முதுஅறிவியல் (M.Sc) - கணிப்பொறி அறிவியல்
பட்டப் படிப்பிற்கானப் பாடத்திட்டம் (OBE)

Program Educational Objectives (PEOs)	
The MSc Computer Science program describes accomplishments for graduates to attain within five to seven years after their degree	
PEO1	Employed in educational institutions or in software industry and engaging in understanding and applying new ideas and thoughts as the field evolves.
PEO2	Promotion of inter disciplinary research for inventions/innovations for professional careers to meet the needs of the society.
PEO3	Enhanced to cope up with the changing technologies in frontier of computer science and there area of specialization executed in their research.
PEO4	Incorporating Industry 5.0 Technologies in their career based on industry needs.

Program Specific Outcomes (PSOs)	
After the successful completion of MSc computer science program, the research scholars are expected to	
PSO1	To take up further research degrees in top institutions
PSO2	Get career opportunities as best researchers

Program Outcomes (POs)	
After the successful completion of MSc Computer Science program	
PO1	Gain and apply the knowledge of computer science concepts in appropriate domain of interest
PO2	Ability to analyze the problem, identify the required computing facility and implement it to obtain solutions
PO3	Ability to create a new design for the complex computational problems which meets the specific needs for environmental and societal impact domains
PO4	Students can independently enable to acquire the innovative ideas and solve complex real-time problems by considering professional, ethical, legal and social issues
PO5	Understand and choose the appropriate modern techniques and tools for the complex systems of various domains and understands the advantages and limitations
PO6	Ability to work in a group with an effective rapport building with team members in computer industries to accomplish a common goal
PO7	Ability to communicate effectively in the basis of presenting their research work and gain knowledge on documentation and reports writing in a professional way
PO8	Ability to distinguish the ethical, legal, and societal issues of computing surroundings and will take the responsibility by applying computer skill practices
PO9	Ability to analyze the local and global impact of computing on individuals, organizations and society
PO10	Demonstrate the principles of computer science and apply these in the multidisciplinary environments to manage project.

முதுஅறிவியல் (M.Sc) - கணிப்பொறி அறிவியல்

பருவம் Semester	பா.கு.எண் Course Code	பாடத் தலைப்பு Course Title	கற்பித்தல் அளவைகள் Credits	கற்பித்தல் நேரம் – Per Week		அகமதிப்பெண்	புறமதிப்பெண் External Marks	பொராத்த மதிப்பெண் Total Marks
				Theory	Practicals			
பருவம் 1 Semester 1		Core Paper - 1 Mathematical Foundation for Computer Science	4	4		25	75	100
		Core Paper - 2 Advanced Java Programming	4	4		25	75	100
		Core Paper - 3 Advanced Java Programming Lab	2		4	25	75	100
		Elective - 1: Mobile Communications / Computer Networks	4	4		25	75	100
		Elective – 2: Swayam Course – 1 & Swayam Course -2	4		2	25	75	100
பருவம் 2 Semester 2		Core Paper - 4 Distributed Operating System	4	4		25	75	100
		Core Paper - 5 Database Administration and Management	4	4		25	75	100

Semester		Course						
		Core Paper - 6 Relational Database Systems - Lab	2		4	25	75	100
		Elective – 3 Software Engineering	4	4		25	75	100
		Elective – 4: Swayam Course – 3 & Swayam Course -4	4		2	25	75	100
பருவம் 3 Semester 3		Core Paper - 7 Grid and Cloud Computing	4	4		25	75	100
		Core Paper - 8 Web Technologies	4	4		25	75	100
		Core Paper - 9 Web Technologies-Lab	2		4	25	75	100
		Elective - 5 **Pattern Recognition and Neural Networks**	4	4		25	75	100
		Elective – 6: Swayam Course – 5 & Swayam Course- 6	4		2	25	75	100

Semester		Course					
பருவம் 4 Semester 4		Core Paper - 10 Data Mining Techniques and Tools	4	4	25	75	100
		Core Paper - 11 C # and .Net framework	4	4	25	75	100

	Course	Credit			Int	Ext	Total
	Core Paper - 12 C # and .Net framework-Lab	2		4	25	75	100
	Elective - 7 **Natural Language Processing**	4	4		25	75	100
	Elective - 8 Swayam Course –7 & Swayam Course - 8	4		2	25	75	100
	திட்ட ஆய்வேடு மற்றும் வாய்மொழித் தேர்வு (Project Work and Viva Voce)	8		8	25	75	100
		80	80 hrs				2100

> Study Web of Active Learning by Young and Aspiring Minds (SWAYAM) Course.
> Credits earned through Study Web of Active Learning by Young and Aspiring Minds (SWAYAM) Courses shall be transferred in the credit plan of the program as extra credits
> Out of the 4 semesters, student has to select SWAYAM course as mandatory in any one of the semester.
> Eligibility to enrol this course is B.Sc Computer science or BCA.
> Minimum pass mark is 10 in Internals and 40 in Externals.

பாடத்திட்டக் குழு   துறைத்தலைவர்   பாடத்திட்ட வல்லுநர்கள்

உறுப்பினர்-1   1.

(முனைவர் அ.செந்தில் குமார்)   2.

பாடத்திட்டக் குழு   3.

உறுப்பினர் – 2 (முனைவர் அ.பா.கார்த்திக் ஆனந்த் பாபு)

Course Code	22CS-SUB-1	MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE	L	T	P	C
Core/Elective/Supportive	CORE		4	0	0	4
Pre-requisite		Basic, Logic Statements and Automata, COMBINATORICS, ALGEBRAIC STRUCTURES, RECURSIVE FUNCTIONS	Syllabus Version	2022-2023		
Course Objectives	1. To teach the students understand Logic Statements and Automata 2. To develop Review of Permutation and Combination.					

