SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Computer Science and Engineering IT

Syllabus applicable to July 2022 admitted and later batches

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Engineering Science Course (PCC)
SubjectCode:**AI-2051**	Subject Name: **Computer Networks**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	150	3	-	2	4

Prerequisites:

Basic Electrical and Electronics with Physics

Course Objective:

1. Have fundamental knowledge of the various aspects of computer networking and enables students to appreciate recent developments in the area.
2. Be familiar with various types of computer networks.
3. Understand the concepts of Network Layer ,Transport Layer, Application Layer

Course Outcomes: After completion of this course students will be able to

CO1: Develop a fundamental understanding of network design principles and structure of computer network.

CO2: Explain the importance of data communications, how communication works in data networks and the internet, recognize the different internetworking devices and their functions.

CO3: Explain the role of protocols in networking, Analyze the role and services and features of the various layers of data networks.

CO4: Analyze the features and operations of various routing protocols such as Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multicast Routing.

CO5: Describe and examine working of Transport Layer and Application Layer protocol.

UNITs	Descriptions	Hrs.	CO's
I	Computer Network: Definitions, goals, components, structure, Architecture, Classifications & types, Growth, Complexity and applications etc. Layered Architecture: Protocol hierarchy, Connection Oriented & Connectionless Services, Service primitive Design issues & its functionality. ISO-OSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP.	8	1
II	Transmission Media: Various Transmission Media - guided and unguided media, characteristics of media, Twisted-pair, Coaxial cable, Optical fibre, transmission impairment, Shannon Capacity. Network Topology, Mesh, Bus, Star, Ring, Trees. Connecting Devices Hubs, Repeaters, Bridges, Two & Three layer switches & Gateway.	10	2
III	Data Link Layer: Need, Services Provided, Framing & its methods, Flow Control, Error control. DLL Protocol: Elementary & Sliding Window. Piggybacking & Pipelining. HDLC & Internet. MAC Sub layer: Static & Dynamic channel allocation, Media access control for LAN & WAN. Classification of MAC Sub layer protocol, collision, Collision free, limited contention protocol , ALOHA : pure, slotted , CSMA, CSMA/CD,CSMA/CA, Bit Map, Binary count down,	12	3

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	Adaptive tree walk & urn protocol.		
IV	Network Layer: Need, Services Provided, Design issues, Routing algorithms: Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing Strategies, Congestion Control, Principles , Prevention Policies, Virtual-Circuit Subnets, Datagram subnets. IP protocol, IP Addresses, Comparative study of IPv4 & IPv6, Mobile IP.	8	4
V	Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http. APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.	7	5
Guest Lectures (if any)		Nil	
Total Hours		45	

Suggestive list of experiments:

1. Setup a network and configure IP addressing, subnetting, masking. (Eg. CISCO Packet Tracer, Student Ed)
2. Use basic networking commands in Linux (ping, tracert, nslookup, netstat, ARP, RARP, ip, ifconfig, dig, route)
3. Build a simple network topology and configure it for static routing protocol using packet tracer.
4. Perform network discovery using discovery tools (eg. mrtg)
5. Use Wireshark to understand the operation of TCP/IP layers :
    1. Ethernet Layer : Frame header, Frame size etc.
    2. Data Link Layer : MAC address, ARP (IP and MAC address binding)
    3. Network Layer : IP Packet (header, fragmentation), ICMP (Query and Echo)
    4. Transport Layer: TCP Ports, TCP handshake segments etc.
    5. Application Layer: DHCP, FTP, HTTP header formats
6. CRC/ Hamming code implementation.
7. Stop and wait protocol/ sliding window (selective repeat / Go back N)
8. Use simulator (Eg. NS2) to understand functioning of ALOHA, CSMA/CD

Text Book-

1. Tanenbaum A. S, "Computer Networks", Pearson Education , 4th Edition

Reference Books-

1. William Stallings, "Data and Computer Communications", PHI 6th Edition .
2. Douglas E. Comer ,"Computer Network & Internet", Pearson Education, 6th Edition.
3. Behraj A Forouzan,"Data Communication & Networking", McGraw-Hill,4th edition.
4. Natalia Olifar & Victor Olifer,"Computer Networks", Willey Pub.
5. Prakash C. Gupta, "Data Comunications and Computer Networks", PHI,2end edition.
6. Gallo,"Computer Communication & Networking Technologies",Cengage Learning.1st edition.

