Progressive Education Society's

Modern College of Engineering, Shivajinagar,Pune-05.

Department of Artificial Intelligence and Data Science

Curriculum Booklet

2019 Pattern

Semester: I

Class: TE (Artificial Intelligence and Data Science)

Vision of the Institute

- Creation of a collaborative academic environment to foster professional excellence and ethical values.

Mission of the Institute

- To develop outstanding professionals with high ethical standards capable of creating and managing global enterprises.
- To foster innovation and research by providing a stimulating learning environment.
- To ensure equitable development of students of all ability levels and backgrounds.
- To be responsive to changes in technology, socio-economic and environmental conditions.
- To foster and maintain mutually beneficial partnerships with alumni and industry.

Objectives of the Institute

- To develop infrastructure appropriate for delivering quality education
- To develop the overall personality of students who will be innovators and future leaders capable of prospering in their work environment.
- To inculcate ethical standards and make students aware of their social responsibilities.
- Promote close interaction among industry, faculty and students to enrich the learning process and enhance career opportunities.
- Encourage faculty in continuous professional growth through quality enhancement programs and research and development activities.
- Foster a healthy work environment which allows for freedom of expression and protection of the rights of all stakeholders through open channels of communication

Vision of the Department

To create a collaborative academic environment in the field of Artificial Intelligence and Data Science by imparting required skill sets and interactive industry interface for students and inculcate into them social and ethical values

Mission of the Department

M1: To nurture students with latest technologies in the field of Artificial Intelligence and Data Science.

M2: To build industry academia interface to update the recent trends in field of Artificial Intelligence and Data Science.

M3: To prepare students with professional approach, strong ethical values and research spirit along with leadership skills.

M4: To mentor students in the field of Artificial Intelligence and Data Science research to serve the needs of the society.

Program Educational Objectives (PEOs)

Program Educational Objectives (PEO's)	
A graduate of the Artificial Intelligence and Data Science Program will able to-	
PEO1	Work in the area of Artificial Intelligence and Data Science to design ability of a computer system.
PEO2	Apply analytical skills ,decision making skills, leadership skills and critical thinking skills to solve multidisciplinary problems for the betterment of the society
PEO3	Demonstrate professionalism as a means of lifelong learning in the area of Artificial Intelligence and Data Science with emerging tools and technologies like IoT , Big Data, Cloud Services , Artificial Neural Network.

Program Specific Outcomes (PSOs)

Program Specific Outcomes (PSO's)	
A graduate of the Artificial Intelligence and Data Science Program will demonstrate	
PSO1	**Professional Skills-**The ability to understand, analyze and develop computer programs in the areas of Artificial Intelligence and Data Science for efficient design of computer based systems.
PSO2	**Problem-Solving Skills-** The ability to apply the knowledge of Artificial Intelligence and Data Science to cater the need of industry, academia and society.
PSO3	**Successful Career and Entrepreneurship-** The ability to employ modern computer languages, environments and platforms to become an entrepreneur and to have a zest for higher studies.

Program Outcomes (POs)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant and cultural issues and the consequent responsibilities relevant to professional engineering practice.

7. Environment and Sustainability: Understand the impact of professional engineering solutions in societal and professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

10. Communication Skills : Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.

11. Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long Learning: Recognize the need for and have the preparation and ability to engage in independent and preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Course Structure

Curriculum for Third Year of Artificial Intelligence and Data Science (2019 Course), Savitribai Phule Pune University

Savitribai Phule Pune University														
Third Year of Artificial Intelligence and Data Science (2019 Course)														
(With effect from Academic Year 2022-23)														
Semester-V														
Course Code	**Course Name**	**Teaching Scheme (Hours/Week)**			**Examination Scheme and Marks**							**Credit Scheme**			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
310241	Data Base Management System	03	-	-	30	70	-	-	-	100	03	--	-	03
317521	Computer Networks	03	-	-	30	70	-	-	-	100	03	-	-	03
310252	Web Technology	03	-	-	30	70	-	-	-	100	03	-	-	03
310253	Artificial Intelligence	03	-	-	30	70	-	-	-	100	03	-	-	03
**	Elective I	03	-	-	30	70	-	-	-	100	03	-	-	03
317523	Software Laboratory I	-	04	-	-	-	25	25	-	50	-	02	-	02
317524	CN Laboratory	-	02	-	-	-	25	25	-	50	-	01	-	01
317525	Elective I Laboratory	-	02	-	-	-	25	-	25	50	-	01	-	01
317526	Seminar and Technical Communication	-		01	-	-	25	-	-	25	-	-	01	01
317527	Environmental Studies	-	-	01	-	-	25	-	-	25	-	-	01	01
	Total	**15**	**08**	**02**	**150**	**350**	**125**	**50**	**25**	**700**	**15**	**04**	**02**	**21**
317528	Audit Course 5										**Grade**			
									Total		**15**	**04**	**02**	**21**
**** Elective-I Options**						**Audit Course 5 Options**								
317522 (A)Embedded Systems & Security						317528(A) Emotional Intelligence								
314445 (C)Design Thinking						317528(B) Industrial Safety And Environment Consciousness								
317522 (B)Pattern Recognition						317528(C) 3D Printing								
310245 (B) Human Computer Interface						317528(D) Foreign Language								
						317528(E) MOOC- Learn New Skills								
Software Laboratory I (**Assignments from**)						Data Base Management System and Artificial Intelligence								

Subject 1: Database Management Systems

Weekly Work Loads(in Hrs)	Lecture	Tutorial	Practical
	03	-	-

Online/ In-sem	Theory	Practical	Oral	Term-work	Total Marks	Credit
30	70	0	0	0	100	03

Course Objectives:

- To understand the fundamental concepts of Database Management Systems
- To acquire the knowledge of database query languages and transaction processing
- To understand systematic database design approaches
- To acquire the skills to use a powerful, flexible, and scalable general-purpose databases tohandle Big Data
- To be familiar with advances in databases and applications

Course Outcomes:

On completion of the course, learners should be able to

- Analyze and design Database Management System using ER model
- Implement database queries using database languages
- Normalize the database design using normal forms
- Apply Transaction Management concepts in real-time situations
- Use NoSQL databases for processing unstructured data
- Differentiate between Complex Data Types and analyze the use of appropriate data types

Syllabus

Unit	Course Content	Hours
I	**Introduction to Database Management Systems and ER Model**	06
	Introduction, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Data Models. Database Design and ER Model: Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity-Relationship Model, ER Diagram, Design Issues, Extended E-R Features, converting ER and EER diagram into tables.	
II	**SQL and PL/SQL**	07
	SQL: Characteristics and Advantages, SQL Data Types and Literals, DDL, DML, DCL, TCL, SQL Operators. Tables: Creating, Modifying, Deleting, Updating.SQL DML Queries: SELECT Query and clauses, Index and Sequence in SQL. Views: Creating, Dropping, Updating using Indexes, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, SQL Functions, Nested Queries.PL/SQL: Concept of Stored Procedures and Functions, Cursors, Triggers, Assertions, Roles and Privileges.	
III	**Relational Database Design**	06
	Relational Model: Basic concepts, Attributes and Domains, CODD's Rules. **Relational Integrity**: Domain, Referential Integrities, Enterprise Constraints. **Database Design**: Features of Good Relational Designs, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF.	
IV	**Database Transaction Management**	07
	Introduction to Database Transaction, Transaction states, ACID properties, Concept of Schedule, Serial Schedule. **Serializability**: Conflict and View, Cascaded Aborts, Recoverable and Non- recoverable Schedules. **Concurrency Control**: Lock-based, Time-stamp based Deadlock handling. **Recovery methods**: Shadow-Paging and Log-Based Recovery, Checkpoints. **Log-Based Recovery**: Deferred Database Modifications and Immediate Database Modifications.	
V	**NoSQL Databases**	07
	Introduction to Distributed Database System, Advantages, Disadvantages, CAP Theorem. **Types of Data:** Structured, Unstructured Data and Semi-Structured Data. **NoSQL Database:** Introduction, Need, Features. **Types of NoSQL Databases:** Key-value store, document store, graph, wide column stores,	

	BASE Properties, Data Consistency model, ACID Vs BASE, Comparative study of RDBMS and NoSQL. **MongoDB** (with syntax and usage): CRUD Operations, Indexing, Aggregation, MapReduce, Replication, Sharding.	
VI	**Advances in Databases**	07
	Emerging Databases: Active and Deductive Databases, Main Memory Databases, Semantic Databases. Complex Data Types: Semi-Structured Data, Features of Semi-Structured Data Models. Nested Data Types: JSON, XML. Object Orientation: Object-Relational Database System, Table Inheritance, Object-Relational Mapping. Spatial Data: Geographic Data, Geometric Data.	

TeachingPlan

Sr. No.	Unit	Topics to be covered	Book Referred	Total Lecture Planned
1	I	Introduction, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Data Models. Database Design and ER Model: Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity-Relationship Model, ER Diagram, Design Issues, Extended E-R Features, converting ER and EER diagram into tables.	Text Book no. 1	06
2	II	SQL: Characteristics and Advantages, SQL Data Types and Literals, DDL, DML, DCL, TCL, SQL Operators. Tables: Creating, Modifying, Deleting, Updating.SQL DML Queries: SELECT Query and clauses, Index and Sequence in SQL. Views: Creating, Dropping, Updating using Indexes, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, SQL Functions, Nested Queries.PL/SQL: Concept of Stored Procedures and Functions, Cursors, Triggers, Assertions, Roles and Privileges.	Text Book no. 1	07

3	III	**Relational Model**: Basic concepts, Attributes and Domains, CODD's Rules. **Relational Integrity**: Domain, Referential Integrities, Enterprise Constraints. **Database Design**: Features of Good Relational Designs, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF.	Text Book no. 1	06
4	IV	Introduction to Database Transaction, Transaction states, ACID properties, Concept of Schedule, Serial Schedule. **Serializability**: Conflict and View, Cascaded Aborts, Recoverable and Non- recoverable Schedules. **Concurrency Control**: Lock-based, Time-stamp based Deadlock handling. **Recovery methods**: Shadow-Paging and Log-Based Recovery, Checkpoints. **Log-Based Recovery**: Deferred Database Modifications and Immediate Database Modifications.	Text Book no. 1	07
5	V	Introduction to Distributed Database System, Advantages, Disadvantages, CAP Theorem. **Types of Data:** Structured, Unstructured Data and Semi-Structured Data. **NoSQL Database:** Introduction, Need, Features. **Types of NoSQL Databases:** Key-value store, document store, graph, wide column stores, BASE Properties, Data Consistency model, ACID Vs BASE, Comparative study of RDBMS and NoSQL. **MongoDB** (with syntax and usage): CRUD Operations, Indexing, Aggregation, MapReduce, Replication, Sharding.	Text Book no. 1	07
6	VI	Emerging Databases: Active and Deductive Databases, Main Memory Databases, Semantic Databases. Complex Data Types: Semi-Structured Data, Features of Semi-Structured Data Models. Nested Data Types: JSON, XML. Object Orientation: Object-Relational Database System, Table Inheritance, Object-Relational Mapping. Spatial Data: Geographic Data, Geometric Data.	Text Book no. 1	07

Text Books :
1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", McGraw HillPublishers, ISBN 0-07-120413-X, 6th edition
2. Connally T, Begg C., "Database Systems", Pearson Education, ISBN 81-7808-861-4 Pramod J. Sadalage and Martin Fowler, "NoSQL Distilled", Addison Wesley, ISBN-10: 0321826620, ISBN-13: 978-0321826626