Expected Course Outcomes	After the successful completion of this course, the student will be able to:	
	1. To Apply the concepts of Logic Statements and Automata	K3
	2. Analyse the Mathematical Induction	K4
	3. To find out the Semi group	K1
	4. Understand the concepts of recursive functions	K2
	5. To understand the Lattices concepts	K2
	6. To remember the concepts of Boolean algebra	K1

K1 – Remember, K2 – Understand, K3 – Apply, K4 –Analyse, K5 – Evaluate, K6 – Create

Unit - 1	Logic Statements and Automata	15 Hrs
	LOGIC Statements – Connectives – Truth Tables – Normal forms – Predicate calculus – Inference – Theory for Statement Calculus and Predicate Calculus – automata theorem proving.	
Unit-2	COMBINATORICS	15hrs
	Review of Permutation and Combination - Mathematical Induction - Pigeon hole principle - Principle of Inclusion and Exclusion - generating function - Recurrence relations.	
Unit – 3	ALGEBRAIC STRUCTURES:	15 hrs
	Semi group - Monoid - Groups(Definition and Examples only) Cyclic group - Permutation group(Sn and Dn) - Substructures - Homomorphism of semi group, monoid and groups - Cosets and Lagrange Theorem – Normal Subgroups - Rings and Fields (Definition and examples only)	
Unit-4	RECURSIVE FUNCTIONS	15 hrs
	Recursive functions - Primitive recursive functions - computable and non - computable functions.	

Unit - 5	LATTICES	10 hrs
	Partial order relation, poset - Lattices, Hasse diagram - Boolean algebra.	
Total Lecture Hours		**70 Hrs**
Text Books	1. Gersting J.L., Mathematical Structure for Computer Science, 3rd Edition W.H. Freeman and Co., 1993.	
Reference Books	1. 1. Lidl and pitz., Applied Abstract Algebra, Springer - Verlag, New York, 1984. 2. K.H. Rosen, Discrete Mathematics and its Applications, Mc-Graw Hill Book Company, 1999.	
Related Online Contents	http://www.mhhe.com//rosen.	
Course Designed By	*Dr K. RAVIKUMAR*	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	L	L	S	M	S
CO2	S	S	L	L	S	S	S	S	M	S
C03	S	S	S	M	L	S	S	S	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	S	M	L	S	S	S	S	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L – Low

Course Code	22CS-SUB-2	ADVANCED JAVA PROGRAMMING	L	T	P	C
Core / Elective / Supportive		CORE	4	0	0	4
Pre-requisite		Basic, Object Oriented Concepts, Syntax, Semantics of programming	Syllabus Version	2022-2023		
Course Objectives	1. To teach the students understand java and its advanced concepts 2. To develop Java based applications by applying these advanced concepts of Java and to implement the same in computer systems.					

Expected Course Outcomes	After the successful completion of this course, the student will be able to:	
	7. Understand the concepts of Threading process execution in java	K2
	8. Analyse the Networking classes and Events Handling in java	K4
	9. Remember the classes of Window creation and its utilities	K1
	10. Understand the concepts of Images, animation, database concepts applicability in java	K2
	11. To understand and remember the package classes and Java Servlets, Enterprise Java Bean[EJB] in java	K2/K1

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Unit - 1	Multithreading, Networking and Event Handling	15 Hrs
	Multithreading: Java Thread Model-Main Thread-Creating a Thread-Creating Multiple Threads Using is Alive() and join().Synchronization- Interthread Communication-Suspending, Resuming and Stopping Threads-Using Multithreading. I/O Exploring java.io: Java I/O classes and interfaces-File-Closable and Flushable Interfaces- The stream classes-Byte Streams-Character Streams-Console Class-Using Stream I/O-Serialization. Networking: Basics-Networking classes and interface-Inet Address-Inet4 Address and Inet6Address.-TCP/IP Client Socket-URL-URL connection-http URL Connection-URI class-Cookies-TCP/IP server socket-Datagrams. Event Handling: Event Handling mechanisms-Delegation Event model-Event classes-Source of Events-Event Listener Interfaces-Using delegation Event model-Adapter classes-Inner classes.	
Unit - 2	Abstract Window Tool Kit, Layouts and Menus	15hrs
	AWT: AWT classes-Window Fundamentals-Working with frame windows-Creating a frame window in an applet-Creating a windowed program-Displaying information within a window. Working with Graphics, colour and font-Managing text output using font metrics. AWT Controls: Control Fundamentals, Labels, Using Buttons, Checkboxes, Choice Control, List ,Scroll Bars and Text Field, AWT Layouts and Menus : Understanding Layout Managers- Menu Bars	

	and Menus-Dialog Boxes-File Dialog-Handling Events.	
Unit – 3	Images, Animation, Audio Formats, Java Swing and Java Database Connectivity (JDBC) Concepts	15 hrs
	Images, Animation and Audio: File Format-Image fundamentals-Image Observer-Double Buffering-Media Tracker-Image Producer , Consumer and Filter-Cell Animation. Swing: Features of Swing-MVC Connection-Components and containers-Swing packages-Event handling-Creating a swing-Exploring swing. JDBC: Introduction-Relational Databases-SQL Manipulating Database with JDBC.	
Unit - 4	Java Servlets and Java Server Pages(JSP)	15 hrs
	Java Servlets: Life Cycle-Simple Servlet - Servlet API-javax.servlet package-javax.servlet.http Package-Handling HTTP requests and responses-cookies-session tracking. Java Server Pages: Overview-Implicit Objects-Scripting- Standard actions- Directives. Remote Method Invocation-Client/Server Application using RMI.	
Unit - 5	Enterprise Java Bean Architecture and its Session Concepts[EJB]	10 hrs
	EJB Architecture-overview-Building and Deploying EJB-Roles in EJB-Design and Implementation-EJB Session Bean: Constraints-Life Cycle-Stateful Session Bean-Stateless Session Bean- EJB Entity Bean: Bean managed versus Container managed persistence - Life Cycle-Deployment.	
Total Lecture Hours		**70 Hrs**
Text Books	1. Herbert Schildt, "The Complete Reference – JAVA," 7th Edition, TMH,2012 2. Deitel H.M. & Deitel P.J, "Java: How To Program," Prentice-Hall of India, 5th Edition, 2003. 3. Tom Valesky, "Enterprise JavaBeans – Developing component based Distributed Applications," Pearson 2000.	
Reference Books	1. C.Muthu, "Programming with Java," Vijay Nicole Imprints Private Ltd., 2004. 2. Cay.S. Horstmann, Gary Cornel, "Core Java 2 – Vol. II-Advanced Features," Pearson Education, 2004. 3. S.Gokila, "Advanced JAVA Programming," Vijay Nicole Imprints Private Ltd., 2014	
Related Online Contents	1.https://www.tutorialspoint.com/java 2.https://www.javatpoint.com/java-tutorial 3. https://www.javatpoint.com/java-tutorial	
Course Designed By	***Dr A.SENTHIL KUMAR***	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	S	M	S
CO2	S	M	L	L	S	S	S	S	M	S
C03	S	S	S	M	L	S	S	S	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L - Low