List and Links of e-learning resources:

1. https://nptel.ac.in/courses/117103063/
2. https://www.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

Dr. Kanak Saxena
Chairperson

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Syllabus applicable to July 2022 admitted and later batches

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Engineering Science Course (PCC)
SubjectCode:**AI-2052**	Subject Name: **Artificial Intelligence**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	150	3	-	2	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
2 Review of classical problem solving: search and forward and backward chaining.
3 Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem etc.

Course Outcomes: After completion of this course students will be able to

CO1: Describe various searching methods and reasoning in AI.
CO2: Uses of Knowledge Representation Techniques.
CO3: Analysis the concepts of reasoning and planning
CO4: Illustrate the concept of NLP and NN
CO5: Apply and evaluate AI Techniques using PROLOG and LISP

UNITs	Descriptions	Hrs.	CO's
I	Definitions – Foundation and History of AI, Evolution of AI - Applications of AI, Classification of AI Systems with respect to environment. Artificial Intelligence vs Machine learning, Tic - Tac – Toe problem. Intelligent Agent: Concept of Rationality, nature of environment, structure of agents.	8	1
II	Heuristic Search Techniques: Generate-and-Test; Hill Climbing; Properties of A* algorithm, Best first Search; Problem Reduction. Constraint Satisfaction problem: Interference in CSPs; Back, tracking search for CSPs; Local Search for CSPs; structure of CSP Problem. Beyond Classical, Search: Local search algorithms and optimization problem, local search in continuous spaces, searching with nondeterministic action and partial observation, online search agent and unknown environments.	10	2
III	Game playing – Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge	12	3

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IV	Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques. Natural Language Processing Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing.Hopfield Network, Learning in Neural Networks, Application of Neural Networks, Recurrent Networks, Distributed Representations, Connectionist AI and Symbolic AI.	8	4
V	Developments Process, knowledge Acquisition. PROLOG Introduction, Syntax and Numeric Function, Basic List Manipulation, Functions, Predicates and Conditional, input, output and Local Variables, iteration and Recursion, Property Lists and Arrays, LISP and other AI Programming Languages.	7	5
Guest Lectures (if any)		Nil	
Total Hours		45	

Suggestive list of experiments:

1. Write a program to solve 8 queens problem
2. Solve any problem using depth first search.
3. Solve any problem using best first search.
4. Solve 8-puzzle problem using best first search
5. Solve travelling salesman problem.
6. Write a program to solve the Monkey Banana problem

Text Book-

1. Artificial Intelligence -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill

Reference Books-

2. Introduction to Prolog Programming By Carl Townsend.
3. Programming with PROLOG —By Klocksin and Mellish.
4. Artificial Intelligence (Fifth Edition) -By George F Luger, Pearson Education.
5. Artificial Intelligence (Second Edition}-By Stuart Russell and Peter Norvig, Pearson Education.
6. Artificial Intelligence Application Programming, Tim Jones, Wiley India
7. Artificial Intelligence And Expert Systems - By D.W Patterson .

List and Links of e-learning resources:

1. https://nptel.ac.in/courses/117103063/
2. https://www.

