SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT				
Subject Category	DC	Subject Code:	IT 501	Subject Name	Mobile Application Development					

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Basic knowledge of programming skills.

Course Objective:

1. To facilitate students to understand android SDK.
2. To help students to gain a basic understanding of Android application development.
3. To inculcate working knowledge of Android Studio development tool

UNITs	Descriptions	Hrs.
I	Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.	8
II	Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.	8
III	Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.	8
IV	Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.	8
V	Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.	8
Total Hours		40

Course Outcomes:

CO1: Identify various concepts of mobile programming that make it unique from programming for other platforms.

CO2: Critique mobile applications on their design pros and cons.

CO3: Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.

CO4: Program mobile applications for the Android operating system that use basic and advanced phone features.

CO5: Deploy applications to the Android marketplace for distribution.

Text Book & Reference Books-

1. T1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011).
2. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd.
3. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd.
4. Android Application Development All in one for Dummies by Barry Burd, Edition.

List/Links of e-learning resource

- https://archive.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 practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1		2			2							2	1	2
CO-2	2	3		2	1						1	2	3	3
CO-3	2	3	3	2								2	2	2
CO-4	2	2		2								2	3	3
CO-5	2	2	2									2	3	3

Suggestive list of experiments:

1. Develop an application that uses GUI components, Font and Colours.
2. Develop an application that uses Layout Managers and event listeners.
3. Write an application that draws basic graphical primitives on the screen.
4. Develop an application that makes use of databases.
5. Develop an application that makes use of Notification Manager.
6. Implement an application that uses Multi-threading.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that makes use of RSS feed.
11. Develop a mobile application to send an email.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT				
Subject Category	DC	Subject Code:		IT 502	Subject Category	Wireless & Mobile Computing				
Maximum Marks Allotted							Contact Hours			Total Credits Theory Quiz
Theory				Practical			Total Marks Quiz			
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

- Basic concept of Communication systems.
- Basic knowledge of programming skills.

Course Objective:

1. To provide an overview of Wireless Communication networks area and its applications in communication engineering.
2. To introduce various standards of mobile communication.
3. To explain the various terminology, principles, devices, schemes, concepts used in Wireless Communication Networks.
4. To introduce the concepts of Adhoc networks and Sensor networks and their issue
5. To introduce various security threats in wireless networks and the techniques for the prevention and detection of threats

UNITs	Descriptions	Hrs.
I	Antenna , radiation pattern, antenna types, antenna gain, propagation modes, types of fading. Model for wireless digital communication, multiple access technique-SDMA, TDMA, FDMA, CDMA, DAMA, PRMA, MAC/CA, Cellular network organization, operations of cellular system, mobile radio propagation effects, handoff, power control, sectorization, traffic engineering, Infinite sources, lost calls cleared, grade of service, poison arrival process.	8
II	GSM- Services, system architecture, radio interface, logical channels, protocols, localization and calling, handover, security, HSCSD, GPRS-architecture, Interfaces, Channels, mobility management DECT, TETRA, UMTS.	8
III	IEEE 802.11: LAN-architecture, 802.11 a, b and g, protocol architecture, physical layer, MAC layer , MAC management, HIPERLAN-protocol architecture, physical layer, access control sub layer, MAC sub layer. Bluetooth-user scenarios- physical layer, MAC layer.	8
IV	Mobile IP, DHCP, Ad hoc networks: Characteristics, performance issue, routing in mobile host. Wireless sensor network, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP. Introduction to WAP.	8
V	Intruders, Intrusion detection, password management, viruses and related threads, worms, trojan horse defense, difference biometrics and authentication system, firewall design principle.	8
Total Hours		40

Course Outcomes:

CO1: Explain the basic concepts of wireless network and wireless generations.
CO2: Demonstrate the different wireless technologies such as CDMA, GSM, GPRS etc
CO3: Explain the design considerations for deploying the wireless network infrastructure.
CO4: Appraise the importance of Adhoc networks such as MANET and Wireless Sensor networks

CO5: Differentiate and support the security measures, standards. Services and layer wise security considerations.

Text Book & Reference Books-

1 J. Schiller, "Mobile Communication", Addision , Wiley.
2 William Stalling, "Wireless Communication and Network", Pearson Education.
3 Upena Dalal," Wireless Communication", Oxford Higher Education.
4 Dr. Kamilo Feher, "Wireless Digital communication", PHI.
5 William C.Y Lee, "Mobile Communication Design Fundamental" , John Wiley.