Course Code	22CS-SUB-2	ADVANCED JAVA PROGRAMMING LAB	L	T	P	C
Core / Elective / Supportive	CORE		0	0	4	4
Pre-requisite		Basic, Object Oriented Concepts, Syntax, Semantics of programming	Syllabus Version	2022-2023		
Course Objectives	1. To teach the students understand java syntax, its compilation and execution statements and commands 2. To develop Java based programs based on algorithmic approaches					
Expected Course Outcomes	After the successful completion of this course, the student will be able to:					
	1. Understand the programming syntax and its executable procedures			K2		
	2. Remember the syntax and to start developing the laboratory cycle programs			K1		
	3. Applying the concept learned in theory class by implementing the programs			K3		
	4. Evaluate the program control structures			K5		
	5. Apply all the syntax and semantic theme in the practical's.			K3		
	6. Create own application of java with its advanced programming methods.			K6		
K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create						
Program 1	Implementation of Multi-threading and Exception handling concepts			3 hrs		
Program 2	Write a program to read, write and copy a file using byte streams.			3 hrs		
Program 3	Write a program to read, write and copy a file using character streams.			3 hrs		
Program 4	Develop a programs using AWT to display the personal detail of an employee.			3 hrs		
Program 5	Develop a banking system using Swing.			3 hrs		
Program 6	Write a program to handle Mouse and Key events..			3 hrs		

Program 7	Implement UDP protocol for message communication.	3 hrs
Program 8	Using JDBC develop a student information system.	3 hrs
Program 9	Implement client/server communication using servlets.	3 hrs
Program 10	Develop a web page using JSP.	3 hrs
Program 11	Implementation of RMI.	3 hrs
Program 12	Write a program to read, write and copy a file using character streams.	3 hrs
Total Practical Hours		**36 Hrs**
Text Books	1. Herbert Schildt, "The Complete Reference – JAVA," 7th Edition, TMH,2012.	
Related Online Contents	1.https://www.tutorialspoint.com/java 2.https://www.javatpoint.com/java-tutorial 3.https://www.javatpoint.com/java-tutorial	
Course Designed By	**Dr A.SENTHIL KUMAR**	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	L	S	S	M	S	S	S	S
CO2	S	S	M	M	L	M	L	M	L	S
C03	S	M	S	S	M	L	M	L	M	M
C04	S	S	M	M	M	M	M	S	M	S
C05	M	S	S	S	S	S	S	M	M	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L - Low

Elective – 1 – Mobile Communications

Course Code		MOBILE COMMUNICATIONS	L	T	P	C
Core / Elective / Supportive		CORE	4	0	0	4
Pre-requisite		NETWORKS	Syllabus Version		2022-2023	
Course Objectives	On taking this course the student will be able to explain the basics of Mobile communication systems					
Expected Course Outcomes	At the end of the Course, the Student will be able to :					
	1. Knowledge of Wireless Networking concepts. Analyse and compare the various cellular systems and its components					K1
	2. Analyse various wireless techniques in wireless LAN and implement it into user environment					K4
	3. Analyse the concepts of Telecommunication networks					K4
	4. Demonstrate the working of mobile systems.					K3
	5. Analyse and compare the various mobile systems and its components.					K5
K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create						

Unit I

Introduction: Applications-Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons

Unit II

Telecommunications System: Telecommunication System– GSM – Architecture – Protocols – Hand over - Security – UMTS and IMT 2000 – UMTS System Architecture-UTRAN-Core Network-Handover- Satellite System

Unit III

Wireless LAN : IEEE S02.11 –System Architecture- Protocol ArchitectureMedium Access Control Layer-MAC Frame-MAC Management—RoamingBluetooth:Architecture-Link Manager Protocol- Security -and Link Management.

Unit IV

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

Unit V

WIRELESS APPLICATION PROTOCOL: Wireless ApplicationProtocol (WAP) – Architecture – XML – WML Script – Applications

Text Books

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

References

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993. 2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003. 3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	M	S	S
CO2	S	S	S	L	S	M	S	S	M	L
C03	S	S	L	L	S	S	S	M	S	M
C04	S	L	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	M	S	S	M

COS- Course Outcomes, PO- Programme Outcomes, S- Strong, M – Medium, L - Low

Course Code	22CS-SUB-9	COMPUTER NETWORKS	L	T	P	C
Core / Elective / Supportive		Elective - 1	4	0	0	4
Pre-requisite		Basics of Computer Networks, The OSI Reference model	Syllabus Version	2022-2023		
Course Objectives	1. To teach the students understand Networking concepts and its applications 2. To create an exposure about the importance of Network based applications with its usage.					

Expected Course Outcomes	After the successful completion of this course, the student will be able to:	
	1. To understand the concepts of Networking Applications	K2
	2. To apply and remember the datalink layer design issues.	K1/K3
	3. To understand concept of Network Layer Design Issues	K2
	4. To remember and applying Transport Layer	K1
	5. To Analyse Concept of Application Layer	K4

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Unit - 1	INTRODUCTION:	15 Hrs
	Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, frame relay. THE PHYSICAL LAYER: Theoretical basis for communication, guided transmission media, wireless transmission, the public switched telephone networks, mobile telephone system	
Unit - 2	THE DATA LINK LAYER:	15hrs
	Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example data link protocols - HDLC, the data link layer in the internet. THE MEDIUM ACCESS SUBLAYER: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wireless LAN, Broadband Wireless, Bluetooth.	
Unit – 3	THE NETWORK LAYER:	15 hrs
	Network layer design issues, routing algorithms, Congestion control algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service..	