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Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

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Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Engineering Science Course (PCC)
SubjectCode:**AI-2053**	Subject Name: **Cloud Computing**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	150	3	-	2	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 To learn how to use Cloud Services.
2. To implement Virtualization
3. To implement Task Scheduling algorithms.
4. Apply Map-Reduce concept to applications.
5. To build Private Cloud.
6. Broadly educate to know the impact of engineering on legal and societal issues involved

Course Outcomes: After completion of this course students will be able to

CO1: Describe the principles of cloud computing from existing technologies.
CO2: Implement different types of Virtualization technologies and Abstraction .
CO3: Elucidate the concepts of Google Cloud Computing architecture.
CO4 : Analyse the issues in Resource provisioning and Security governance in clouds
CO5: Choose among various cloud technologies and Service Oriented Architecture .

UNITs	Descriptions	Hrs.	CO's
I	Introduction Cloud,Types – NIST model, Cloud Cube model, Deployment models Service models ,Reference model, Characteristics, Benefits and advantages ,Cloud Architecture ,Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Connecting to Cloud by Clients Services and Applications ,Types.	8	1
II	Abstraction and Virtualization (access, application, CPU, storage), Mobility patterns (P2V, V2V, V2P, P2P, D2C, C2C, C2D, D2D) ,Load Balancing, Network resources, Application Delivery Controller and Application Delivery Network, Google Cloud. Hypervisors: Virtual machine technology and types, VMware vSphere Machine Imaging Distinction between SaaS and PaaS.	10	2
III	Application frameworks Google Web Services ,Google Applications Portfolio – Indexed search, Dark Web, Aggregation and disintermediation, Productivity applications and service, Adwords, Google Analytics, Google Translate, Google Toolkit, features of Google App Engine service, Amazon Web Service components and services: Amazon Elastic Cloud, Amazon Simple Storage system, Amazon Elastic Block Store.	8	3

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IV	Windows Azure platform: Microsoft's approach, architecture, and main elements, AppFabric, Content Delivery Network, SQL Azure, and Windows Live services, Types of services, Consulting, Configuration, Customization and Support Cloud Management. network management systems ,vendors, Monitoring cloud computing deployment stack , Lifecycle management cloud services .	8	4
V	Cloud security concerns, service boundary Security of data, Brokered cloud storage access, Storage location and tenancy, encryption, and auditing and compliance Identity management. Service Oriented Architecture,message-based transactions, Protocol stack for an SOA architecture, Event-driven SOA, System abstraction Cloud Bursting, Applications , APIs.	8	5
Guest Lectures (if any)		Nil	
Total Hours		42	

Suggestive list of experiments:

1. Create Amazon Account to store images.
2. Create Google Account to store files and programs.
3. Create IBM cloud account and access storage space.
4. Create Microsoft Azure Account and working on AzureCloud
5. Create salesforce.com Account and working onTrailhead.com

Text Book-

1. Cloud Computing – Second Edition by Dr. Kumar Saurabh, Wiley India
2.Cloud Computing Bible by Barrie Sosinsky, Wiley India Pvt. Ltd, 2013 .

Reference Books-

1. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education (India) Private Limited, 2013.
2. Cloud computing: A practical approach, Anthony T. Velte, Tata Mcgraw-Hill
3. Cloud Computing, Miller, Pearson
4. Building applications in cloud:Concept, Patterns and Projects, Moyer, Pearson

List and Links of e-learning resources:

1. https://nptel.ac.in/courses/117103063/
2. https://www.

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Approval by Academic council on	
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Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Engineering Science Course (PCC)
SubjectCode:**AI-2054(1)**	Subject Name: **Introduction to Logic**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	150	3	-	2	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1. To study the Logical fundamentals and mathematical transforms necessary for Data Processing.
2. To study the Data and logic techniques
3. To study Data Analytics and comprehensive techniqués.
4. To study the logics, deductions, procedure resolution and cleanup procedures.

Course Outcomes: After completion of this course students will be able to

CO1.