List/Links of e-learning resource

- https://archive.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 practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	
CO-2		3	3	2	3									
CO-3	2	3	3	3	2									
CO-4		2	3	3										
CO-5		3	2	3										

Suggestive list of experiments:

1. To implement mobile network using open source softwares like NS2 etc.
2. Implement Code Division Multiple Access (CDMA).
3. To write a programme to implement concept of frequency reuse when given size of geographical area and the set of available frequencies.
4. Study of OPNET tool for modeling and simulation of different cellular standards.
5. Study and Analysis of wired network.
6. Study and Analysis of wireless network.
7. Study and Analysis of Bluetooth.
8. Study of Mobile IP.
9. Write programs using WML (Wireless Markup Language)

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year		V/III	Program		B.Tech -IT
Subject Category	DC	Subject Code:	IT 503	Subject Name	Artificial Intelligence

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	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 maybe 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.

UNITs	Descriptions	Hrs.
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
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
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
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
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.	8
Total Hours		45

Course Outcomes:

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

Text Book & Reference Books-

1. Artificial Intelligence -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill.
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/Links of e-learning resource

- https://archive.nptel.ac.in

Modes of Evaluation and Rubric

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CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	
CO-2		3	3	2	3									
CO-3	2	3	3	3	2							2	2	2
CO-4		2	3	3								3	3	3
CO-5		3	2	3								3	3	3

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

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

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DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT
Subject Category	DE	Subject Code:	IT 504(A)	Subject Name		Information Theory & Coding

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	--	--	--	100	3	1	0	4

Prerequisites:

Basic Knowledge of probability.

Course Objective:

- To understand Information properties and source coding techniques.
- To acquire knowledge about error coding techniques for efficient transmission.
- To understand various compression algorithms for data, Image and video.

UNITs	Descriptions	Hrs.
I	Information–Entropy-Information rate-classification of codes – Kraft Mc Millanine quality-Source coding theorem–Shannon – Fano coding – Huffman coding–Extended, Huffman coding – Joint and conditional entropies-Mutual information-Discrete memory less channels–BSC- BEC – Channel capacity-Shannon limit.	8
II	Text: Adaptive Huffman Coding – Arithmetic Coding – LZW algorithm–Audio: Perceptual coding-Masking techniques – Psychoacousticmodel-MEGAudiolayersI,II,III,DolbyAC3- Speech: Channel Vocoder-Linear Predictive Coding.	8
III	Image and Video Formats–GIF–TIFF– SIF–CIF – QCIF–Image compression: READ- JPEG – Video Compression: Principles-I, B, P frames - Motion estimation - Motion compensation - H.261 -MPEG standard.	8
IV	Definitions and Principles: Hamming weight-Hamming distance-Minimum distance decoding –Single parity codes – Hamming codes – Repetition codes – Linear block codes – Cyclic codes –Syndrome calculation-Encoder and decoder– Cyclic Redundancy check codes.	8
V	Convolutional codes–code tree–trellis-state diagram-Encoding–Decoding: Sequential search and Viterbi algorithm– Principle of Turbo coding.	8
Total Hours		40

Course Outcomes:

CO-1: Apply the suitable coding schemes for information..
CO2: Make use of coding schemes for text compression**.**
CO-3: Illustrate the compression schemes for video and image. .
CO-4: Utilize the various types of error control codes**.**
CO-5: Construct the code tree and state diagram for error control codes.

Text Book & Reference Books-

1. Ranjan Bose, “Information Theory, Coding and Cryptography”, Tata McGraw Hill, 2nd edition.
2. P.S. Satyanarayana, “Concepts of Information Theory and Coding”, Dynaram Publication, 2005

3. Richard B. Wells, "Applied Coding and Information Theory for Engineers" Pearson Education, LPE 2004.
4. Shu Lin and Daniel Castello, "Error Control Coding – Fundamentals and Applications", second edition 2004
5. Thomas M Cover, Joy Thomas, "Elements of Information Theory", MGH 2006.

List/Links of e-learning resource

- https://archive.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 practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5		1	2	3									2	

Suggestive list of experiments:

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT
Subject Category	DE	Subject Code:	IT 504 (B)	Subject Name		Block chain Technology

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	--	--	--	100	3	1	0	4

Prerequisites:

Basic Knowledge of mathematics.