Unit - 4	THE TRANSPORT LAYER:	15 hrs
	Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP.	
Unit–5	THE APPLICATION LAYER:	10 hrs
	Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http. APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.	
Total Lecture Hours		**70 Hrs**
Text Books	1. 1 A. S. Tanenbaum (2003), Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India.	
Reference Books	1. 1. Behrouz A. Forouzan (2006), Data communication and Networking, 4th Edition, Mc Graw-Hill, India. 2. Kurose, Ross (2010), Computer Networking: A top down approach, Pearson Education, India.	
Course Designed By	*Dr. K. RAVIKUMAR*	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	S	M	S
CO2	S	M	L	L	S	S	S	S	M	S
C03	S	S	S	M	L	S	S	S	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L - Low

Course Code	22CS-SUB-4	Distributed Operating System	L		T	P	C
Core / Elective / Supportive	CORE		4		0	0	4
Pre-requisite		Basic, Distributed Operating System, Distributed File System	Syllabus Version		2022-2023		
Course Objectives		1.To teach the students understand Distributed Operating System 2. To teach the students about Distributed Memory concepts					

Expected Course Outcomes	After the successful completion of this course, the student will be able to:	K2
	1. Understand the concepts of Distributed Operating System	
	2. Understand the Group Communication	K2
	3. Remember the Distributed Shard Memory	K1
	4. Understand the concepts File Models	K2
	5. To understand and remember Potential Attacks to Computer System	K1 /K2

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Unit - 1	Fundamentals:	15 Hrs
	What is Distributed Operating System – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity – What is a Distributed Computing System – Issues in Designing Distributed Computing System – Introduction to Distributed Computing Environment. Introduction to Computer Networks – Network types – LAN –WAN – Communication protocols – Internetworking – ATM Technology	
Unit - 2	Message Passing:	15hrs
	Introduction – Desirable features – Issues in PC Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding – Process Addressing – Failure Handling – Group Communication	
Unit – 3	Distributed Shared Memory	15 hrs
	Distributed Shard Memory: Introduction – General Architecture of DSM system – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory –Replacement Strategy – Thrasing – Heterogeneous DSM – Advantages Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithm	
Unit - 4	Distributed File System:	15 hrs
	Introduction – Desirable features – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles	

Unit - 5	Security:	10 hrs
	Introduction – Potential Attacks to Computer System – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles	
	Total Lecture Hours	70 Hrs
Text Books	Distributed Operating Systems – Concepts and Design, Pradeep K Sinha, PHI, 2003.	
Reference Books	Distributed Operating Systems 1e, Andrew S Tanenbaum, PHI.	
Course Designed By	*Dr K. RAVIKUMAR*	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	S	M	S
CO2	S	M	L	L	S	S	S	S	M	S
C03	S	S	S	M	L	S	S	S	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L – Low

Core Paper – 5 - Database Administration and Management

Course Code		DATABASE ADMINISTRATION AND MANAGEMENT	L	T	P	C
Core / Elective / Supportive		CORE	4	0	0	4
Pre-requisite		Nil	Syllabus Version	2022-2023		
Course Objectives	Student will be able to understand the role of a database management system in an organization and the basic concepts and terminology related to DBMS.					
Expected Course Outcomes	At the end of the Course, the Student will be able to :					
	1. Describe the characteristics of Database Management Systems and about the concepts and models of database.			K1		
	2. Design ER-models to represent simple database application scenarios.			K2		
	3. Convert the ER-model to relational tables, populate relational database. Improve the database design by normalization			K6		
	4. Describe the fundamental elements of Transaction management.			K3		
	5. Get the knowledge of Data Warehousing And Distributed DBMS			K4		
K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create						

Unit – I

Introduction: Purpose of Database Systems - View of Data - Database Languages - Data Storage and Querying -Transaction Management – Storage Management –Database Users and Administrators– Relational Databases: Introduction to the Relational Model - Structure of Relational Databases-Database Schema - Keys-Schema Diagrams -Relational Query Languages - Relational Operations.

Unit – II

Introduction to SQL: Overview of the SQL -Data Definition – Basic Structure of SQL Queries – Set operations - Null values-Aggregate Functions - Modification of the Database -

Integrity Constraints – Views – SQL Data Types and Schemas. Advanced SQL - Accessing SQL From a Programming Language – Triggers - Advanced Aggregation Features-OLAP.

Unit - III

Transaction Management : Overview of Transaction Management- The ACID PropertiesTransactions and Schedules- Concurrent Execution of Transactions - Lock-Based Concurrency Control - Performance of Locking - Introduction to Crash Recovery. Concurrency Control: 2PL, Serializability, and Recoverability - Introduction to Lock Management - Lock Conversions - Dealing With Deadlocks - Specialized Locking Techniques - Concurrency Control without Locking.

Unit – IV

Distributed Database Management Systems: The Evolution of Distributed Database Management Systems - DDBMS Advantages and Disadvantages - Distributed Processing and Databases - Characteristics of Distributed DBMS - DDBMS Components - Levels of Data and Process Distribution - Distribution Transparency - Transaction Transparency - Distributed Database Design - Client/Server vs. DDBMS.

Unit - V

Business Intelligence and Data Warehouses: The Need for Data Analysis - Business Intelligence and Architecture - Data Warehouse- OLAP - Star Schemas - Implementing a Data Warehouse - SQL Extensions for OLAP. Database Connectivity and Web Technologies: Database Connectivity - Internet Databases - Extensible Markup Language (XML).

REFERENCES:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database SystemConcepts", Fifth Edition, McGraw Hill, 2006.
2. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, Third Edition 2004.
3. Peter Rob, Carlos Coronel, "Database System Concepts", Cengage Learning, 2008.

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	M	M	S
CO2	S	M	L	L	S	M	M	S	M	S
C03	S	S	S	L	L	S	S	M	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes, PO- Programme Outcomes, S- Strong, M – Medium, L - Low

Course Code		PL/SQL Programming	L	T	P	C
Core / Elective / Supportive		CORE	0	0	3	3
Pre-requisite		DBMS	Syllabus Version		2022-2023	
Course Objectives	Student will be able to apply database management system in an organization					
Expected Course Outcomes	At the end of the Course, the Student will be able to :					
	1. Apply the basic concepts of Database Systems and Applications.					K3
	2. Use the basics of SQL and construct queries using SQL in database creation and interaction.					K1
	3. Design a commercial relational database system by writing SQL using the system.					K6
	4. Analyze and write stored procedure queries					K4
	5. Evaluate role of cursor and loops in database					K5
K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create						

1. Simple queries: selection, projection, sorting on a simple table

2. Small-large number of attributes

3. Simple-complex conditions (AND, OR, NOT), Partial Matching operators ASC-DESC ordering combinations, Checking for Nulls.

4. Multi-table queries (JOIN OPERATIONS), Simple joins (no INNER JOIN), Aliasing tables – Full/Partial name qualification,. Inner-joins (two and more (different) tables)

5. Inner-recursive-joins (joining to itself), Outer-joins (restrictions as part of the WHERE and ON clauses), Using where & having clause

6. PL/SQL Programming I

7. Programs using named and unnamed blocks

8. ii. Programs using Cursors, Cursor loops and records

9. PL/SQL Programming II

10. i. Creating stored procedures, functions and packages.