UNITs	Descriptions	Hrs.	CO's
I	Creating Motivation for the Study of Logic,Sets,Relations and Functions,Operations on Binary Relations, Ordering Relations,Partial Orders and Trees,Infinite Sets: Countability and Uncountability .	8	1
II	Induction Principles Mathematical Induction Mathematical Induction Complete Induction inductive definitions Structural Induction Universe constructor depth of construction , elements rules generation	8	2
III	Propositional Logic Syntax of Propositional Logic The model of truth Semantics of Propositional Logic , boolean algebra Satisfiability, Validity and Contingency contradiction.	8	3
IV	An Axiomatic Theory for Propositional Logic a deductive system pattern substitution rules complete system. Formal theories inference rules Monotonicity Compactness Substitutivity Hilbert-style Proof System Proof tree for theorem Natural Deduction Proof System Derived Operators Derived Inference Consistency, completeness and decidability Compactness Propositional Resolution	10	4
V	Resolution in Propositional Logic: Introduction, procedure Space Complexity, Time Complexity, procedure resolution, cleanup operations Undecidability : Introduction Representability Godel's	8	5

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	Incompleteness Theorem Second-Order Logic		
Guest Lectures (if any)		Nil	
Total Hours		42	

Suggestive list of experiments:

1.

Text Book-

1. Introduction to Logic for Computer Science,S. Arun-Kumar

Reference Books-

1. Logic in Computer Science: Modeling and Reasoning about Systems (2nd edition), Huth and Ryan, Cambridge
2. Logic for Computer Science Steve Reeves and Michael Clarke. Addison-Wesley, 1990. ISBN: 0-201-41643-3
3. Logic for Computer Science. Jean H. Gallier. Harper and Row, New York, 1986.
4. First-Order Logic and Automated Theorem Proving. Melvin Fitting. Springer Verlag, Berlin, 1990.
5. A Mathematical Introduction to Logic. Herbert B. Enderton. Academic Press, New York, 1972.
6. Natural Deduction (A Proof-theoretical study). Dag Prawitz. Almqvist and Wiskell, 1965.

List and Links of e-learning resources:

1. https://nptel.ac.in/courses/117103063/
2. http://www.public.asu.edu/~yzhan442/teaching/CSE259F19-LCS
3. http://www.wikihow.com/Email-a-Professor.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

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Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Engineering Science Course (PCC)
SubjectCode:**AI-2054(2)**	Subject Name: **Image Processing**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	100	3	1	--	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 1.To study the image fundamentals and mathematical transforms necessary for image processing.
2.To study the image enhancement techniques
3.To study image restoration procedures.
4.To study the image compression procedures.

Course Outcomes: After completion of this course students will be able to

CO-1: Ability to apply principles and techniques of digital image processing in applications related to design and analysis of digital imaging systems.
CO-2: Ability to analyze and implement image processing algorithms to real problems.
CO-3: Gaining of hands-on experience in using software tools for processing digital images.
CO-4: Interpret image segmentation and representation techniques.
CO-5: Apply Mathematical Morphology using Polynomial approximation.

UNITs	Descriptions	Hrs.	CO's
I	**Digital Image Fundamentals** A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images.	8	1
II	**Image Transformations Introduction** to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.	8	2
III	**Image Enhancement** Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.	8	3

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IV	**Image Encoding and Segmentation** Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques.	8	4
V	**Mathematical Morphology** Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation.	8	5
Guest Lectures (if any)		Nil	
Total Hours		42	

Suggestive list of experiments:

NO Lab

Text Book-

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing Pearson.

Reference Books-

1. Sonka, Digital Image Processing & Computer Vision, Cengage Learning.
2. Jayaraman, Digital Image Processing, TMH.
3. Pratt, Digital Image Processing, Wiley India.
4. Annadurai, Fundamentals of Digital Image Processing,Pearson Education.

List and Links of e-learning resources:

1.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

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Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Engineering Science Course (PCC)
SubjectCode:**AI-2054(C)**	Subject Name: **Data Mining and Warehousing**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	100	3	1	--	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 To provide students with knowledge, advanced skills and understanding of Data Warehousing.
2. Its components, design principles and modelling.
3. Provide students with in-depth concepts in knowledge discovery.
4. Data mining, different data mining algorithms and classification techniques.

