-I **6 Hrs**

Overview of asp.Net framework , understanding asp.Net control ,application web servers, installation of IIS . web forms , web forms control – server control ,client controls , web forms & html ,Adding controls to a web forms ,buttons ,list box etc. Running a web application,creating a multiform web project.

UNIT-II **6 Hrs**

Form validation : clients side validation,server side validation, validation controls : required field comparison range .Colander control , ad rotator control ,internet explorer control . state management view state ,session state application state .

UNIT-III **6 Hrs**

Architecture of ADO.NET ,connected and disconnected database ,create connection using ADO. Net object modal , connection class , command class data adopter class,dataset class.

Display data on data bound controls and data grid . Database accessing on web application : data binding concept with web , creating data grid binding standard web server controls. Display data on web form using data bound controls .

UNIT-IV **6 Hrs**

Writing dataset to XML,reading dataset with XML. Web services : Introduction , remote method call using XML ,SOAP,Web service description language building & consuming a web service , Web application deployments .

UNIT-V **6 Hrs**

Overview of C# , C# and .NET, similarities and differences form JAVA, structure of C# program. Language features :type system, boxing & unboxing ,flow controls ,classes interface ,serialization , delegates ,reflection .

Text & Reference Books :

1. VB.Net Black Book
2. ASP.NET Unleashed
3. C# Programming – Wrox Publication

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Assessment Methods

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MCS404 Artificially Intelligence and expert system

MCS404	**Artificially Intelligence and expert system**	**4L:0T:0P**	**40 Hrs.**	**4 Hrs/Week**

Objective:

The purpose of this course is to impart concepts of Artificial Intelligence and Expert System.

Outcomes:

Describe the modern view of AI as the study of agents that receive percepts from the Environment and perform actions.

Demonstrate awareness of informed search and exploration methods. Explain about AI techniques for knowledge representation, planning and uncertainty Management.

Develop knowledge of decision making and learning methods. CO5: Describe the use of AI to solve English Communication problems.

Explain the concept of Knowledge Representation.

UNIT –I **6 Hrs**

General issues and overview of AI ,AI techniques , AL Problems ,AI Techniques , importance and areas of AI ,problem solving state space Search –DLF,BFS problem characteristics. Heuristics search technique : generate and test Hill climbing , best first search ,problem reduction , constraints satisfaction Crypt arithmetic and problems.

UNIT-II **6 Hrs**

Knowledge representation & mapping , approaches to knowledge representation ,issues in knowledge representation, representing simple facts in logic , representing instance and relationship ,resolution and natural deduction representing kwoledge using rules ,procedural v/s declarative knowledge ,logic programming ,forward v/s background chaining ,matching & control knowledge .

UNIT-III **6 Hrs**

AI programming language prolog- object , relationship , facts rules and variables , prolog syntax and data structures representing objects & relationship by using tree and list, use of cut , I/O of character and structure. symbolic reasoning under uncertainty : introduction to monotonic reasoning , logics for nonmotonic reasoning , implementation issues , implementation DFS & BFS.

UNIT- IV **6 Hrs**

Slot and filler structure : semantic nets, frames ,conceptual dependency, scripts,CYC natural languages and NLP , syntactic processing parsing technique , semantic analysis case grammar augmented transition net discourse & pragmatic processing ,translation .

UNIT – V **6 Hrs**

Definition & characteristics of expert system , representing and using domain knowledge ,expert system shells knowledge engineering , knowledge acquisition , expert system life cycle & expert system tools , MYCIN & DENDRAL examples of expert system.

Teaching Learning Process

- Each topic to be explained with examples.
- Students to be involved in discussions and encouraged to ask questions.
- Students to be given homework/assignments.
- Students to be encouraged to give short presentations.
- Illustrate the concepts through CAS.

Assessment Methods

- Presentations and participation in discussions.
- Assignments and class tests.
- Mid-term examinations.
- End-term examinations.