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	M	M	S
CO2	S	M	L	L	S	M	M	S	M	S
C03	S	S	S	L	L	S	S	M	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes, PO- Programme Outcomes, S- Strong, M – Medium, L - Low

Course Code	22CS-ELEC-3	SOFTWARE ENGINEERING	L	T	P	C
Core / Elective / Supportive		Elective	4	0	0	4
Pre-requisite		Basics of Software, Development approaches, Data input methods, functional, procedural programming.	Syllabus Version	2022-2023		

Course Objectives	1. To teach the students understand software engineering concepts and its applications. 2. To create an exposure about the importance of software development analysis methods design and implementation stages in a coherent order.	
Expected Course Outcomes	After the successful completion of this course, the student will be able to: 1. To understand the concepts of software engineering and its life cycle models.	K2
	2. To understand and remember the steps of software engineering and studying the cohesion and coupling methods in software design.	K1/K2
	3. To understand the object oriented concepts and remembering it in software engineering approaches.	K1/K2
	4. To understand the testing processes in software and remembering the basic software development stages.	K2/K1
	5. To understand the software project management techniques with its development methods.	K2

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Unit - 1	**Introduction to software engineering and its life cycle models.**	15 Hrs
	Introduction. Life cycle models, Requirements analysis and specification, Formal requirements specification.	
Unit - 2	**Design steps, cohesion and coupling methods with its analysis.**	15hrs
	Fundamental issues in software design: goodness of design, cohesion, and coupling. Function-oriented design: structured analysis and design.	
Unit – 3	**Object oriented concepts and UML design process**	15 hrs
	Overview of object-oriented concepts. Unified Modeling Language (UML). Unified design process. User interface design. Coding standards and guidelines. Code walkthrough and reviews.	

Unit - 4	**Testing stages with its quality methods.**	15 hrs
	Unit testing. Black box and white box testing. Integration and system testing. Software quality and reliability. SEI CMM and ISO 9001. PSP and Six Sigma. Clean room technique.	
Unit– 5	**Software project management techniques.**	10 hrs
	Software project management. Configuration management. Software maintenance issues and techniques. Software reuse. Client-server software development.	
Total Lecture Hours		**70 Hrs**
Text Books	1. Rajib Mall, "Fundamentals of Software Engineering, Prentice Hall India., latest edition". 2. Pankaj Jalote, "An integrated approach to Software Engineering, Springer/ Narosa. Latest edition".	
Reference Books	1. Roger S. Pressman, Software Engineering: A practitioner's approach, McGraw Hill. Ian Sommerville, Software Engineering, Addison-Wesley., latest edition.	
Related Online Contents	1. https://www.vssut.ac.in/lecture_notes/lecture1428551142.pdf 2. https://www.slideshare.net/software-engineering-book/ch1-introduction-42645973.	
Course Designed By	Dr K. Ravikumar	

 Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	S	M	S
CO2	S	M	L	L	S	S	S	S	M	S
C03	S	S	S	M	L	S	S	S	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L – Low

Core Paper – 7 - Grid and Cloud Computing

Course Code		GRID AND CLOUD COMPUTING	L	T	P	C
Core / Elective / Supportive	CORE		4	0	0	4
Pre-requisite	C / C++ / JAVA		Syllabus Version		2022-2023	
Course Objectives	On taking this course the student will be able to assess fundamental ideas behind grid and cloud computing, the evolution of the paradigm, its applicability and benefits. Public, private and hybrid cloud deployment models and various cloud computing services such as Saas, Paas and Iaas.					
Expected Course Outcomes	At the end of the Course, the Student will be able to :					
	12. Articulate the main concepts, key technologies, strengths, and limitations, the current and future challenges of cloud computing.		**K2**			
	13. Analyse various cloud deployment models and their issues on the cloud.		**K4**			
	14. Identify the architecture and infrastructure of various cloud services including SaaS, PaaS, and IaaS and apply them to develop a applications.		**K2**			
	15. Design and develop various algorithms using tools for virtualization in cloud computing and acquire the knowledge of doing research		**K6**			
	16. Develop and deploy cloud applications using modern tools and techniques based on the organizational needs.		**K3**			
K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create						

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	S	M	S	S
CO2	S	M	S	L	S	M	M	S	M	L
C03	S	S	S	L	S	S	S	M	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes, PO- Programme Outcomes, S- Strong, M – Medium, L - Low

UNIT I INTRODUCTION

Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers - Grid computing Infrastructures – cloud computing - service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

UNIT II GRID SERVICES

Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services.

UNIT III VIRTUALIZATION

Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

UNIT IV PROGRAMMING MODEL

Open source grid middleware packages – Globus Toolkit (GT4) Architecture , Configuration – Usage of Globus – Main components and Programming model - Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

UNIT V SECURITY

Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TEXT BOOK(S):

T1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012

REFERENCES:

1. Jason Venner, "Pro Hadoop- Build Scalable, Distributed Applications in the Cloud", A Press, 2009

2. Tom White, "Hadoop The Definitive Guide", First Edition. O"Reilly, 2009.

3. Bart Jacob (Editor), "Introduction to Grid Computing", IBM Red Books, Vervante, 2005

4. Ian Foster, Carl Kesselman, "The Grid: Blueprint for a New Computing Infrastructure", 2nd Edition, Morgan Kaufmann.

5. Frederic Magoules and Jie Pan, "Introduction to Grid Computing" CRC Press, 2009.

6. Daniel Minoli, "A Networking Approach to Grid Computing", John Wiley Publication, 2005.

7. Barry Wilkinson, "Grid Computing: Techniques and Applications", Chapman and Hall, CRC, Taylor and Francis Group, 2010

Course Code	22CS-SUB-12	WEB TECHNOLOGIES	L	T	P	C
Core / Elective / Supportive	CORE		4	0	0	4
Pre-requisite		Basics of Web Technologies, Internet, HTML, XML, Domains	Syllabus Version	2022-2023		
Course Objectives	**1. To teach the students understand web technologies concepts and its applications** **2. To create an exposure about the importance of web based applications with its usage.**					
Expected Course Outcomes	After the successful completion of this course, the student will be able to:			K2		
	1. To understand the concepts of web technologies and the internet domains.					
	2. To understand and remember the java script concepts and its syntax.			K1/K2		
	3. To understand the xml, html and analysing them with applications.			K2/K4		
	4. To remember and applying the idea of web technologies with java script options.			K2		
	5. To understand Active Server Pages [ASPs] and Java Server Pages [JSP].			K2		