Reference Books :
1. C J Date, "An Introduction to Database Systems", Addison-Wesley, ISBN: 0201144719
2. S.K.Singh, "Database Systems: Concepts, Design and Application", Pearson Education,ISBN 978-81-317-6092-5
3. Kristina Chodorow, Michael Dierolf, "MongoDB: The Definitive Guide", O'ReillyPublications, ISBN: 978-1-449-34468-9
4. Adam Fowler, "NoSQL For Dummies", John Wiley & Sons, ISBN-1118905628
5. Kevin Roebuck, "Storing and Managing Big Data - NoSQL, HADOOP and More",Emereopty Limited, ISBN: 1743045743, 9781743045749
6. Joy A. Kreibich, "Using SQLite", O'REILLY, ISBN: 13:978-93-5110-934-1
7. Ivan Bayross, "SQL, PL/SQL the Programming Language of Oracle", BPB PublicationsISBN: 9788176569644, 9788176569644
Seema Acharya, "Demystifying NoSQL", Wiley Publications, ISBN: 9788126579969

e-B ooks :
1. SQL and Relational Theory
   a. (How to Write Accurate SQL code), C.J. Date, O'REILLY Publication
   SQL A Beginner's Guide, Andy Oppel, Robert Sheldon, McGraw Hill Publication

Unit No.-I-

Name of the Unit : Introduction to Database Management Systems and ER Model

Lecture No.	Details of the Topic to be covered	References
1	Introduction, Purpose of Database Systems, Database-System Applications	Text Book 1
2	View of Data, Database Languages, Database System Structure, Data Models.	Text Book 1
3	Database Design and ER Model: Entity, Attributes, Relationships	Text Book 1
4	Constraints, Keys	Text Book 1
5	Design Process, Entity-Relationship Model	Text Book 1
6	,ER Diagram, Design Issues	Text Book 1
7	Extended E-R Features, converting ER and EER diagram into tables.	Text Book 1

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain Application of DBMS
Q. 2	What are the advantages of DBMS?
Q. 3	List various users of DBMS and specify the roles
Q. 4	What is aggregation? Explain with example

Unit No.-II-

Name of the Unit : SQL and PL/SQl

Lecture No.	Details of the Topic to be covered	References
1	Introduction, Purpose of Database Systems, Database-System Applications	Text Book 1
2	View of Data, Database Languages, Database System Structure, Data Models.	Text Book 1
3	Database Design and ER Model: Entity, Attributes, Relationships	Text Book 1
4	Constraints, Keys	Text Book 1
5	Design Process, Entity-Relationship Model	Text Book 1
6	,ER Diagram, Design Issues	Text Book 1

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain Select and intersection operation of Relational Algebra with example
Q. 2	List Various DDL commands. Explain any one with example
Q. 3	Explain Aggregate function with example.
Q. 4	Explain GROUPBY Clause with exmple
Q. 5	Explain weak entity with example.

Unit No.-III

Name of the Unit : Relational Database Design

Lecture No.	Details of the Topic to be covered	References
1	**Relational Model**: Basic concepts, Attributes and Domains, CODD's Rules.	Text Book 1
2	**Relational Integrity**: Domain, Referential Integrities, Enterprise Constraints.	Text Book 1
3	**Database Design**: Features of Good Relational Designs, Normalization.	Text Book 1
4	Atomic Domains and First Normal Form	Text Book 1
5	Decomposition using Functional Dependencies,	Text Book 1
6	Algorithms for Decomposition, 2NF, 3NF, BCNF.	Text Book 1

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	What are the problems caused by Redundancy? Explain about Normalization and need for normalization

Q. 2	Define Functional Dependencies. Explain First, second normal forms with relevant table.

Q. 3	Explain about Third NF and BCNF with relevant table structure

Q. 4	Discuss about higher level normal form.

Q. 5	Explain the steps to improving the design.

Unit No.-IV

Name of the Unit: Database Transaction Management

Lecture No.	Details of the Topic to be covered	References
1	Introduction to Database Transaction, Transaction states, ACID properties, Concept of Schedule, Serial Schedule.	Text Book 1
2	Conflict and View, Cascaded Aborts, Recoverable and Non- recoverable Schedules.	Text Book 1
3	Concurrency Control: Lock-based, Time-stamp based Deadlock handling.	Text Book 1
4	Recovery methods: Shadow-Paging and Log-Based Recovery, Checkpoints.	Text Book 1
5	Log-Based Recovery: Deferred Database Modifications and Immediate Database Modifications.	Text Book 1

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	What is transaction? Explain the ACID Properties.
Q. 2	Explain various locking methods with example.
Q. 3	Define ACID. Explain about scheduling in transaction management method.
Q. 4	Define Concurrency control. Explain different concurrency control.
Q. 5	Explain about concurrency control based on time stamp ordering.

Unit No.-V

Name of the Unit: NoSQL Databases

Lecture No.	Details of the Topic to be covered	References
1	Introduction to Distributed Database System, Advantages, Disadvantages, CAP Theorem.	Text Book No. 1
2	Types of Data: Structured, Unstructured Data and Semi-Structured Data.	Text Book No. 1
3	NoSQL Database: Introduction, Need, Features. Types of NoSQL Databases: Key-value store, document store, graph, wide column stores.	Text Book No. 1
4	BASE Properties, Data Consistency model, ACID Vs BASE, Comparative study of RDBMS and NoSQL.	Text Book No. 1
5	MongoDB (with syntax and usage): CRUD Operations,	Text Book No. 1
6	Indexing, Aggregation, MapReduce	Text Book No. 1
7	Replication, Sharding.	

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain log-based Recovery in detail

Q. 2	Explain about advanced recovery techniques.

Q. 3	How to handle failure with loss of nonvolatile storage.

Q. 4	Explain about Buffer management.

Q. 5	Explain the merits and demerits of remote backup.

Unit No.-VI-

Name of the Unit: Advances in Databases

Lecture No.	Details of the Topic to be covered	References
1	Emerging Databases: Active and Deductive Databases, Main Memory Databases, Semantic Databases.	Text Book No. 1
2	Complex Data Types: Semi-Structured Data, Features of Semi-Structured Data Models.	Text Book No. 1
3	Nested Data Types: JSON, XML. Object Orientation: Object-Relational Database System.	Text Book No. 1
4	Table Inheritance, Object-Relational Mapping.	Text Book No. 1
5	Spatial Data: Geographic Data, Geometric Data.	Text Book No. 1

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain Active and Deductive Databases.

Q. 2	Explain different complex data types.

Q. 3	Define table inheritance. Explain with suitable example.

Q. 4	Differentiate Geographic Data, Geometric Data.

Q.5	What is object –Relational mapping> Explain with example.

Subject 2: Computer Networks

Weekly Work Loads(in Hrs)	Lecture	Tutorial	Practical
	03	-	-

Online/ In-sem	Theory	Practical	Oral	Term-work	Total Marks	Credit
30	70	0	0	0	100	03

Course Objectives:
- To understand the Basics concepts of networking standards, protocols and technologies.
- To learn the different signal transmission, multiplexing techniques.
- To learn the role of protocols at various layers in the protocol stacks.
- To learn the different IEEE standards.

Course Outcomes:
On completion of the course, learner will be able to–
- Summarize fundamental concepts of Computer Networks, architectures, protocols andtechnologies
- Analyze the working of physical layer protocols.
- Analyze the working of different routing protocols and mechanisms
- Implement client-server applications using sockets
- Illustrate role of application layer with its protocols, client-server architectures
- Summarize concepts of MAC and Ethernet.

Syllabus

Unit	Course Content	Hours
I	**Fundamentals of Computer Network**	06
	Definition, uses of computer network, **Network Devices**: Bridge, Switch, Router, Gateway, Access Point, **Network Topologies:** Bus, Star, Ring, Tree, Mesh, Hybrid**, Types of Network:** LAN, MAN, WAN, PAN, Ad-Hoc Network, Networks Software, Protocol, Design issues for the Network layers. **Types of Transmission Media:** Guided Media, Unguided Media. **Network Architecture:** Client- Server, Peer To Peer, Hybrid. **Network Models:** OSI and TCP/IP Model, **Types of Addressing:** Physical addressing, Logical addressing, Port addressing and other addressing.	
II	**Physical Layer**	07
	Functions of Physical Layer, Data And Signals, Digital Transmission, Analog Transmission, **Transmission Impairment**: Attenuation, Distortion, Noise, **Bandwidth utilization**: **Multiplexing** : Frequency-Division Multiplexing , Wavelength Division, synchronous time-division multiplexing, statistical time-division multiplexing. **Spread Spectrum**: Frequency Hopping (FHSS) and Direct Sequence Spread Spectrum (DSSS), Switching: circuit switching, packet switching, message switching, **Types of cable connection**: Straight through connection, Cross over Connection. **Line Coding Schemes:** Manchester and Differential Manchester Encodings.	
III	**Network Layer**	07
	Introduction: Functions of Network layer. **Switching Techniques**: Circuit switching, Message Switching, Packet Switching. **IP Protocol**: Classes of IP (Network addressing), IPv4, IPv6,Network Address Translation, Sub-netting, CIDR. **Network layer Protocols**: ARP, RARP, ICMP, IGMP. **Network Routing and Algorithms**: Static Routing, Dynamic Routing, Distance Vector Routing, Link State Routing, Path Vector. **Routing Protocols**: RIP, OSPF, BGP, MPLS. **Routing in MANET**: AODV, DSR, Mobile IP.	
IV	**Transport Layer**	07
	Process to Process Delivery, Services, Socket Programming. **Elements of Transport Layer Protocols**: Addressing, Connection establishment, Connection release, Flow control and buffering, Multiplexing, Congestion Control. **Transport Layer Protocols**: TCP and UDP, SCTP, RTP, Congestion control and Quality of Service (QoS), Differentiated services,	

		TCP and UDP for Wirelessnetworks.	
V		**Application Layer**	06
		Client Server Paradigm, Peer to Peer Paradigm, Communication using TCP and UDP services, Domain Name System (DNS), HyperText Transfer Protocol (HTTP), Email: SMTP, MIME, POP3, Webmail, FTP, TELNET, Dynamic Host Control Protocol (DHCP), Simple Network Management Protocol (SNMP).	
VI		**Medium Access Control**	06
		Channel allocation: Static and Dynamic, Multiple Access Protocols: Pure and Slotted ALOHA, CSMA, WDMA, IEEE 802.3 Standards and Frame Formats, CSMA/CD, Binary Exponential Back -off algorithm, Fast Ethernet, Gigabit Ethernet, IEEE 802.11a/b/g/n and IEEE 802.15 and IEEE 802.16 Standards, Frame formats, CSMA/CA.	