Course Outcomes: After completion of this course students will be able to

CO1: Explain the functionality of the various data warehousing models and components.
CO2: Apply data pre- processing techniques on different datasets.
CO3: Evaluate the performance of different association rules and classification techniques.
CO4: Compare different association rule mining techniques.
CO5: Identify different advance Classification and Clustering data mining techniques.

UNITs	Descriptions	Hrs.	CO's
I	**Data Warehousing:** Introduction to Data warehousing, needs for developing data Warehouse, Data warehouse systems and its Components, Design of Data Warehouse, Dimension and Measures, Data Marts:-Dependent Data Marts, Independents Data Marts and Distributed Data Marts, Conceptual Modelling of Data Warehouses, Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model and Aggregates.	8	1
II	Characteristics of OLAP System, Motivation for using OLAP, Multidimensional View and Data Cube, Data Cube Implementations, Data Cube Operations, Guidelines for OLAP Implementation, Difference between OLAP and OLTP, OLAP Servers: ROLAP, MOLAP, HOLAP Queries.	8	2
III	Introduction to Data Mining, Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing: Data Cleaning, Data Integration and Transformation. Data Reduction, Data Mining Statistics, Guidelines for Successful Data Mining.	8	3

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IV	Introduction, Basic, The Task and a Naïve Algorithm, Apriori Algorithms, Improving the efficiency of the Apriori Algorithm, Apriori-Tid, Direct Hasing and Pruning (DHP), DynamicItemset Counting (DIC), Mining Frequent Patterns without Candidate Generation(FP-Growth),Performance Evaluation of Algorithms.	8	4
V	Introduction, Decision Tree, The Tree Induction Algorithm,Split Algorithms Based on Information Theory, Split Algorithm Based on the Gini Index, Overfitting and Pruning, Decision Trees Rules, Naïve Bayes Method. Cluster Analysis: Introduction, Desired Features of Cluster Analysis, Types of Cluster Analysis Methods: Partitional Methods, Hierarchical Methods, Density- Based Methods, Dealing with Large Databases, Quality and Validity of Cluster Analysis Methods	8	5
Guest Lectures (if any)		Nil	
Total Hours		42	

Suggestive list of experiments:

NO Lab

Text Book-

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Elsevier Pub.

Reference Books-

1 Arun K. Pujari, "Data Mining Techniques", University Press.
2. Berson, "Data Warehousing and Data Mining and OLAP", TMH

List and Links of e-learning resources:

1.

Modes of Evaluation and Rubric

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Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Open Engineering Course (OEC)
SubjectCode:**AI-2055(OE-1A)**	Subject Name: **IoT Architecture**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10			100	3	--	--	3

Prerequisites:

Basic Knowledge of computer System Architecture ,Computer Network and Cloud Computing.

Course Objective:

1 . To Understand the Architectural Overview of IoT
2. To Understand the IoT Reference Architecture and Real World Design Constraints
3. To Understand the various IoT Concepts with Applications.

Course Outcomes: After completion of this course students will be able to

CO-1: Interpret the impact and challenges posed by IoT networks architectural models.
CO-2: Elaborate the need for Design Principle in IoT.
CO-3: Understand the Data Acquisition and analysis in IoT Environment.
CO-4: Design and Integration of IoT with Cloud.
CO-5: Understand and develop the IoT Privacy and Security.