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Unit - 1	Internet Basics and Introduction to HTML	15 Hrs
	Internet Basics: Basic Concepts – Internet Domains – IP Address – TCP/IP Protocol – The WWW – The Telnet — Introduction to HTML: Web server - Web client / browser - Tags – Text Formatting – Lists – Tables – Linking Documents - Frames.	
Unit - 2	JavaScript and its functions	15hrs
	JavaScript: JavaScript in Web Pages – The Advantages of JavaScript – Writing JavaScript into HTML – Syntax – Operators and Expressions – Constructs and conditional checking – Functions – Placing text in a browser – Dialog Boxes – Form object's methods – Built in objects – user defined objects.	
Unit – 3	Extendable Mark-up Language[XML] and its various Attributes	15 hrs
	XML: Comparison with HTML – DTD – XML elements – Content creation – Attributes –Entities – XSL – XLINK – XPATH – XPOINTER – Namespaces – Applications – integrating XML with other applications.	
Unit - 4	Java Server Pages[JSP] and its library directives	15 hrs
	JSP Fundamentals: Basics – Directive basics – Page directive – The tag library directive – The include directive – JSP Standard Actions – Java Beans – Error Handling.	

Unit– 5	Active Server Pages [ASP] and MS – Access Database and SQL Server	10 hrs
	ASP: Introduction to ASP – Objects – Components – Working with HTML forms – Connecting to Microsoft SQL Server & MS–Access Database – SQL statements with connection object – Working with record sets.	
Total Lecture Hours		**70 Hrs**
Text Books	1. "Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI", Ivan Bayross, BPB Publication. UNIT I & II 2. "XML Bible", Elliotte Rusty Harold, 2nd Edition, Wrox Publication. UNIT III	
Reference Books	1. "Beginning Java Server Pages", Vivek Chopra, Sing Li, Rupert Jones, Jon Eaves, John T. Bell, Wrox Publications. UNIT IV 2. "Practical ASP", Ivan Bayross, BPB Publication. UNIT V	
Related Online Contents	3. https://www.slideshare.net/SelvinJosyBaiSomu/web-technology 4. https://www.powershow.com/viewfl/4cba7czRjM/Web_Technology_powerpoint_ppt_presentation	
Course Designed By	*Dr A.SENTHIL KUMAR*	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	S	M	S
CO2	S	M	L	L	S	S	S	S	M	S
C03	S	S	S	M	L	S	S	S	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L - Low

Course Code	22CS-SUB-13	WEB TECHNOLOGIES LAB	L	T	P	C
Core / Elective / Supportive		CORE	0	0	4	4
Pre-requisite		Internet, JavaScript, extendable Mark-up Language [XML], JAVA Server Pages[JSP], Active Server Pages[ASP]	Syllabus Version	2022-2023		
Course Objectives	1. **To teach the students understand the xml, java script, java server pages [JSP], Active Server Pages [ASP] with its syntax, compilation, execution statements and its commands.** 2. **To develop Java based programs based on algorithmic approaches.**					
Expected Course Outcomes	**After the successful completion of this course, the student will be able to:**					
	1. **Understand the programming syntax and its executable procedures**					**K2**
	2. **Remember the syntax and to start developing the laboratory cycle programs**					**K1**
	3. **Applying the concept learned in theory class by implementing the programs**					**K3**
	4. **Evaluate the program control structures**					**K5**
	5. **Apply all the syntax and semantic theme in the practical's.**					**K3**
	6. **Create own application of xml, JavaScript, java server pages [JSP], Active Server Pages [ASP] with its advanced programming methods.**					**K6**
K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create						
Program 1	Write a XML program for job listing in HTML.					3 hrs
Program 2	Write a JavaScript code block, which checks the contents entered in a form's text element. If the text entered is in the lower case, convert to upper case.					3 hrs
Program 3	Write a JavaScript code block, which validates a username and password. a) If either the name or password field is not entered display an error message.					3 hrs
Program 4	Write a JavaScript code to display the current date and time in a browser.					3 hrs
Program 5	Write a JSP Program for user authentication.					3 hrs

Program 6	Write a JSP Program for a simple shopping cart.	3 hrs
Program 7	Write a JSP Program to prepare a bio data and store it in database.	3 hrs
Program 8	Write an ASP Program using Response and Request Object.	3 hrs
Program 9	Write an ASP Program using AdRotator Component.	3 hrs
Program 10	Write an ASP program using database connectivity for student's record.	3 hrs

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	L	S	S	M	S	S	S	S
CO2	S	S	M	M	L	M	L	M	L	S
C03	S	M	S	S	M	L	M	L	M	M
C04	S	S	M	M	M	M	M	S	M	S
C05	M	S	S	S	S	S	S	M	M	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L - Low

Course Code	22CS-SUB-14	PATTERN RECOGNITION AND NEURAL NETWORKS	L	T	P	C
Core / Elective / Supportive		CORE	4	0	0	4
Pre-requisite		Basic, Simple Network, classification process, Grouping	Syllabus Version	2022-2023		
Course Objectives		1. To teach the students understand pattern recognition and its basic concepts. 2. To teach the students about neural networks concepts				
Expected Course Outcomes		After the successful completion of this course, the student will be able to:				
		6. Understand the concepts of neural network, its architecture importance.	K2			
		7. Understand the back propagation theme and associative memory.	K2			
		5. Remember the neural networks and also self - organising maps	K1			
		6. Understand the concepts of supervised, parametric and non - parametric approach.	K2			
		7. To understand and remember unsupervised learning with clustering approaches.	K1 /K2			

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Unit - 1	INTRODUCTION AND SIMPLE NEURAL NET	15 Hrs
	Elementary neurophysiology and biological neural network- Artificial neural network – Architecture, biases and thresholds, Hebb net, Perceptron, Adaline and Madaline.	
Unit - 2	BACK PROPOGATION AND ASSOCIATIVE MEMORY	15hrs
	Back propagation network, generalized delta rule, Bidirectional Associative memory, Hopefield network	
Unit – 3	NEURAL NETWORKS BASED ON COMPETITION	15 hrs
	Kohonen Self organising map, Learning Vector Quantisation, counter propagation network.	
Unit - 4	SUPERVISED LEARNING USING PARAMETRIC AND NON PARAMETRIC APPROACH	15 hrs
	Bayesian classifier, non- parametric density estimation, histograms, kernels, window estimators, k-nearest neighbour classifier, estimation of error rates.	