Teaching Plan

Sr. No.	Unit	Topics to be covered	Book Referred	Total Lecture Planned
1	I	Definition, uses of computer network, Network Devices: Bridge, Switch, Router, Gateway, Access Point, Network Topologies: Bus, Star, Ring, Tree, Mesh, Hybrid, Types of Network: LAN, MAN, WAN, PAN, Ad-Hoc Network, Networks Software, Protocol, Design issues for the Network layers. Types of Transmission Media: Guided Media, Unguided Media. Network Architecture: ClientServer, Peer To Peer, Hybrid. Network Models: OSI and TCP/IP Model, Types of Addressing: Physical addressing, Logical addressing, Port addressing and other addressing.	1.1 , 1.2 , 2.1 ,2.2	6
2	II	Functions of Physical Layer, Data And Signals, Digital Transmission, Analog Transmission, Transmission Impairment: Attenuation, Distortion, Noise, Bandwidth utilization: Multiplexing : Frequency-Division Multiplexing , Wavelength Division, synchronous time-division multiplexing, statistical time-division multiplexing. Spread Spectrum: Frequency Hopping (FHSS) and Direct Sequence Spread Spectrum (DSSS), Switching: circuit switching, packet switching, message switching, Types of cable	1.1 , 1.2 ,1.4,2.1,2.2, 2.5,2.7	7

		connection: Straight through connection, Cross over Connection. Line Coding Schemes: Manchester and Differential Manchester Encodings.		
3	III	Introduction: Functions of Network layer. Switching Techniques: Circuit switching, Message Switching, Packet Switching. IP Protocol: Classes of IP (Network addressing), IPv4, IPv6,Network Address Translation, Sub-netting, CIDR. Network layer Protocols: ARP, RARP, ICMP, IGMP. Network Routing and Algorithms: Static Routing, Dynamic Routing, Distance Vector Routing, Link State Routing, Path Vector. Routing Protocols: RIP, OSPF, BGP, MPLS. Routing in MANET: AODV, DSR, Mobile IP.	1.2 ,1.4, 2.1,2.2, 2.5,2.7	7
4	IV	Process to Process Delivery, Services, Socket Programming. Elements of Transport Layer Protocols: Addressing, Connection establishment, Connection release, Flow control and buffering, Multiplexing, Congestion Control. Transport Layer Protocols: TCP and UDP, SCTP, RTP, Congestion control and Quality of Service (QoS), Differentiated services, TCP and UDP for Wireless networks.	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7	7
5	V	Client Server Paradigm, Peer to Peer Paradigm, Communication using TCP and UDP services, Domain Name System (DNS), HyperText Transfer Protocol (HTTP), Email: SMTP, MIME, POP3, Webmail, FTP, TELNET, Dynamic Host Control Protocol (DHCP), Simple Network Management Protocol (SNMP).	1.2 ,1.4, 2.1,2.2, 2.5,2.7	6
6	VI	Channel allocation: Static and Dynamic, Multiple Access Protocols: Pure and Slotted ALOHA, CSMA, WDMA, IEEE 802.3 Standards and Frame Formats, CSMA/CD, Binary Exponential Back -off algorithm, Fast Ethernet, Gigabit Ethernet, IEEE 802.11a/b/g/n and IEEE 802.15 and IEEE 802.16 Standards, Frame formats, CSMA/CA.	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7	6

1. Text Books:

1. Fourauzan B.,"Data Communications and Networking",5thEdition,TataMcGrawHill,Publications, ISBN:0–07 – 058408 – 7

2. Andrew S. Tanenbaum, "Computer Networks", 5th Edition, Pearson India, 2012.

3. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on Approach", Universities Press, ISBN: 0: 0996025510, 13: 978-0996025515

4. Behrouz A. Forouzan, TCP/IP Protocol Suite, McGraw Hill Education, ISBN: 978-0-07-070652- 1, 4th Edition

2. Reference Books:

1.L. Peterson and B. Davie, "Computer Networks: A Systems Approach", 5th Edition, MorganKaufmann, 2012.

2.Kurose, Ross "Computer Networking a Top Down Approach Featuring the Internet", Pearson, ISBN-10:0132856204

3. Matthew S. G, "802.11 Wireless Networks", O'Reilly publications, ISBN: 81-7656-992-5

4. C. Siva Ram Murthy and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols" Prentice Hall, ISBN-10: 8131706885; ISBN-13: 978-8131706886

5. Holger Karl and Andreas Willing, "Protocols and Architectures for Wireless Sensor Networks", Wiley India , ISBN: 9788126533695

6. Eldad Perahia, Robert Stacey, "Next Generation Wireless LANs", Cambridge, ISBN-10: 1107016762; ISBN- 13: 978-1107016767

7. Efraim Turban, Linda Volonino, Gregory R. Wood "Computer Networking a Top Down Approach Featuring the Internet", 10th Edition, Wiley; ISBN13: 978-1-118-96126-1

Reference Web Links/ Research Paper/ Referred Book other than Mention in Syllabus:

e-Books:
MOOC Courses

Unit No.-I-

Name of the Unit : Fundamentals of Computer Network

Lecture No.	Details of the Topic to be covered	References
1	Definition, uses of computer network	1.1 , 1.2 , 2.1 ,2.2
2	Network Devices: Bridge, Switch, Router, Gateway, Access Point ,Network Topologies: Bus, Star, Ring, Tree, Mesh, Hybrid,	1.1 , 1.2 , 2.1 ,2.2
3	Types of Network: LAN, MAN, WAN, PAN, Ad-Hoc Network, Networks Software, Protocol, Design issues for the Network layers	1.1 , 1.2 , 2.1 ,2.2
4	Types of Transmission Media: Guided Media, Unguided Media	1.1 , 1.2 , 2.1 ,2.2
5	Network Architecture: ClientServer, Peer To Peer, Hybrid. Network Models: OSI and TCP/IP Model,	1.1 , 1.2 , 2.1 ,2.2
6	Types of Addressing: Physical addressing, Logical addressing, Port addressing and other addressing.	1.1 , 1.2 , 2.1 ,2.2

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Define Computer Network. Explain its Uses and Explain different types of Network.
Q. 2	Explain different Network Devices and Network Topologies
Q. 3	Explain Addressing , Explain Physical , Logical and Port Addressing
Q. 4	Explain Network Models and difference between OSI model and TCP/IP model
Q. 5	Explain the network layer design issues
Q. 6	Explain the types of Transmission medium.
Q. 7	Explain Different Network Architecture.

Unit No.-II-

Name of the Unit : Physical Layer

Lecture No.	Details of the Topic to be covered	References
1	Functions of Physical Layer, Data And Signals	1.1 , 1.2 ,1.4,2.1,2.2, 2.5,2.7
2	Digital Transmission, Analog Transmission	1.1 , 1.2 ,1.4,2.1,2.2, 2.5,2.7
3	Transmission Impairment: Attenuation, Distortion, Noise, Bandwidth utilization	1.1 , 1.2 ,1.4,2.1,2.2, 2.5,2.7
4	Frequency-Division Multiplexing, Wavelength Division, synchronous time-division multiplexing, statistical time-division multiplexing.	1.1 , 1.2 ,1.4,2.1,2.2, 2.5,2.7
5	Spread Spectrum: Frequency Hopping (FHSS) and Direct Sequence Spread Spectrum (DSSS), Switching: circuit switching, packet switching, message switching,	1.1 , 1.2 ,1.4,2.1,2.2, 2.5,2.7
6	Types of cable connection: Straight through connection, Cross over Connection.	1.1 , 1.2 ,1.4,2.1,2.2, 2.5,2.7
7	Line Coding Schemes: Manchester and Differential Manchester Encodings.	1.1 , 1.2 ,1.4,2.1,2.2, 2.5,2.7

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain the Functions of Physical Layer.
Q. 2	Explain Manchester and Differential Manchester Line Coding Schemes and specify the difference between the two Schemes.
Q. 3	Explain the Transmission Impairments.
Q. 4	Explain Different Types of Digital to Analog Conversion.
Q. 5	The power of a signal is 10 mW and the power of the noise is 1 micro W; what are the values of SNR and SNRdB ?
Q. 6	Five channels, each with a 100-kHz bandwidth, are to be multiplexed together. What is the minimum bandwidth of the link if there is a need for a guard band of 10kHz between the channels to prevent interference? Solve Problem with the help of diagram .

Q.7 A multiplexer combines four 100-kbps channels using a time slot of 2 bits. Show the output with four arbitrary inputs. What is the frame rate? What is the frame duration? What is the bit rate? What is the bit duration? Solve the problem with the help of Diagram

Q.8 With the help of the diagram Explain Statistical and Synchronous TDM and Also Explain the difference between the them with the help of Parameters

Unit No.-III

Name of the Unit : Network Layer

Lecture No.	Details of the Topic to be covered	References
1	Introduction: Functions of Network layer.	1.2 ,1.4, 2.1,2.2, 2.5,2.7
2	Switching Techniques: Circuit switching, Message Switching, Packet Switching	1.2 ,1.4, 2.1,2.2, 2.5,2.7
3	IP Protocol: Classes of IP (Network addressing), IPv4, IPv6,	1.2 ,1.4, 2.1,2.2, 2.5,2.7
4	Network Address Translation, Sub-netting, CIDR	1.2 ,1.4, 2.1,2.2, 2.5,2.7
5	Network layer Protocols: ARP, RARP, ICMP, IGMP.	1.2 ,1.4, 2.1,2.2, 2.5,2.7
6	Network Routing and Algorithms: Static Routing, Dynamic Routing, Distance Vector Routing, Link State Routing, Path Vector.	1.2 ,1.4, 2.1,2.2, 2.5,2.7
7	Routing Protocols: RIP, OSPF, BGP, MPLS. Routing in MANET: AODV, DSR, Mobile IP	1.2 ,1.4, 2.1,2.2, 2.5,2.7

## Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	An organization is granted the block l30.34.l2.64/26. The organization needs to have four subnets with equal number of addresses in each subnet.What are the subnet addresses and the range of addresses for each subnet?
Q. 2	Draw and Explain IPV6 header. Explain the significance of the extension header.

Q. 3 A host with IP address 130.23.3.20 and physical address B2345510221O has a packet to send to another host with IP address 130.23.43.25 and physical address A46EF45983AB. The two hosts are on the same Ethernet network. Show the ARP request and reply packets encapsulated in Ethernet frames. **[4]**

Q. 4 Write a short note on

i) NAT

i) ICMP

Q. 5 Explain Distance Vector Routing Algorithm? Consider topology given in fig.(a) and Vectors received from router J's four neighbors are given in fig (b). Calculate New routing table for router J using Distance Vector Routing Algorithm. **[a]**

(a)
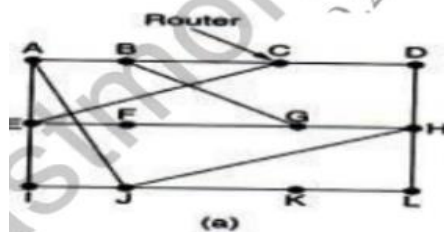
To	A	I	H	K
A	0	24	20	21
B	12	36	31	28
C	25	18	19	36
D	40	27	8	24
E	14	7	30	22
F	23	20	19	40
G	18	31	6	31
H	17	20	0	19
I	21	0	14	22
J	9	11	7	10
K	24	22	22	0
L	29	33	9	9

| JA delay is 8 | JI delay is 10 | JH delay is 12 | JK delay is 6 |

Vectors received from J's four neighbors

(b)

Unit No.-IV

Name of the Unit : Transport Layer

Lecture No.	Details of the Topic to be covered	References
1	Process to Process Delivery, Services, Socket Programming.	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
2	Elements of Transport Layer Protocols: Addressing, Connection establishment, Connection release,	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
3	Flow control and buffering, Multiplexing, Congestion Control.	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
4	Transport Layer Protocols: TCP and UDP, SCTP, RTP	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
5	Congestion control and Quality of Service (QoS)	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
6	Differentiated services	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
7	TCP and UDP for Wireless networks.	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	In a Stop-and-Wait system, the bandwidth of the line is 2Mbps, and I bit takes 20 milliseconds to make a round trip. What is the bandwidth-delay product? If the system data packets are 2,000 bits in length, what is the utilization percentage of the link?

Q. 2	Explain Go-back-N Sliding window protocol with example.

Q. 3	What causes Silly Window syndrome? How it is avoided? Explain.

Q. 4 For each of the following applications, determine whether TCP or UDP is used as the transport layer protocol and explain the reason(s) for your choice **[8]**

i) Watching a real time streamed video

ii) Web browsing

iii) A Voice over IP (VoIP) telephone conversation

iv) YouTube video

Q. 5 What are the types of socket? Explain various socket primitives used in connection oriented client server approach. **[8]**

Q. 6 **b)** Explain UDP Header? Below is an Hexadecimal dump of an UDP datagram captured. **[8]**

e2 a7 00 0D 00 20 74 9e 0e ff 00 00 00 00 0I 00 00 00 00 00 00 00 00 06 69 73 6I 74 6I 70 00 00 0I 00 0I

i) What is source port number?

ii) What is destination port number?

iii) What is total length of the user datagram?

iv) What is the length of the data?

v) Is packet directed from a client to server or vice versa?