UNITs	Descriptions	Hrs.	CO's
I	Internet of things ,IOt Conceptual Framework,Arcitecture View,Technology Behind IoT,Sources for IoT,M2M ommunication, Design Principles for nconnected Devices.IOT/M2M System Layers,Communication Technologies,Data Consolidation, Enrichment and Device Management,Gateways.	8	1
II	Design Principle of Web Connectivity,Web Communication Protocol,Message communication Protocols, Web Connectivity,SOAP,REST,HTTP RESTful and Webstocks, Internet Conncetivity, Internet based Communication,IP Addressing in IoT, Media Access Control,HTTP,HTTPS,FTP,Telnet.	8	2
III	Data Acquiring ,Organising, Processing and Analytics,,Storage,Transactions,Business process,Integration and Enterprise Systems, Analytics,Knowledge acquiring ,Managing and storing Processes,Data Collection,IOT Cloud Base Services,xively,Nimbits.	8	2,3

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IV	Sensors,Participatory sensing,RFIDS ,Wireless Sensor Networks,industrial IoT, Automative IoT,Actuator,Sensor data Communication,prototyping embedded Devices for IoT and M2M,Embedded Computing, things always connected to the Internet/ Cloud.	8	4
V	Prototyping and Designing the software for IoT Applications, Embedded devices Softwares, Devices ,Gateways, Internet and Web /Cloud Services Software Development IoT Privacy, Security and Vulnerabilities Solutions.	8	5
Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:

NO Lab

Text Book-

1. Raj Kamal,"Internet of Things Architecture and Design Principles", McGrawHill Publications.

Reference Books-

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a NewAge of Intelligence", 1st Edition, Academic Press, 2014.
2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN978-3-642-
4. . Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on Approach)", 1 st
5. Edition, VPT, 2014.19156-5 e-ISBN 978-3-642-19157-2, Springer
6. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications

List and Links of e-learning resources:

1. http://skybox.uconn.edu
2. https://lms.uconn.edu
3. http://www.utc-iase.uconn.edu

Modes of Evaluation and Rubric

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Dr. Kanak Saxena

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Computer Science and Engineering IT

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Open Engineering Course (OEC)
SubjectCode:**AI-2055(OE-1B)**	Subject Name: **Computer Graphics and Multimedia**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10			100	3	--	--	3

Prerequisites:

Knowledge of Higher Mathematics , Basic Electronics, Algorithms and Discrete Mathematics,

Course Objective:

Throughout the course, students will be expected to demonstrate their understanding in Computer Graphics by being able to:

1. Understand the basic concepts of computer graphics and its applications.
2. Apply and analyze the algorithms to draw graphics output primitives.
3. Apply and create 2-D & 3-D transformation on various objects.

Course Outcomes: After completion of this course students will be able to

CO-1: To understand the Graphics systems, its applications, hardware & software requirement.
CO-2: To apply scan conversion algorithms of various graphics output primitives.
CO-3: To understand the basic principles of homogeneous coordinate systems, 2-dimensional & 3-dimensional computer graphics systems.
CO-4: To create geometrical transformation on 2-dimensional & 3-dimensional objects.
CO-5: To apply window into viewport, clipping algorithms of graphics objects against a window.

UNITs	Descriptions	Hrs.	CO's
I	Basic of Computer Graphics, Applications of computer graphics, Display devices, Cathode Ray Tube, quality of phosphors, CRTs for color display, beam penetration CRT, The Shadow - Mask CRT, Direct View Storage Tube,LED and LCD. Graphics input devices, Graphics software and standards, Output primitives, attributes of output primitives, point and line style, color and intensity, Area filling algorithms, Scan line algorithm, boundary fill & flood fill algorithm, Antialiasing techniques.	8	1
II	Line drawing- various algorithms and their comparison, circle generation - Bresenham's midpoint circle drawing algorithm, 2D transformation- Basic Transformations, Matrix Representation and Homogeneous Coordinates, translation, scaling, rotation, reflection, sheering, composite transformation, Window to view port transformation, line clipping algorithm; Cohen Sutherland, polygon clipping; Sutherland hodgman algorithm.	8	2