Unit - 5	UNIT V - UNSUPERVISED LEARNING AND CLUSTERING ANALYSIS	10 hrs
	Patterns and features, training and learning in pattern recognition, discriminant functions, different types of pattern recognition. Unsupervised learning- hierarchical clustering, partitional clustering. Neural pattern recognition approach – perceptron model	
Total Lecture Hours		70 Hrs
Text Books	**Neural Networks - A Classroom Approach Paperback – 1 July 2017 by sathish kumar, July 2017, McGraw Publication**	
Reference Books	1. Brian D. Ripley, University of Oxford, Cambridge University Press, Online publication date: August 2014	
Related Online Contents	1. https://www.slideshare.net/Ahmed_hashmi/neural-network-its applications	
Course Designed By	*Dr A.SENTHIL KUMAR*	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	S	M	S
CO2	S	M	L	L	S	S	S	S	M	S
C03	S	S	S	M	L	S	S	S	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes

PO- Programme Outcomes

S- Strong, M – Medium, L - Low

Course Code	22CS-SUB-16	DATA MINING AND DATA WAREHOUSING	L	T	P	C
Core / Elective / Supportive		CORE	4	0	0	4
Pre-requisite		Basic, Data, Data types, classification process, Grouping	Syllabus Version	2022-2023		
Course Objectives	**1. To teach the students understand data mining and its advantages of using in computation in real time fields.**					
Expected Course Outcomes	**After the successful completion of this course, the student will be able to:**					
	1. Understand the concepts of data warehousing with its architecture.		**K2**			
	2. Understand the data mining and pre-processing the data with concepts like Knowledge discovery databases [KDD].		**K2**			
	3. Understand and remember the association rule mining concepts with its importance.		**K2/K1**			
	4. Remember the idea of data concepts and understanding the classification and prediction concepts		**K1/K2**			
	5. To understand cluster and analysing data clustering methods		**K2/K4**			

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Unit - 1	DATA WAREHOUSE	15 Hrs
	Data Warehousing - Operational Database Systems vs Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools.	
Unit - 2	DATA MINING & DATA PREPROCESSING	15hrs
	Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Pre-processing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.	
Unit – 3	ASSOCIATION RULE MINING	15 hrs
	Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Item sets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.	

Unit - 4	CLASSIFICATION & PREDICTION	15 hrs
	Classification vs Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.	
Unit – 5	CLUSTERING	15 hrs
	Cluster Analysis - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.	
Total Lecture Hours		**70 Hrs**
Text Books	1. Jiawei Han and Micheline Kamber "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2011. 2. Pang-Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education, 2007.	
Reference Books	1. K.P. Soman, Shyam Diwakar and V. Ajay "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006. 2. G. K. Gupta "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.	
Related Online Contents	[Moocs, Swayam etc.]	
Course Designed By	*Dr A.SENTHIL KUMAR*	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	S	M	S
CO2	S	M	L	L	S	S	S	S	M	S
CO3	S	S	S	M	L	S	S	S	S	M
CO4	S	M	S	L	S	M	M	L	M	S
CO5	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes PO- Programme Outcomes

S- Strong,   M – Medium,   L - Low

Core paper – 11 – C# and .Net Framework

Course Code		C# AND .NET FRAMEWORK	L	T	P	C
Core / Elective / Supportive		CORE	4	0	0	4
Pre-requisite		C / C++ / JAVA	Syllabus Version	2022-2023		
Course Objectives	On taking this course, student will be able to gain knowledge on concepts of .NET environment and C# basics, to create console application in C# using object-oriented concepts, to integrate C# and ASP.NET in developing web application, to build a web application using database connectivity, to construct a web application with enhanced Add-on services which includes web services, cookies and session					
Expected Course Outcomes	At the end of the Course, the Student will be able to :					
	1. Acquire the knowledge of .NET environment.					K1
	2. Expertise the fundamental concepts in developing the basics of C# programming					K2
	3. Develop, compile and execute console application in C# using object-oriented concepts.					K3
	4. Construct console application in C# program using delegates and events					K4
	5. Integrate web application using cookies, sessions and web services					K6
K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create						

UNIT I

Review of OOP Concepts - Overview of .NET Framework - Basic Elements of C# - Program Structure and simple Input and Output Operations – Operators and Expressions – Statements – Arrays and Structures.

UNIT II

Inheritance - Namespace – Polymorphism – Interface and Overloading – Multiple Inheritance – Property – Indexes – Delegates – Publish/Subscribe Design Patterns- Operator Overloading-Method Overloading

UNIT III

C# Concepts for creating Data Structures - File Operation – File Management systems- Stream Oriented Operations- Multitasking – Multithreading – Thread Operation – Synchronization.

UNIT IV

Working with XML – Techniques for Reading and Writing XML Data - Using XPath and Search XML - ADO.NET Architecture – ADO.NET Connected and Disconnected Models – XML and ADO.NET – Simple and Complex Data Binding– Data Grid View Class.

UNIT V

Application Domains – Remoting – Leasing and Sponsorship - .NET Coding Design Guidelines –Assemblies – Security – Application Development – Web Services - Building an XML Web Service - Web Service Client – WSDL and SOAP – Web Service with Complex Data Types – Web Service Performance

TEXT BOOKS:

1. S. Thamarai Selvi and R. Murugesan "A Textbook on C# ", Pearson Education,2003.
2. Stephen C. Perry " Core C# and .NET", Pearson Education,2006.

REFERENCES:

1. Jesse Liberty, "Programming C#", Second Edition, O'Reilly Press, 2002.
2. Robinson et al, "Professional C#", Fifth Edition, Wrox Press, 2002.
3. Herbert Schildt, "The Complete Reference: C#", Tata McGraw Hill, 2004.
4. Andrew Troelsen, "C# and the .NET Platform", A! Press, 2003.
5. Thuan Thai and Hoang Q. Lam, ". NET Framework Essentials", Second Edition, O'Reilly, 2002.