Unit No.-V

Name of the Unit : Application Layer

Lecture No.	Details of the Topic to be covered	References
1	Client Server Paradigm, Peer to Peer Paradigm, Communication using TCP and UDP services,	1.2 ,1.4, 2.1,2.2, 2.5,2.7
2	Domain Name System (DNS), Hyper Text Transfer Protocol (HTTP),	1.2 ,1.4, 2.1,2.2, 2.5,2.7
3	Email: SMTP, MIME, POP3, Webmail	1.2 ,1.4, 2.1,2.2, 2.5,2.7
4	FTP, TELNET	1.2 ,1.4, 2.1,2.2, 2.5,2.7
5	Dynamic Host Control Protocol (DHCP),	1.2 ,1.4, 2.1,2.2, 2.5,2.7
6	Simple Network Management Protocol (SNMP).	1.2 ,1.4, 2.1,2.2, 2.5,2.7

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain DNS message format?

Q. 2	Explain FTP? Can we specify file transfer in a Web page? Explain with The help of suitable example.

Q. 3	Browsers have a in-built caching mechanism for a better user experience. How do websites indicate if a web resource needs to be cached or not? Show HTTP messages in transit for both scenarios.

Q. 4	What is the difference between persistent & non persistent HTTP? Explain HTTP request and reply message format. [a]

Q. 5	Write short notes on i) DHCP ii) MIME

Q. 6	Explain FTP in detail? Explain any four FTP commands.

Q. 7	Explain working of IMAP.

Q. 8	Explain DNS Request and Response message format?

Q. 9	Why we need DHCP? Explain in detail

Unit No.-VI-

Name of the Unit : Medium Access Control

Lecture No.	Details of the Topic to be covered	References
1	Channel allocation: Static and Dynamic,	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
2	Multiple Access Protocols: Pure and Slotted ALOHA, CSMA, WDMA,	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
3	IEEE 802.3 Standards and Frame Formats, CSMA/CD,	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
4	Binary Exponential Back -off algorithm, Fast Ethernet, Gigabit Ethernet,	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
5	IEEE 802.11a/b/g/n and IEEE 802.15 and IEEE 802.16 Standards,	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7
6	Frame formats, CSMA/CA.	1.2 ,1.4, 2.1,2.2,2.3, 2.4 , 2.5,2.7

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Consider building a CSMA/CD network running at 1 Gbps over a cable with no repeaters. The signal speed in the cable is 200000km/ What is the minimum frame size?

Q. 2	State the difference between static and dynamic channel allocation? (two examples for each?

Q. 3	Explain working of CSMA/CA with the help of flow diagram.

Q. 4	Explain 802.11 Wireless LAN frame format.

Subject 3: Web Technology

Weekly Work Loads(in Hrs)	Lecture	Tutorial	Practical
	03	**-**	**-**

Online/ In-sem	Theory	Practical	Oral	Term-work	Total Marks	Credit
30	70	0	0	0	100	03

Course Objectives

- To learn the fundamentals of web essentials and markup languages
- To use the Client side technologies in web development
- To use the Server side technologies in web development
- To understand the web services and frameworks

Course Outcomes

At the end of the Course, Students will be able to,
- Implement and analyze behavior of web pages using HTML and CSS
- Apply the client side technologies for web development
- Analyze the concepts of Servlet and JSP
- Analyze the Web services and frameworks
- Apply the server side technologies for web development
- Create the effective web applications for business functionalities using latest web development platforms

SYLLABUS

Unit	Course Content	Hours
I	**Web Essentials and Mark-up language- HTML**	07
	The Internet, basic internet protocols, the World Wide Web, HTTP Request message, HTTP response message, web clients, web servers.**HTML**: Introduction, history and versions.**HTML elements**: headings, paragraphs, line break, colors and fonts, links, frames, lists, tables, images and forms, Difference between HTML and HTML5. **CSS**: Introduction to Style Sheet, CSS features, CSS core syntax, Style sheets and HTML, Style rule cascading and inheritance, text properties. Bootstrap.	
II	**Client Side Technologies: JavaScript and DOM**	07
	JavaScript: Introduction to JavaScript, JavaScript in perspective, basic syntax, variables and data types,statements, operators, literals, functions, objects, arrays, built in objects, JavaScript debuggers. **DOM**: Introduction to Document Object Model, DOM history and levels, intrinsic event handling, modifying element style, the document tree, DOM event handling, jQuery, Overview of Angular JS.	
III	**Java Servlets and XML**	07
	I Servlet: Servlet architecture overview, A "Hello World" servlet, Servlets generating dynamic content, Servlet life cycle, parameter data, sessions, cookies, URL rewriting, other Servlet capabilities, data storage, Servlets concurrency, databases (MySQL) and Java Servlets. **XML**: XML documents and vocabularies, XML declaration, XML Namespaces, DOM based XML processing, transforming XML documents, DTD: Schema, elements, attributes. **AJAX**: Introduction, Working of AJAX.	
IV	**JSP and Web Services**	07
	JSP: Introduction to Java Server Pages, JSP and Servlets, running JSP applications, Basic JSP, JavaBeans classes and JSP, Support for the Model-View-Controller paradigm, JSP related technologies. **Web Services**: Web Service concepts, Writing a Java Web Service, Writing a Java web service client, Describing Web Services: WSDL, Communicating Object data: SOAP. **Struts**: Overview, architecture, configuration, actions, interceptors, result types, validations, localization, exception handling, annotations.	
V	**Server Side Scripting Languages**	07
	PHP: Introduction to PHP, uses of PHP, general syntactic characteristics, Primitives, operations and expressions, output, control statements, arrays,	

		functions, pattern matching, form handling, files, cookies, session tracking, using MySQL with PHP, WAP and WML. **Introduction to ASP.NET**: Overview of the .NET Framework, Overview of C#, Introduction to ASP.NET, ASP.NET Controls, Web Services. Overview of Node JS.	
	VI	**Ruby and Rails**	07
		Introduction to Ruby: Origins & uses of Ruby, scalar types and their operations, simple input and output, control statements, fundamentals of arrays, hashes, methods, classes, code blocks and iterators, pattern matching. **Introduction to Rails**: Overview of Rails, Document Requests, Processing Forms, Rails Applications and Databases, Layouts, Rails with Ajax. Introduction to EJB.	

Teaching Plan

Sr. No.	Unit	Topics to be covered	Book Referred	Total Lecture Planned
1	I	The Internet, basic internet protocols, the World Wide Web, HTTP Request message, HTTP response message, web clients, web servers.HTML: Introduction, history and versions.HTML elements: headings, paragraphs, line break, colors and fonts, links, frames, lists, tables, images and forms, Difference between HTML and HTML5. CSS: Introduction to Style Sheet, CSS features, CSS core syntax, Style sheets and HTML, Style rule cascading and inheritance, text properties. Bootstrap.	1.1,2.1	7
2	II	JavaScript: Introduction to JavaScript, JavaScript in perspective, basic syntax, variables and data types, statements, operators, literals, functions, objects, arrays, built in objects, JavaScript debuggers. DOM: Introduction to Document Object Model, DOM history and levels, intrinsic event handling, modifying element style, the document tree, DOM event handling, jQuery, Overview of Angular JS.	1.1,1.2,2.1	7
3	III	Servlet: Servlet architecture overview, A "Hello	1.1,1.2	7

		World" servlet, Servlets generating dynamic content, Servlet life cycle, parameter data, sessions, cookies, URL rewriting, other Servlet capabilities, data storage, Servlets concurrency, databases (MySQL) and Java Servlets. XML: XML documents and vocabularies, XML declaration, XML Namespaces, DOM based XML processing, transforming XML documents, DTD: Schema, elements, attributes. AJAX: Introduction, Working of AJAX.		
4	IV	JSP: Introduction to Java Server Pages, JSP and Servlets, running JSP applications, Basic JSP, JavaBeans classes and JSP, Support for the Model-View-Controller paradigm, JSP related technologies. Web Services: Web Service concepts, Writing a Java Web Service, Writing a Java web service client, Describing Web Services: WSDL, Communicating Object data: SOAP. Struts: Overview, architecture, configuration, actions, interceptors, result types, validations, localization, exception handling, annotations.	1.1,1.2	7
5	V	PHP: Introduction to PHP, uses of PHP, general syntactic characteristics, Primitives, operations and expressions, output, control statements, arrays, functions, pattern matching, form handling, files, cookies, session tracking, using MySQL with PHP, WAP and WML. Introduction to ASP.NET: Overview of the .NET Framework, Overview of C#, Introduction to ASP.NET, ASP.NET Controls, Web Services. Overview of Node JS.	1.1,1.2,2.1	7
6	VI	Introduction to Ruby: Origins & uses of Ruby, scalar types and their operations, simple input and output, control statements, fundamentals of arrays, hashes, methods, classes, code blocks and iterators, pattern matching. Introduction to Rails: Overview of Rails, Document Requests, Processing Forms, Rails Applications and Databases, Layouts, Rails with Ajax. Introduction to EJB.	1.2	7

1. Text Books:

1. Jeffrey C.Jackson, "Web Technologies: A Computer Science Perspective", Second Edition, Pearson Education, 2007, ISBN 978-0131856035

2. Robert W. Sebesta," Programming the World Wide Web", 4th Edition, Pearson education, 2008

2. Reference Books:

1. Marty Hall, Larry Brown, "Core Web Programming", Second Edition, Pearson Education, 2001, ISBN 978-0130897930.
2. H.M. Deitel, P.J. Deitel and A.B. Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006, ISBN 978-0131752429.
3. Chris Bates, "Web Programming Building Internet Applications", 3rd Edition, Wiley India, 2006.
4. Xue Bai et al, "The web Warrior Guide to Web Programming", Thomson, 2003.

Reference Web Links/ Research Paper/ Referred Book other than Mention in Syllabus:

- *e-Books:*

  1. https://www.w3.org/html/
  2. HTML, The Complete Reference http://www.htmlref.com/
  3. http://w3schools.org/
  4. http://php.net/
  5. https://jquery.com/
  6. https://developer.mozilla.org/en-US/docs/AJAX
  7. http://www.tutorialspoint.com/css/

- *MOOC/ Video Lectures available at:*

  1. http://www.nptelvideos.in/2012/11/internet-technologies.html
  2. https://freevideolectures.com/course/2308/internet-technology/25video lecture by Prof. Indranil Sengupta, IIT, Kharagpur
  3. https://www.digimat.in/nptel/courses/video/106105191/L01.html
  4. http://www.nptelvideos.com/php/php_video_tutorials.php

Unit No.-I-

Name of the Unit: Web Essentials and Mark-up language- HTML

Lecture No.	Details of the Topic to be covered	References
1	The Internet, basic internet protocols, the World Wide Web, HTTP Request message, HTTP response message, web clients, web servers	1.1
2	Introduction, history and versions.HTML elements: headings, paragraphs, line break, colors and fonts,	1.1, 2.1
3	Links, frames, lists, tables	1.1, 2.1
4	Images and forms, Difference between HTML and HTML5.	1.1, 2.2
5	Introduction to Style Sheet, CSS features, CSS core syntax, Style sheets and HTML	1.1, 2.3
6	Style rule cascading and inheritance, text properties	1.1, 2.2
7	Bootstrap	1.1, 2.2

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Write a difference between HTML and HTML5.

Q. 2	Explain features of CSS.

Q. 3	Explain HTPP request and response message.

Q. 4	Explain text properties of CSS with example.

Q. 5	Give a brief about Bootstrap.

Unit No.-II-

Name of the Unit: Client Side Technologies: JavaScript and DOM

Lecture No.	Details of the Topic to be covered	References
1	Introduction to JavaScript, JavaScript in perspective, basic syntax	1.1, 1.2
2	variables and data types, statements, operators, literals	1.1, 1.2, 2.3
3	functions, objects, arrays,	1.1, 1.2, 2.4
4	built in objects, JavaScript debuggers	1.2, 2.4
5	Introduction to Document Object Model, DOM history and levels	1.1, 1.2, 2.3
6	Intrinsic event handling, modifying element style, the document tree	1.1, 1.2, 2.2
7	DOM event handling, jQuery, Overview of Angular JS	1.1, 1.2, 2.2

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Explain JavaScript in detail.