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III	Need for 3-Dimensional imaging, techniques for 3-Dimesional displaying, 3D transformation, projection and its types, Curve-parametric and non parametric functions, Bezier (Bernstein Polynomials) Curves, Cubic-Splines, B-Splines, Need for hidden surface removal, Back face detection, Z-buffer method, Painter's algorithm.	8	3
IV	Shading Algorithms-Phong's shading model, Gouraud shading, Shadows and background, illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection), Color models: properties of light, XYZ, RGB, YIQ and CMY color models.	8	4
V	Multimedia systems-An introduction, multimedia hardware and architecture, Data and file format standard i.e. RTF, TIFF, MIDI, JPEG, MPEG, Video- AVI, 3GP, MOV, MPEG, Compression standards, Multimedia Authoring.	8	5
Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:

NO Lab

Text Book-

1. Computer Graphics C Version, Donald Hearn & M. Pauline Baker , Pearson Education, New Delhi, 2004 (Chapters 1 to 12 except 10-9 to 10-22).

Reference Books-

1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007.
2. OpenGL ES 3.0 Programming Guide 2nd Edition (English, Paperback, Budi Rijanto Purnomo, Dan Ginsburg), PEARSON.
3. Rogers, "Procedural elements of Computer Graphics", Tata McGraw Hill. Parekh, "Principles if multimedia", Tata McGraw Hill.

List and Links of e-learning resources:
www.nptel.ac.in

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Ajay Kumar Goyal

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Syllabus applicable to July 2022 admitted and later batches

Name of the course:	B. Tech in **Artificial Intelligence and Data Science**
Semester and Year of study	B. Tech 3rd Year 5thSemester
Subject Category	Open Engineering Course (OEC)
SubjectCode:**AI-2055(OE-1C)**	Subject Name: **Web Technology**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		**Total Marks**				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10			100	3	--	--	3

Prerequisites:

Knowledge of Higher Mathematics , Basic Electronics, Algorithms and Discrete Mathematics,

Course Objective:

The course content enables students to:

1. understand best technologies for solving web client/server problems
2. analyze and design real time web applications
3. use Java script for dynamic effects and to validate form input entry
4. Analyze to Use appropriate client-side or Server-side applications

Course Outcomes: After completion of this course students will be able to

CO-1: Analyze a web page and identify its elements and attributes.
CO-2: Create web pages using XHTML and Cascading Style Sheets.
CO-3: Build dynamic web pages using JavaScript (Client side programming).
CO-4: Create XML documents and Schemas and AJAX.
CO-5: Build interactive web applications using PHP

UNITs	Descriptions	Hrs.	CO's
I	Introduction to WWW Protocols and programs, secure connections, application and development tools, the web browser, setting up UNIX and Linux web servers, Logging users, dynamic IP Web Design, Web site design principles, planning the site and navigation.	8	1
II	Introduction to HTML, Html tags and simple HTML forms, web site structure Introduction to XHTML : XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser	8	2
III	Introduction to Javascript ,Advance script, Javascript and objects, the DOM and web browser environments, forms and validations DHTML,CSS and Javascript, events and buttons, controlling your browser.	8	3
IV	Ajax, advantages & disadvantages ,ajax based web application, alternatives of ajax. Introduction to XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML	8	4

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	with application.XML, XSL and XSLT.		
V	PHP : Starting to script on server side, Arrays, function and forms, advance PHP Databases : Basic command with PHP Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, PHP myadmin and database bugs.	8	5
Guest Lectures (if any)		Nil	
Total Hours		40	

Suggestive list of experiments:
NO Lab
Text Book- 1. Steven Holzner,"HTML Black Book", Dremtech press.
Reference Books- 1. Web Technologies, Black Book, Dreamtech Press 2. Web Applications : Concepts and Real World Design, Knuckles, Wiley-India 3. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson
List and Links of e-learning resources: 1. https://nptel.ac.in/courses/117103063/ 2. https://elearningindustry.com 3. https://ocw.mit.edu/
Modes of Evaluation and Rubric
The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

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