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	S	M	S	L
CO2	S	M	L	L	S	M	M	S	M	L
C03	S	S	S	L	L	S	S	M	S	M
C04	S	M	S	L	S	M	M	L	M	S
C05	S	S	M	M	L	S	S	S	S	M

COS- Course Outcomes, PO- Programme Outcomes, S- Strong, M – Medium, L - Low

Course Code		C# AND .NET FRAMEWORK LAB	L	T	P	C
Core / Elective / Supportive		CORE	0	0	3	3
Pre-requisite		C# AND .NET FRAMEWORK	**Syllabus Version**	2022-2023		
Course Objectives	This Lab course will help students to achieve the following objectives: Introduce to .Net IDE Component Framework, Programming concepts in .Net Framework and Creating website using ASP.Net Controls					
Expected Course Outcomes	At the end of the Course, the Student will be able to :					
	6. Create user interactive web pages using ASP.Net.				K6	
	7. Create simple data binding applications using ADO.Net connectivity				K3	
	8. Performing Database operations for Windows Form and web applications				K3	
	9. Create console applications in C#.				K1	
	10. Apply basic data structure concepts in C#				K3	
K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create						

C# PROGRAMS

1. Demonstrate the concept of Implementation and Interface Inheritance in C#.
2. Demonstrate simple delegate, multicast delegate and events.
3. Demonstrate Lists, Queues, Stacks, Linked List, Collections in C#.
4. Demonstrate Attributes and Reflection in C#.
5. Demonstrate Exception Handling (In-built & user-defined exceptions).
6. Demonstrate Threading and Synchronization in C#.
7. Demonstrate the concept of Lists in SharePoint (Create a list, enumerating a list, accessing list values, assigning event handlers).
8. Create site and web site in SharePoint.
9. Create a Web Part in SharePoint.
10. Create a web site using various features of SharePoint designer (Master pages, CSS, Themes, Page Layouts and out-of –the-box web parts)

.NET TECHNOLOGIES

1. Create Simple application using web controls

2. Work with States of ASP.NET Pages & Adrotator Control

3. Use of calendar control, Treeview control & Validation controls

4. Query textbox and Displaying records & Display records by using database

5. Datalist link control & Databinding using dropdownlist control

6. Inserting record into a database & Deleting record into a database

7. Databinding using datalist control & Datalist control template

8. Databinding using datagrid & Datagrid control template

9. Datagrid hyperlink & Datagrid button column

10. Datalist event & Datagrid paging

11. Creating own table format using datagrid

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	S	L	M	M	S
CO2	S	M	L	L	S	M	M	S	M	S
C03	S	S	S	M	L	S	S	M	S	M
C04	S	M	M	L	S	M	M	L	M	S
C05	S	S	S	M	S	S	S	M	S	M

COS- Course Outcomes, PO- Programme Outcomes, S- Strong, M – Medium, L - Low

Course Code	22CS-SUB-	NATURAL LANGUAGE PROCESSING	L	T	P	C
Core / Elective / Supportive		CORE	4	0	0	4
Pre-requisite		Basic, Natural language Processing, Syntax, Semantics	Syllabus Version	2022-2023		
Course Objectives	1.To teach the students understand Natural Language Processing 2.To Teach Linguistings Essential and semantic anylysis cocpets in NLP					

Expected Course Outcomes	After the successful completion of this course, the student will be able to:	
	6. Understand the concepts of Natural Language Processing tasks in syntax.	K2
	7. To Apply the Linguistic essentials.	K3
	8. Understand and remember the - Grammar formalisms and tree banks.	K2/K1
	9. Remember the idea of data concepts and understanding the Semantic Analysis concepts	K1/K2
	10. To Evaluate the Named entity recognition and relation extraction	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Unit - 1	INTRODUCTION	15 Hrs
	Natural Language Processing tasks in syntax, semantics, and pragmatics – Issues - Applications - The role of machine learning - Probability Basics –Information theory – Collocations -N-gram Language Models - Estimating parameters and smoothing - Evaluating language models	
Unit - 2	MORPHOLOGY AND PART OF SPEECH TAGGING	15hrs
	Linguistic essentials - Lexical syntax- Morphology and Finite State Transducers - Part of speech Tagging - Rule-Based Part of Speech Tagging - Markov Models - Hidden Markov Models – Transformation based Models - Maximum Entropy Models. Conditional Random Fields	
Unit – 3	SYNTAX PARSING	15 hrs
	Syntax Parsing - Grammar formalisms and tree banks - Parsing with Context Free Grammars - Features and Unification -Statistical parsing and probabilistic CFGs (PCFGs)-Lexicalized PCFGs. 103	

Unit - 4	SEMANTIC ANALYSIS	15 hrs
	Representing Meaning – Semantic Analysis - Lexical semantics – Word-sense disambiguation - Supervised – Dictionary based and Unsupervised Approaches - Compositional semantics. Semantic Role Labelling and Semantic Parsing – Discourse Analysis.	
Unit – 5	APPLICATIONS	15 hrs
	Named entity recognition and relation extraction- IE using sequence labelling-Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment- phrase-based translation – Question Answering	
Total Lecture Hours		**70 Hrs**
Text Books	1. Daniel Jurafsky and James H. Martin Speech and Language Processing (2nd Edition), Prentice Hall; 2 edition, 2008 2. Foundations of Statistical Natural Language Processing by Christopher D. Manning and HinrichSchuetze, MIT Press, 1999 3. Steven Bird, Ewan Klein and Edward Loper Natural Language Processing with Python, O'Reilly Media; 1 edition, 2009 4. Roland R. Hausser, Foundations of Computational Linguistics: Human- C o m p u t e r Communication in Natural Language, Paperback, MIT Press, 2011	
Reference Books	1. Pierre M. Nugues, An Introduction to Language Processing with Perl and Prolog: An Outline of Theories, Implementation, and Application with Special Consideration of English, French, and German (Cognitive Technologies) Softcover reprint, 2010 2. James Allen, Natural Language Understanding, Addison Wesley; 2 edition 1994	
Related Online Contents	NLTK – Natural Language Tool Kit - http://www.nltk.org/	
Course Designed By	Dr K.RAVIKUMAR	

Mapping with Programme outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	L	S	M	S
CO2	S	M	L	L	S	S	S	S	M	S
CO3	S	S	S	M	L	S	S	S	S	M
CO4	S	M	S	L	S	M	M	L	M	S
CO5	S	S	M	M	L	S	S	S	S	M

COS- Course OutcomesPO- Programme Outcomes

S- Strong, M – Medium, L – Low