Q. 2	What is DOM? Explain levels of DOM

Q. 3	Write a note on functions in JS.

Q. 4	Explain jQuery.

Q. 5	Write a note on Angular JS.

Unit No.-III

Name of the Unit: Java Servlets and XML

Lecture No.	Details of the Topic to be covered	References
1	Servlet architecture overview, A "Hello World" servlet, Servlets generating dynamic content	1.1, 1.2, 2.4
2	Servlet life cycle, parameter data, sessions, cookies	1.1, 1.2, 2.4
3	URL rewriting, other Servlet capabilities, data storage	1.1, 1.2, 2.4
4	Servlets concurrency, databases (MySQL) and Java Servlets	1.1, 1.2, 2.4
5	XML documents and vocabularies, XML declaration, XML Namespaces	1.1, 1.2, 2.3
6	DOM based XML processing, transforming XML documents, DTD: Schema, elements, attributes	1.1, 1.2, 2.3
7	AJAX: Introduction, Working of AJAX	1.1, 1.2, 2.1

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Differentiate between HTML and XML

Q. 2	Write a Java Servlet which will display "Hello Welcome" message.

Q. 3	What is AJAX? Explain Working of AJAX.

Q. 4	How do servlet work?

Q. 5	Explain life cycle of sevlet.

Unit No.-IV

Name of the Unit: JSP and Web Services

Lecture No.	Details of the Topic to be covered	References
1	Introduction to Java Server Pages, JSP and Servlets, running JSP applications, Basic JSP	1.1, 1.2, 2.2
2	JavaBeans classes and JSP, Support for the Model-View-Controller paradigm, JSP related technologies	1.1, 1.2, 2.2
3	Web Services: Web Service concepts, Writing a Java Web Service,	1.1, 1.2, 2.2
4	Writing a Java web service client, Describing Web Services: WSDL	1.1, 1.2, 2.2
5	Describing Web Services: WSDL, Communicating Object data: SOAP	1.1, 1.2, 2.2
6	Struts: Overview, architecture, configuration, actions, interceptors, result types	1.1, 1.2, 2.2
7	validations, localization, exception handling, annotations	1.1, 1.2, 2.2

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Draw and explain neat diagram which depict MVC to the struts architecture.

Q. 2	What are the Web services? List and explain layers in protocol stack of web services architecture.

Q. 3	What is JSP? Enlist advantages of JSP over CGI

Q. 4	Write a note on WSDL.

Q. 5	Identify and explain data tags from struts 2 which are used to manipulate data displayed on any web application page.

Unit No.-V

Name of the Unit: Server Side Scripting Languages

Lecture No.	Details of the Topic to be covered	References
1	Introduction to PHP, uses of PHP, general syntactic characteristics, Primitives	1.1, 1.2, 2.1
2	operations and expressions, output, control statements, arrays	1.1, 1.2, 2.2
3	functions, pattern matching, form handling, files, cookies	1.1, 1.2, 2.2
4	session tracking, using MySQL with PHP, WAP and WML	1.1, 1.2, 2.2
5	Overview of the .NET Framework, Overview of C#,	1.1, 1.2, 2.2
6	Introduction to ASP.NET, ASP.NET Controls	1.1, 1.2, 2.2
7	Web Services. Overview of Node JS	1.1, 1.2, 2.2

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	What are the benefits of using PHP?

Q. 2	How is MySQL Database connected to PHP? Explain PHP OOBC in detail

Q. 3	Classify data types of PHP and describe various data types in each types

Q. 4	What is a session? List the session tracking techniques.

Q. 5	Explain Node JS.

Unit No. -VI

Name of the Unit: Ruby and Rails

Lecture No.	Details of the Topic to be covered	References
1	Origins & uses of Ruby, scalar types and their operations, simple input and output	1.2, 2.2
2	control statements, fundamentals of arrays, hashes	1.2, 2.2
3	methods, classes, code blocks and iterators, pattern matching	1.2, 2.2
4	Overview of Rails, Document Requests	1.2, 2.2
5	Processing Forms, Rails Applications and Databases	1.2, 2.2
6	Layouts, Rails with Ajax	1.2, 2.2
7	Introduction to EJB	1.2, 2.2

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Explain input and output in Ruby.

Q. 2	Draw and explain scenario of client accessing remote EJB.

Q. 3	Explain Rails application and databases.

Q. 4	List some EJB clients

Q. 5	What are hashes in Ruby?

Subject 4: Artificial Intelligence

Weekly Work Loads(in Hrs)	Lecture	Tutorial	Practical
	03	-	-

Online/ In-sem	Theory	Practical	Oral	Term-work	Total Marks	Credit
30	70	0	0	0	100	03

Syllabus

Unit	Course Content	Hours
I	**Introduction**	07
	Introduction to Artificial Intelligence, Foundations of Artificial Intelligence, History of Artificial Intelligence, State of the Art, Risks and Benefits of AI, Intelligent Agents, Agents and Environments, Good Behavior: Concept of Rationality, Nature of Environments, Structure of Agents.	
II	**Problem-solving**	07
	Solving Problems by Searching, Problem-Solving Agents, Example Problems, Search Algorithms, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions, Searchin Complex Environments, Local Search and Optimization Problems.	
III	**Adversarial Search and Games**	07
	Game Theory, Optimal Decisions in Games, Heuristic Alpha–Beta Tree Search, Monte Carlo Tree Search, Stochastic Games, Partially Observable Games, Limitations of Game Search Algorithms, Constraint Satisfaction Problems (CSP), Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs.	
IV	**Knowledge**	07
	Logical Agents, Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic: A Very Simple Logic, Propositional	

		Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic, First-Order Logic, Representation Revisited, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.	
V	**Reasoning**		07
		Inference in First-Order Logic, Propositional vs. First-Order Inference, Unification and First-Order Inference, Forward Chaining, Backward Chaining, Resolution, Knowledge Representation, Ontological Engineering, Categories and Objects, Events, Mental Objects and Modal Logic, Reasoning Systems for Categories, Reasoning with Default Information	
VI	**Planning**		07
		Automated Planning, Classical Planning, Algorithms for Classical Planning, Heuristics for Planning,Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Time, Schedules, and Resources, Analysis of Planning Approaches, Limits of AI, Ethics of AI, Future of AI, AI Components, AI Architectures.	

Teaching Plan

Sr. No.	Unit	Topics to be covered	Book Referred	Total Lecture Planned
1	I	Introduction to Artificial Intelligence, Foundations of Artificial Intelligence, History of Artificial Intelligence, State of the Art, Risks and Benefits of AI, Intelligent Agents, Agents and Environments, Good Behavior: Concept of Rationality, Nature of Environments, Structure of Agents.	T1	07
2	II	Solving Problems by Searching, Problem-Solving Agents, Example Problems, Search Algorithms, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions, Search in Complex Environments, Local Search and	T1,T2	07

		Optimization Problems.		
3	III	Game Theory, Optimal Decisions in Games, Heuristic Alpha–Beta Tree Search, Monte Carlo Tree Search, Stochastic Games, Partially Observable Games, Limitations of Game Search Algorithms, Constraint Satisfaction Problems (CSP), Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs.	T1, T2, T3	07
4	IV	Logical Agents, Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic: AVery Simple Logic, Propositional Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic, First-Order Logic, Representation Revisited, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.	T1, T2	07
5	V	Inference in First-Order Logic, Propositional vs. First-Order Inference, Unification and First-Order Inference, Forward Chaining, Backward Chaining, Resolution, Knowledge Representation, Ontological Engineering, Categories and Objects, Events, Mental Objects and Modal Logic, Reasoning Systems for Categories, Reasoning with Default Information	T1	07
6	VI	Automated Planning, Classical Planning, Algorithms for Classical Planning, Heuristics for Planning, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Time, Schedules, and Resources, Analysis of Planning Approaches, Limits of AI, Ethics of AI, Future of AI, AI Components, AI Architectures.	T1, T3	07

Text Books:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third edition, Pearson, 2003, ISBN :10: 0136042597

2. Deepak Khemani, "A First Course in Artificial Intelligence", McGraw Hill Education(India), 2013, ISBN : 978-1-25-902998-1

3. Elaine Rich, Kevin Knight and Nair, "Artificial Intelligence", TMH, ISBN-978-0-

07-008770- 5

Reference Books:

1. Nilsson Nils J , "Artificial Intelligence: A new Synthesis", Morgan Kaufmann Publishers Inc. San Francisco, CA, ISBN: 978-1-55-860467-4

2. Patrick Henry Winston, "Artificial Intelligence", Addison-Wesley Publishing Company, ISBN: 0-201-53377-4

3. Andries P. Engelbrecht-Computational Intelligence: An Introduction, 2nd Edition-Wiley India- ISBN: 978-0-470-51250-0

4. Dr. LavikaGoel, "Artificial Intelligence: Concepts and Applications", Wiley publication, ISBN: 9788126519934

5. Dr. Nilakshi Jain, "Artificial Intelligence, As per AICTE: Making a System Intelligent", Wiley publication, ISBN: 9788126579945

Reference Web Links/ Research Paper/ Referred Book other than Mention in Syllabus:

- Artificial Intelligence and Machine Learning Book– *By Vinod Chandra S. S.*

- https://www.youtube.com/playlist?list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH

- https://www.javatpoint.com/artificial-intelligence-ai

Unit No: I Introduction

Lecture No.	Details of the Topic to be covered	References
1	Introduction to Artificial Intelligence, Foundations of Artificial Intelligence	T1.1
2	History of Artificial Intelligence, State of the Art	T1.1
3	Risks and Benefits of AI,	T1.2
4	Intelligent Agents	T1.2
5	Agents and Environments	T1.2
6	Good Behavior: Concept of Rationality, Nature of Environments	T1.2
7	Structure of Agents	T1.2

Question Bank: Theory& Numerical
Mapped to Course Outcome:

Q. 1	Explain four main approaches to AI

Q. 2	Explain Risk & Benefits of AI

Q. 3	What are PEAS descriptors? Give PEAS descriptors for Part - picking Robot.

Q. 4	Explain Model-based Reflex Agent with block diagram.

Q. 5	What are the basic building blocks of learning agents? Explain each of them with a neat block diagram

Unit No.-II Problem-solving

Lecture No.	Details of the Topic to be covered	References
1	Solving Problems by Searching, Problem-Solving Agents	T1.3
2	Example Problems : 8 puzzle, N queens	T1.3
3	Search Algorithms, Uninformed Search Strategies	T1.3
4	Uninformed Search Strategies	T1.3,T2.2
5	Informed (Heuristic) Search Strategies	T1.4
6	Heuristic Functions, Search in Complex Environments	T1.4,T2.3
7	Local Search and Optimization Problems	T1.4, T2.3

Question Bank: Theory& Numerical
Mapped to Course Outcome:

Q. 1	Differentiate between DFS & BFS

Q. 2	What is a heuristic function? Explain with the help of examples.

Q. 3	Explain A* algorithm with example

Q. 4	Explain Hill Climbing algorithm. What are its limitations?

Q. 5	Differentiate between uninformed and informed search algorithms

Unit No.-III Adversarial Search and Games

Lecture No.	Details of the Topic to be covered	References
1	Game Theory, Optimal Decisions in Games	T1.5
2	Heuristic Alpha–Beta Tree Search	T3.12
3	Monte Carlo Tree Search, Stochastic Games	T3.12
4	Partially Observable Games	T2.8
5	Limitations of Game Search Algorithms	T2.8
6	Constraint Satisfaction Problems (CSP)	T2.9, T3.3
7	Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs	T2.9

Question Bank: Theory& Numerical
Mapped to Course Outcome:

Q. 1	What is Game Tree? Draw game tree of tic-tac-toe problem.

Q. 2	Explain minimax algorithm with an example.

Q. 3	Give α-β pruning algorithm with an example and its properties; also explain why it is called α-β pruning.

Q. 4	What is CSP? Explain with the example

Q. 5	What are the limitations of Game search algorithms?

Unit No.-IV Knowledge

Lecture No.	Details of the Topic to be covered	References
1	Logical Agents, Knowledge-Based Agents	T1.6
2	The Wumpus World	T1.6
3	Logic, Propositional Logic: A Very Simple Logic	T1.6
4	Propositional Theorem Proving, Effective Propositional Model Checking	T1.6, T2.12
5	Agents Based on Propositional Logic, First-Order Logic	T1.7, T2.12
6	Representation Revisited, Syntax and Semantics of First-Order Logic, Using First-Order Logic	T1.7
7	Knowledge Engineering in First-Order Logic	T1.7

Question Bank: Theory& Numerical
Mapped to Course Outcome:

Q. 1	Explain WUMPUS World Environment giving its PEAS description.

Q. 2	Explain knowledge representation structures and compare them.

Q. 3	Explain the inference process in case of propositional logic with suitable examples

Q. 4	Write short note on first order predicate logic

Q. 5	Write syntax and semantics of FOL with example.

Unit No.-V Reasoning

Lecture No.	Details of the Topic to be covered	References
1	Inference in First-Order Logic, Propositional vs. First-Order Inference	T1.9
2	Unification and First-Order Inference	T1.9
3	Forward Chaining, Backward Chaining	T1.9
4	Resolution, Knowledge Representation, Ontological Engineering	T1.9
5	Categories and Objects, Events, Mental Objects and Modal Logic	T1.10
6	Reasoning Systems for Categories	T1.10
7	Reasoning with Default Information	T1.10

Question Bank: Theory& Numerical
Mapped to Course Outcome:

Q. 1	Explain Forward Chaining process with the help of example.

Q. 2	Differentiate between Forward Chaining and Backward Chaining

Q. 3	Explain Unification algorithm with example.

Q. 4	Differentiate between propositional logic and predicate logic.

Q. 5	Write a short note on : Semantic Networks

Unit No.-VI Planning

Lecture No.	Details of the Topic to be covered	References
1	Automated Planning, Classical Planning	T1.11
2	Algorithms for Classical Planning	T1.11
3	Heuristics for Planning	T1.11
4	Hierarchical Planning, Planning and Acting in Nondeterministic Domains	T3.13
5	Time, Schedules, and Resources	T3.13
6	Analysis of Planning Approaches, Limits of AI	T3.13
7	Ethics of AI, Future of AI, AI Components, AI Architectures.	T3.14

Question Bank: Theory& Numerical
Mapped to Course Outcome:

Q. 1	Compare and contrast problem solving agent and planning agent.

Q. 2	Explain goal of planning with supermarket example.

Q. 3	Explain time, schedulers and resources in temporal domain with the help of example

Q. 4	Explain regression planners with example.

Q. 5	Write short note on ethics of AI and limitations of AI.

Subject 5: Elective I -Pattern Recognition

Weekly Work Loads(in Hrs)	Lecture	Tutorial	Practical
	03	-	-

Online/ In-sem	Theory	Practical	Oral	Term-work	Total Marks	Credit
30	70	0	0	0	100	03

Course Objectives:
- To understand fundamentals of pattern recognition.
- To Study syntactic approach in pattern recognition.
- To study statistical approach in pattern recognition.
- To study artificial neural network-based pattern recognition.

Course Outcomes:
On completion of the course, learner will be able to–
- Distinguish variety of pattern recognition, classification and combination techniques.
- Apply statistical pattern recognition approaches in variety of problems.
- Elaborate different approaches of syntactic pattern recognition.
- Differentiate graphical approach and grammatical inferences in syntactic pattern recognition.
- Illustrate the artificial neural network-based pattern recognition
- Apply unsupervised learning in pattern recognition.

Syllabus

Unit	Course Content	Hours
I	**Introduction to Pattern Recognition**	07
	Pattern Recognition, Classification and Description, **Pattern and Feature Extraction with Examples**: Patterns and Features, Pattern Distortions, Examples: Features Extraction Using Generalized Cylinders for 3-D object Description and Classification, Generating RST Invariant Features and Application to 2-D Figure Recognition, The Feature Vector and Feature Space, Classifiers, Decision Regions and Boundaries and Discriminant Functions, **Training and Learning in PR Systems:** using A Priori knowledge or Experience, Learning Curves, Training Approaches, **Pattern Recognition Approaches:** Statistical, Syntactic, Neural Patten Recognition Approach, Examples of Pattern Recognition Approaches**.**	
II	**Statistical Pattern Recognition**	07
	Introduction to statistical pattern recognition, The Gaussian case and class dependance, Discriminant function, Additional Examples, Extensions: Training, Alternative Classification Procedures, Unsupervised Approaches, Classifier Performance, Risk and Errors: Measurement of Classification Performance, General Measures of Classification Risk.	
III	**Syntactic Pattern Recognition**	07
	Overview, Qualifying structure in Pattern Description and Recognition, Grammar-Based Approach and Applications, Elements of Formal Grammars, Examples of String Generation as Pattern Description, Syntactic **Recognition Via Parsing and other Grammars**: -Recognition of Syntactic Descriptions, Parsing, CYK Parsing Algorithm, ATN in Parsing, Higher Dimensional Grammars, Stochastic Grammars and Applications.	
IV	**Graphical Approaches & Grammatical Inference inSyntactic Pattern Recognition**	07
	Graphical Approaches: Graph Based Structural Representation, Graph Isomorphism, A StructuredStrategy to Compare Attribute Graphs, Other Attributed Graph Distance or Similarity measures. **Learning Via Grammatical Inference:** Learning Grammars, Problem formulation, Grammatical Inference (GI) Approaches, Procedures to Generate Constrained Grammars.	
V	**Neural Pattern Recognition**	06

	Introduction to Neural Networks: Neurons and Neural Nets, Neural Network Structures for PR Applications, Physical Neural Networks, The Artificial Neural Network Model. **Introduction to Neural Pattern Associators and Matrix Approaches:** Neural Network Based Pattern Associators, Matrix Approaches (Linear Associative Mappings) and Examples	
VI	**Feedforward Networks & Unsupervised Learning inNeural Pattern Recognition**	06
	Multilayer, Feedforward Network Structure, Training the Feedforward Network: The Delta Rule, Generalized Delta Rule(GDR), Extension of the DR for Units in the Hidden layers, Pattern Associator for Character Classification, **Unsupervised Learning in NeurPR: Self organizing Networks:** Introduction, Adaptive Resonance Architectures, Self-Organizing Feature Maps(Kohonen).	

Teaching Plan

Sr. No.	Unit	Topics to be covered	Book Referred	Total Lecture Planned
1	I	Pattern Recognition, Classification and Description, Pattern and Feature Extraction with Examples: Patterns and Features, Pattern Distortions, Examples: Features Extraction Using Generalized Cylinders for 3-D object Description and Classification, Generating RST Invariant Features and Application to 2-D Figure Recognition, The Feature Vector and Feature Space, Classifiers, Decision Regions and Boundaries and Discriminant Functions, Training and Learning in PR Systems: using A Priori knowledge or Experience, Learning Curves, Training Approaches, Pattern Recognition Approaches: Statistical, Syntactic, Neural Patten Recognition Approach, Examples of Pattern Recognition Approaches.	T1	07
2	II	Introduction to statistical pattern recognition, The	T1,T2	07

		Gaussian case and class dependance, Discriminant function, Additional Examples, Extensions: Training, Alternative Classification Procedures, Unsupervised Approaches, Classifier Performance, Risk and Errors: Measurement of Classification Performance, General Measures of Classification Risk.		
3	III	Overview, Qualifying structure in Pattern Description and Recognition, Grammar-Based Approach and Applications, Elements of Formal Grammars, Examples of String Generation as Pattern Description, Syntactic Recognition Via Parsing and other Grammars: -Recognition of Syntactic Descriptions, Parsing, CYK Parsing Algorithm, ATN in Parsing, Higher Dimensional Grammars, Stochastic Grammars and Applications.	T1, T2	07
4	IV	Graphical Approaches: Graph Based Structural Representation, Graph Isomorphism, A Structured Strategy to Compare Attribute Graphs, Other Attributed Graph Distance or Similarity measures. Learning Via Grammatical Inference: Learning Grammars, Problem formulation, Grammatical Inference (GI) Approaches, Procedures to Generate Constrained Grammars.	T1, T2	07
5	V	Introduction to Neural Networks: Neurons and Neural Nets, Neural Network Structures for PR Applications, Physical Neural Networks, The Artificial Neural Network Model. Introduction to Neural Pattern Associators and Matrix Approaches: Neural Network Based Pattern Associators, Matrix Approaches (Linear Associative Mappings) and Examples	T1	07
6	VI	Multilayer, Feedforward Network Structure, Training the Feedforward Network: The Delta Rule, Generalized Delta Rule(GDR), Extension of the DR for Units in the Hidden layers, Pattern Associator for Character Classification, Unsupervised Learning in NeurPR: Self organizing Networks: Introduction,	T1, T2	07

		Adaptive Resonance Architectures, Self-Organizing Feature Maps(Kohonen).		

Text Books:

1. ROBBERT SCHALKOFF, "Pattern Recognition: Statistical, Structural and NeuralApproaches", Willey Publication, ISBN978-81-245-1370-3
2. R.O.Duda, P.E.Hart and D.G.Stork, "Pattern Classification", John Wiley,ISBN-978-0-471-05669-0

Reference Books:

1. Earl Gose, Richard Johnsonbaugh, Steve Jost, "Pattern Recognition and Image Analysis"

2. Andrew R.Webb, Keith D.Copsey,"Statistical Pattern Recognition",3rd edition Wiely , ISBN:978-0-470-68227-2

3. Christopher M. Bishop,"Neural network for Pattern Recognition," Oxford University Press,ISBN-978-0-19-853864-6

Reference Web Links/ Research Paper/ Referred Book other than Mention in Syllabus:

- http://users.isr.ist.utl.pt/~wurmd/Livros/school/Bishop%20%20Pattern%20Recognition%20And% 20Machine%20Learning%20-%20Springer%20%202006.pdf

- https://darmanto.akakom.ac.id/pengenalanpola/Pattern%20Recognition%204th%20Ed.%20(2009).pdf

- https://www.inf.ed.ac.uk/teaching/courses/nlu/assets/reading/Gurney_et_al.pdf

Unit No.-I-

Name of the Unit: Introduction to Pattern Recognition

Lecture No.	Details of the Topic to be covered	References
1	Pattern Recognition, Classification and Description, , The, Training and Learning in PR Systems: using A Priori knowledge or Experience, Learning Curves,	1.1
2	Pattern and Feature Extraction with Examples: Patterns and Features,	1.1
3	Pattern Distortions, Examples: Features Extraction Using Generalized Cylinders for 3-D object Description and Classification,	1.2,1.3
4	Generating RST Invariant Features and Application to 2-D Figure Recognition	1.2, 1.3
5	Feature Vector and Feature Space, Classifiers, Decision Regions and Boundaries and Discriminant Functions	1.1, 1.2,
6	Training Approaches, Pattern Recognition Approaches: Statistical, Syntactic, Neural Patten Recognition Approach,	1.1,1.2,
7	Examples of Pattern Recognition Approaches.	1.1, 1.2

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	What are the key components of pattern recognition, and how do they relate to each other?

Q. 2	Describe the process of feature extraction using generalized cylinders for 3-D object description and classification.

Q. 3	Explain the concept of the feature vector and feature space in pattern recognition.

Q. 4	What are classifiers, decision regions, boundaries, and discriminant functions, and how do they contribute to pattern recognition tasks?

Q. 5	Discuss the role of training and learning in pattern recognition systems, particularly in terms of using a priori knowledge or experience.

Unit No.-II-

Name of the Unit: Statistical Pattern Recognition

Lecture No.	Details of the Topic to be covered	References
1	Introduction to statistical pattern recognition,	1.1
2	The Gaussian case and class dependence	3.2,
3	, Discriminant function, Additional Examples,	2.6
4	Extensions: Training, Alternative Classification Procedures,	1.1, 1.2, 2.4
5	Unsupervised Approaches, Classifier Performance,	1.5
6	Risk and Errors: Measurement of Classification Performance	2.2
7	General Measures of Classification Risk.	,2.3

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Define statistical pattern recognition and explain its significance in data analysis.

Q. 2	Discuss the Gaussian case in statistical pattern recognition. How does it relate to the assumption of normality in data distributions?

Q. 3	Explain the concept of a discriminant function. How is it used in classification tasks?

Q. 4	Explore alternative classification procedures beyond the Gaussian case. What are some non-parametric approaches to classification?

Q. 5	Discuss the concept of risk and errors in classification tasks. How are they measured, and why is it important to quantify them?

Unit No.-III-

Name of the Unit: Syntactic Pattern Recognition

Lecture No.	Details of the Topic to be covered	References
1	Overview, Qualifying structure in Pattern Description and Recognition	2.1
2	Grammar-Based Approach and Applications, Elements of Formal Grammars	2.8
3	Examples of String Generation as Pattern Description	2.8
4	Syntactic Recognition Via Parsing	1.5
5	Other Grammars: -Recognition of Syntactic Descriptions, Parsing,	1.6
6	CYK Parsing Algorithm, ATN in Parsing,	1.6
7	Higher Dimensional Grammars, Stochastic Grammars and Applications.	2.8

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	What is the importance of pattern description and recognition in the field of artificial intelligence and data analysis? Provide examples to illustrate its significance.

Q. 2	Describe the grammar-based approach to pattern description and recognition. How are formal grammars utilized in this context?

Q. 3	Define the key elements of formal grammars used in pattern recognition. What are terminals, non-terminals, productions, and start symbols, and how are they defined?

Q. 4	Provide examples of string generation used as a method of pattern description. How can strings represent patterns, and how are they generated using formal grammars?

Q. 5	Describe the CYK parsing algorithm and its significance in syntactic recognition. How

does it work, and what types of grammars can it handle effectively?

Unit No.-IV-

Name of the Unit: Graphical Approaches & Grammatical Inference in Syntactic Pattern Recognition

Lecture No.	Details of the Topic to be covered	References
1	Graphical Approaches: Graph Based Structural Representation,	1.7
2	Graph Isomorphism, A Structured Strategy to Compare Attribute Graphs	1.7.2
3	Other Attributed Graph Distance or Similarity measures.	1.7.3
4	Learning Via Grammatical Inference	1.7.4
5	Learning Grammars, Problem formulation,	1.7.3
6	Grammatical Inference (GI) Approaches,	1.7.3
7	Procedures to Generate Constrained Grammars.	1.7.3

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Explain the concept of graph-based structural representation in pattern recognition. How are graphs used to represent data structures?

Q. 2	What is graph isomorphism? Discuss its significance in pattern recognition and computational complexity

Q. 3	Describe a structured strategy to compare attribute graphs. How do you compare graphs with attributes or properties?

Q. 4	Define the process of learning grammars in the context of pattern recognition. Why is grammatical inference important?

Q. 5	Explore various attributed graph distance or similarity measures used in pattern recognition. Compare and contrast different approaches and discuss their advantages and limitations.

Unit No.-V-

Name of the Unit: Introduction to Pattern Recognition

Lecture No.	Details of the Topic to be covered	References
1	Introduction to Neural Networks: Neurons and Neural Nets	1.9
2	Neural Network Structures for PR Applications	1.9
3	Physical Neural Networks, The Artificial Neural Network Model.	1.10
4	Introduction to Neural Pattern Associators and Matrix Approaches	1.11
5	Neural Network Based Pattern Associators,	1.11
6	Matrix Approaches (Linear Associative Mappings) and Examples	1.12
7	Matrix Approaches (Linear Associative Mappings) and Examples	1.12

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Define neurons and neural nets in the context of artificial intelligence. How do neurons mimic biological neurons, and how are they interconnected to form neural networks?

Q. 2	Explore the concept of physical neural networks. How are physical systems utilized to implement neural network models, and what are the advantages of such implementations?

Q. 3	Explain the artificial neural network model. What are the components of an artificial neural network, and how do they function together to process input data and produce output?

Q. 4	Discuss matrix approaches, specifically linear associative mappings, in pattern recognition. How are matrices utilized to associate input patterns with desired output patterns, and what are some examples of their applications?

Q. 5	Discuss different neural network structures commonly used in pattern recognition applications. What are feedforward, recurrent, and convolutional neural networks, and how are they applied in practice?

Unit No.-VI-

Name of the Unit: Statistical Pattern Recognition

Lecture No.	Details of the Topic to be covered	References
1	Multilayer, Feedforward Network Structure	1.10
2	Training the Feedforward Network: The Delta Rule, Generalized Delta Rule(GDR)	1.10
3	Extension of the DR for Units in the Hidden layers	1.11
4	Pattern Associator for Character Classification	1.11
5	Unsupervised Learning in NeurPR: Self organizing Networks:	1.11,1.12
6	Introduction, Adaptive Resonance Architectures	1.11,1.12
7	Self-Organizing Feature Maps(Kohonen)	1.11,1.12

Question Bank: Theory & Programs
Mapped to Course Outcome:

Q. 1	Describe the structure of a multilayer feedforward neural network. What are the input layer, hidden layers, and output layer, and how are they interconnected?

Q. 2	Explain the concept of feedforward propagation in a neural network. How is information processed and transmitted through the network layers during feedforward operation?

Q. 3	Provide an introduction to self-organizing networks in unsupervised learning. What is the goal of self-organizing networks, and how do they differ from supervised learning approaches?

Q. 4	Discuss Adaptive Resonance Architectures (ARAs) in unsupervised learning. How do ARAs adapt to input patterns and self-organize to form stable representations?

Q. 5	Explain the concept of Self-Organizing Feature Maps (SOFMs) or Kohonen maps. How do SOFMs learn to represent high-dimensional input data in a lower-dimensional space while preserving topological properties?

Subject 5: Elective I - Human Computer Interface

Weekly Work Loads(in Hrs)	Lecture	Tutorial	Practical
	03	**-**	**-**

Online/ In-sem	Theory	Practical	Oral	Term-work	Total Marks	Credit
30	70	0	0	0	100	03

Course Objectives:
- To understand the importance of HCI design process in software development
- To learn fundamental aspects of designing and implementing user interfaces
- To study HCI with technical, cognitive and functional perspectives
- To acquire knowledge about variety of effective human-computer-interactions
- To co-evaluate the technology with respect to adapting changing user requirements in interacting with computer

Course Outcomes:
On completion of the course, learner will be able to–

- Design effective Human-Computer-Interfaces for all kinds of users
- Apply and analyze the user-interface with respect to golden rules of interface
- Analyze and evaluate the effectiveness of a user-interface design
- Implement the interactive designs for feasible data search and retrieval
- Analyze the scope of HCI in various paradigms like ubiquitous computing, virtual reality ,multi-media, World wide web related environments
- Analyze and identify user models, user support, and stakeholder requirements of HCIsystems

Syllabus

Unit	Course Content	Hours
I	**Introduction and Foundation of HCI**	07
	Foundation: Human Memory. **Thinking**: Reasoning and Problem Solving, Emotion, Individual Difference, Psychology and design of Interactive systems, The Computer-Text Entry Device, Positioning, Pointing, Display devices, Devices for virtual reality and 3D Interaction, The Interactions-Models of Interaction, Frameworks and HCI, Ergonomics, Interaction styles, Ergonomics, Elements of WIMP Interface, Interactivity, Measurable Human Factors, The context of Interaction. **Importance of User Interface**: Defining user Interface, Brief History of Human- Computer Interface, Good and Poor Design- Importance of good design.	
II	**Human Perspective in Interaction Design Process**	07
	Know your user/client: Understanding how people interact with computers, Important human characteristics in Design, Human considerations in design of Business systems, Human Interaction speeds, Performance versus Preference, Methods of gaining an understanding of users, Miller's Law. **Design Guidelines**: Navigating the interface, Organizing the display, Getting user's attention, Facilitating data entry. **Principles**: Determine user's skill level, Identify the tasks, Choose an interaction style, Natural Language, Eight Golden rules of Interface design, Prevent errors, Ensuring. Human control while increasing automation. **Theories**: Design-by-level, Stages of action,Consistency, Contextual Theories, Dynamic theories.	
III	**Interaction Styles and HCI in Software Process**	07
	Design, Process of Interaction Design. **Interaction styles**: Command line, Menu Selection, Form fill-in, Direct Manipulation. **Graphical User Interface:** Popularity of Graphics, Concept of direct manipulation, Advantages, Disadvantages and characteristics of Graphical user interface. **Web User Interface**: Popularity and Characteristics, Merging of Graphical business systems and the Web-Characteristics of Intranet versus Internet, Web page versus application design, Principles for user interface design, Software life cycle, Usability Engineering, Iterative design and prototyping, Design Rationale.	
IV	**Usability Evaluation and Universal Design**	07

	User interface design process: Designing for People: Seven commandments, Usability Assessment in the Design process, Common Usability problems, Practical and Objective measures of Usability, Formative and Summative evaluation, Usability specifications for evaluation, Analytic methods, Model based analysis, GOMS model, Empirical methods, Field studies, Usability testing in Laboratory, Controlled experiments, Heuristic Evaluation, Cognitive Walkthrough. **Evaluation framework**: Paradigms and techniques, DECIDE: a framework to guide evaluation, Universal design principles, Multi-modal interaction, Designing for diversity.	
V	**HCI Paradigms**	07
	Paradigms for Interaction: Time sharing, Video display units, Programming toolkits, Personal computing, The metaphor, Direct manipulation, Hypertext, Computer-supported cooperative work, Agent based interfaces. **Ubiquitous Computing**: Sensor-based and context-aware interaction, Data Integrity versus Data immunity, Handling missing data, Data entry and fudge ability, Auditing versus Editing, Retrieval in Physical World, Retrieval in Digital world, Constrained Natural Language output, Five stage search framework, Dynamic queries and faceted search, The social aspects of search. **Pattern Recognition**: Introduction, Examples, Role of Machine Learning, Pattern Recognition Process, Pattern Recognition in HCI.	
VI	**HCI for Mobile and Handheld devices**	07
	Multilayer, Feedforward Network Structure, Training the Feedforward Network: The Delta Rule, Generalized Delta Rule(GDR), Extension of the DR for Units in the Hidden layers, Pattern Associator for Character Classification, **Unsupervised Learning in NeurPR: Self organizing Networks:** Introduction, Adaptive Resonance Architectures, Self-Organizing Feature Maps(Kohonen).	

Teaching Plan

Sr. No.	Unit	Topics to be covered	Book Referred	Total Lecture Planned
1	I	Foundation: Human Memory. Thinking: Reasoning and Problem Solving, Emotion, Individual Difference, Psychology and design of Interactive systems, The Computer-Text Entry Device, Positioning, Pointing, Display devices, Devices for virtual reality and 3D Interaction, The Interactions-Models of Interaction, Frameworks and HCI, Ergonomics, Interaction styles, Ergonomics, Elements of WIMP Interface, Interactivity, Measurable Human Factors, The context of Interaction. Importance of User Interface: Defining user Interface, Brief History of HumanComputer Interface, Good and Poor Design- Importance of good design	. Mary Beth Rosson and John M. Carroll, "Usability Engineering: Scenario-Based Development of Human-Computer Interaction", Morgan Kaufmann Publishers, ISBN 978-1- 558-60712-5	07
2	II	Know your user/client: Understanding how people interact with computers, Important human characteristics in Design, Human considerations in design of Business systems, Human Interaction speeds, Performance versus Preference, Methods of gaining an understanding of users, Miller's Law. Design Guidelines: Navigating the interface, Organizing the display, Getting user's attention, Facilitating data entry. Principles: Determine user's skill level, Identify the tasks, Choose an interaction style, Natural Language, Eight Golden rules of Interface design, Prevent errors, Ensuring Human control while increasing automation. Theories: Design-by-level, Stages of action, Consistency, Contextual Theories, Dynamic theories	. Mary Beth Rosson and John M. Carroll, "Usability Engineering: Scenario-Based Development of Human-Computer Interaction", Morgan Kaufmann Publishers, ISBN 978-1- 558-60712-5	07
3	III	Design, Process of Interaction Design. Interaction styles: Command line, Menu Selection, Form fill-in, Direct Manipulation. Graphical User Interface: Popularity of Graphics, Concept of direct manipulation, Advantages, Disadvantages and characteristics of Graphical user interface. Web User Interface: Popularity and Characteristics, Merging of Graphical business systems and the WebCharacteristics of Intranet versus Internet, Web page versus application design, Principles for user interface design, Software life cycle, Usability Engineering,	Jenifer Tidwell, "Designing Interfaces", O'REILLY, ISBN: 978-1-449-37970-4	07

		Iterative design and prototyping, Design Rationale.		
4	IV	User interface design process: Designing for People: Seven commandments, Usability Assessment in the Design process, Common Usability problems, Practical and Objective measures of Usability, Formative and Summative evaluation, Usability specifications for evaluation, Analytic methods, Model based analysis, GOMS model, Empirical methods, Field studies, Usability testing in Laboratory, Controlled experiments, Heuristic Evaluation, Cognitive Walkthrough. Evaluation framework: Paradigms and techniques, DECIDE: a framework to guide evaluation, Universal design principles, Multi-modal interaction, Designing for diversity.	Julie A. Jacko (Ed), "The Human-Computer Interaction Handbook", 3rd edition, CRC Press, 2012	07
5	V	Paradigms for Interaction: Time sharing, Video display units, Programming toolkits, Personal computing, The metaphor, Direct manipulation, Hypertext, Computer-supported cooperative work, Agent based interfaces. Ubiquitous Computing: Sensor-based and context-aware interaction, Data Integrity versus Data immunity, Handling missing data, Data entry and fudge ability, Auditing versus Editing, Retrieval in Physical World, Retrieval in Digital world, Constrained Natural Language output, Five stage search framework, Dynamic queries and faceted search, The social aspects of search. Pattern Recognition: Introduction, Examples, Role of Machine Learning, Pattern Recognition Process, Pattern Recognition in HCI	Alan Cooper, Robert Reiman, David Cronin, Christopher Noessel, "About Face: The Essentials of Interaction Design", 4th edition, WILEY, ISBN 978-1-118-76658-3	07
6	VI	Designing for Mobile and other devices: Anatomy of a Mobile app, Mobile form factors, Handheld format apps, Tablet format apps, Mini-tablet format apps, Mobile Navigation, Content, and control idioms- browse controls, Navigation and toolbars, Drawers, Tap-to-reveal and direct manipulation, Searching, Sorting and Filtering, Welcome and help screens, Multi-touch gestures, Inter-app integration, Android Accessibility Guidelines. Other devices: Designing for kiosks, Designing for 10-foot interfaces, Designing for automotive interfaces, Designing for audible interfaces	Basu M., Ho T.K. (eds) "Data Complexity in Pattern Recognition. Advanced Information and Knowledge Processing", Springer, London	07

Text Books:

4. Dr. V.K. Pachghare, Cryptography and Information Security, PHI, ISBN 978-81-303- 5082-3

5. Nina Godbole,SunitBelapure, Cyber Security,Wiley India, ISBN:978-81-345-2179-1

Reference Books:

6. William Stallings, "Cryptography and Network Security: Principles and Practice", 7/e, Pearson, ISBN:9789332585225.

7. . Atul Kahate, "Cryptography and Network Security", Mc Graw Hill Publication, 2nd Edition, 2008, ISBN : 978-0-07-064823-4

Reference Web Links/ Research Paper/ Referred Book other than Mention in Syllabus:

- https://www.simplilearn.com/introduction-to-cyber-security-beginners-guide-pdf

- https://pearsoned.co.in/web/books/9789332585225_Cryptography-and-NetworkSecurity_William -Stallings.aspx

- http://84.209.254.175/linux-pdf/Hacking-Exposed-7-Network-SecuritySecrets.pd

Unit No.-I- Introduction

Lecture No.	Details of the Topic to be covered	References
1	Introduction	Pearson -Cryptography and Network Security
2	Elements of Information Security	Mc Graw Hill Publication Cryptography and Network Security
3	security Policy, Techniques, Steps, Categories	Pearson -Cryptography and Network Security
4	Operational Model of Network Security	Mc Graw Hill Publication Cryptography and Network Security
5	Basic Terminologies in Network Security.	Pearson -Cryptography and Network Security
6	Threats and Vulnerability, Difference between Security and Privacy.	McGrowHill -Hacking Exposed Network Security Secrets and Solutions,

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	List and explain element of information security.

Q. 2	What are security approaches to used to implement security policies

Q. 3	Describe 1) Distributed Denial-of-Service (DDoS) 2) Phishing.

Q. 4	Draw and explain operational model of Network Security.

Q. 5	What is passive and active attacks in information security explain with suitable

	diagram

Unit No.-II- Data Encryption Techniques and Standards

Lecture No.	Details of the Topic to be covered	References
1	Introduction, Encryption Methods: Symmetric, Asymmetric, Cryptography	Dr. V.K. Pachghare, Cryptography and Information Security
2	Substitution Ciphers. Transposition Ciphers	Dr. V.K. Pachghare, Cryptography and Information Security
3	Stenography applications and limitations, Block Ciphers and methods of operations	Dr. V.K. Pachghare, Cryptography and Information Security
4	Feistal Cipher	Dr. V.K. Pachghare, Cryptography
5	Data Encryption Standard (DES),Triple DES	Cyber Security, Wiley India
6	Weak Keys in DES Algorithms	Cyber Security ,Wiley India
7	Advance Encryption Standard (AES)	Cyber Security, Wiley India
8	Advance Encryption Standard (AES)	Cyber Security, Wiley India

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Describe a) Symmetric Encryption Method b) Asymmetric Encryption Method c) Cryptography d) Weak Key in DES

Q. 2	Explain different types of cryptography

Q. 3	Use Play fair cipher to encrypt the following message "This is a columnar transposition" use key - APPLE

Q. 4	Explain the operation of DES algorithm in detail

Q. 5	Explain operation of AES algorithm and state its application

Unit No.-III- Public Key and Management

Lecture No.	Details of the Topic to be covered	References
1	Public Key Cryptography, RSA Algorithm	Dr.V.K.Pachghare, Cryptography and Information Security
2	RSA Algorithm Key length, Security, Key Distribution,	Mc Graw Hill Publication Cryptography and Network Security
3	Deffie-Hellman Key Exchange	Mc Graw Hill Publication Cryptography and Network Security
4	Elliptic Curve: Arithmetic, Cryptography, Security,	Dr. V.K. Pachghare, Cryptography and Information Security
5	Authentication methods, Message Digest	Mc Graw Hill Publication Cryptography and Network Security
6	Kerberos, X.509 Authentication service	Mc Graw Hill Publication Cryptography and Network Security
7	Digital Signatures: Implementation, Algorithms, Standards (DSS)	Dr. V.K. Pachghare, Cryptography and Information Security
8	Authentication Protocol.	Mc Graw Hill Publication Cryptography and Network Security

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain various public key distribution approaches.
Q. 2	What is authentication? Explain various methods for authentication
Q. 3	What is Kerberas? Explain its operation
Q. 4	Explain A) Message Digest B) X.509 Authentication service
Q. 5	Describe elliptic curve cryptography.

Unit No.-IV- Security Requirements

Lecture No.	Details of the Topic to be covered	References
1	IP Security: Introduction, Architecture, IPV6, IPv4,	William Stallings, "Cryptography and Network Security
2	IPsec protocols, and Operations, AH Protocol,	William Stallings, "Cryptography and Network Security
3	AH Protocol, ESP Protocol, ISAKMP Protocol VPN. WEB Security	William Stallings, "Cryptography and Network Security
4	Secure Socket Layer (SSL) ,SSL Session and Connection,	William Stallings, "Cryptography and Network Security
5	SSL Record Protocol, Change Cipher Spec Protocol	William Stallings, "Cryptography and Network Security
6	Alert Protocol, Handshake Protocol.	William Stallings, "Cryptography and

		Network Security
7	Electronic Mail Security: Introduction, Pretty Good Privacy	William Stallings, "Cryptography and Network Security
8	MIME, S/MIME, Comparison. Secure Electronic Transaction SET	William Stallings, "Cryptography and Network Security

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Define IP security. Draw and explain the architecture of IP security.

Q. 2	What are different protocols used in IP security. Explain each protocol briefly.

Q. 3	Define Secure socket layer (SSL). Explain SSL record protocol briefly.

Q. 4	What is Electronic mail security? Explain the concept of pretty good privacy.

Q. 5	Explain the concept of virtual private network used for IP security.

Unit No.-V- Firewall and Intrusion

Lecture No.	Details of the Topic to be covered	References
1	Introduction, Computer Intrusions.	William Stallings, "Cryptography and Network Security:
2	Firewall Introduction, Characteristics and types	William Stallings, "Cryptography and Network Security:
3	Benefits and limitations. Firewall architecture	William Stallings, "Cryptography and Network Security:
4	Trusted Systems, Access Control.	William Stallings, "Cryptography and Network Security:
5	Intrusion detection, IDS: Need of IDS	William Stallings, "Cryptography and Network Security:
6	Methods, Types of IDS	William Stallings, "Cryptography and Network Security:
7	Intrusion detection, IDS	William Stallings, "Cryptography and Network Security:
8	Password Management, Limitations and Challenges	William Stallings, "Cryptography and Network Security:

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	What are the challenges of Intrusion Detection

Q. 2	What are various characteristic of firewall

Q. 3	Explain Anomaly-based Intrusion Detection system

Q. 4	What is Access control security service?

Q. 5	Explain Architecture of Firewall

Unit No.-VI- Cyber Forensic, Hacking& its countermeasures

Lecture No.	Details of the Topic to be covered	References
1	Personally Identifiable Information (PII)	George Kurtz, Hacking Exposed Network Security Secrets and Solutions,
2	Personally Identifiable Information (PII)	George Kurtz, Hacking Exposed Network Security Secrets and Solutions,
3	Cyber Stalking, Cybercrime	George Kurtz, Hacking Exposed Network Security Secrets and Solutions,
4	PII Confidentiality Safeguards	George Kurtz, Hacking Exposed Network Security Secrets and Solutions,
5	Information Protection Law: Indian Perspective	George Kurtz, Hacking Exposed Network Security Secrets and Solutions,
6	Hacking: Remote connectivity and VoIP hacking	George Kurtz, Hacking Exposed Network Security Secrets and Solutions,
7	Wireless Hacking, Mobile Hacking	George Kurtz, Hacking Exposed Network Security Secrets and Solutions,
8	Mobile Hacking, countermeasures	George Kurtz, Hacking Exposed Network Security Secrets and Solutions,

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain the concept of confidentiality and cyber forensic

Q. 2	What do you mean by personally identifiable information? Explain the use of PII in terms of confidentiality and cyber forensic

Q. 3	What is cyber stalking? Describe back levels of cyber stalking

Q. 4	What is information Protection law? Explain the IPL law in terms of Indian perspective

Q. 5	What is SIP scanning in VoIP attack? State its counter measure