Course Objective:

1) Technology behind blockchain
2) Emerging trends in blockchain .
3) Real-world applications of block chain

UNITs	Descriptions	Hrs.
I	Introduction to Blockchain Technology: Basic ideas behind block chain, how it is changing the landscape of digitalization, introduction to cryptographic concepts, Hashing, public key cryptosystems, private vs public block chain and use cases, Hash Puzzles	8
II	Blockchain Fundamentals: Basic architecture of Blockchain, different terminologies associated, Characteristics of Block chain, Types of networks, Introducing Smart contract concept in Blockchain.	8
III	Components of Blockchain: Core components of Blockchain, Types of Block chains; Blockchain Protocol, Permission & Permission less Block chains,	8
IV	Digital Ledger: Short History of Money and Trust, Bitcoin Mechanics, Introduction to Ethereum, Introduction to Hyperledger, Hyperledger Fabric and its architecture, Hyperledger Composer Emerging Trends in Blockchain: Cloud-based block chain, Multi chain, Geth , Stellar , Ripple, R3 Corda, Blockchain API, Blockchain Sandboxes	8
V	Block Chain Use Cases: Supply Chain Management, Finance, Health Care, Internet of Things (IoT), Remittance, Land Records, Voting and election, Loyalty Programs, Go Green (Renewable Energy)	8
Total Hours		40

Course Outcomes:

CO-1: Understand the basic concepts, principles and applications of block chain.
CO-2: Understand basic architecture of Block chain, Characteristics of Block chain.
CO-3: Explain Core components of Block chain, Types of Block chains; Blockchain Protocol.
CO-4: Compare the working of different block chain platforms.
CO-5: Analyse the importance of block chain in finding the solution to the real-world problems

Text Book & Reference Books-

1. Artemis Caro, —Blockchain: The Beginners Guide to Understanding the Technology BehindBitcoin& Crypto currency‖.
2. Scott Marks, —Blockchain for Beginners: Guide to Understanding the Foundation and Basics of the Revolutionary Blockchain Technology‖, Create Space Independent Publishing Platform.
3. Mark Watney, —Blockchain for Beginners.
4. Alwyn Bishop, —Blockchain Technology Explained.

List/Links of e-learning resource

- https://archive.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 practical

examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

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

Semester/Year		VI/III	Program		B.Tech –IT
Subject Category	DE	Subject Code:	IT 504 (C)	Subject Name	Big Data Analytics

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	-	-	-	100	3	0	0	3

Prerequisites:

- Knowledge of one Programming Language
- Practice of SQL (queries and sub queries)
- Exposure to Linux Environment.

Course Objective:

• Understand the Big Data Platform and its Use cases
• Provide an overview of Apache Hadoop
• Provide HDFS Concepts and Interfacing with HDFS
• Understand Map Reduce Jobs
• Provide hands on Hodoop Eco System
• Apply analytics on Structured, Unstructured Data.
• Exposure to Data Analytics with R.

UNITs	Descriptions	Hrs.
I	**INTRODUCTION TO BIG DATA AND HADOOP** Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere BigInsights and Big Sheets.	8
II	**HDFS(Hadoop Distributed File System)** The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.	8
III	**Map Reduce** Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.	8
IV	**Hadoop Eco System** **Pig :** Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. **Hive :** Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. **Hbase :** HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. **Big SQL** : Introduction	10
V	**Data Analytics with R** Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with Big R.	8
Total Hours		42

Course Outcomes:

The students will be able to:
• Identify Big Data, list the components of Hadoop and Hadoop Eco-System.
• Understand Hadoop Distributed File System.
• Understand and manage Map reduce,Job Execution, task execution.

• Understand and Develop Big Data Solutions using Hadoop Eco System.
• Understand and apply Machine Learning Techniques using R.

Text Book & Reference Books-

Text Book

• Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
• Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

Reference Books-

• Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
• Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
• Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
• Anand Rajaraman and Jef rey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
• Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
• Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
• Pete Warden, "Big Data Glossary", O'Reily, 2011.
• Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
• ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
• Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012.

List/Links of e-learning resource

- https://www.shiksha.com/online-courses/big-data-hadoop-courses-certification-training-by-nptel-st367

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3													
CO-2	3	2												
CO-3	3	2	3	3										
CO-4	3	2	3	3										
CO-5	3	2	3	3										

Suggestive list of experiments:

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year	IV/II	Program	B.Tech – Internet of Things
Subject Category: OC	Subject Code: IT- 505(A)	Subject Name	Foundation of IoT

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	-	-	-	100	3	1	0	4

Prerequisites:

NA

Course Objective:

- To make students know the IoT ecosystem.
- To provide an understanding of the technologies and the standards relating to theInternet of Things.
- To develop skills on IoT technical planning.

UNITs	Descriptions	Hrs.
I	Introduction & concepts: definition and characteristics of IoT, physical design of IoT, Logical Design of IoT, IoT enabling technologies, IoT levels and development templates, IoT and M2M, IoT design Methodology.	8
II	IoT Networking: Connectivity Technologies, Gateway Prefix Allotment, Impact of Mobility on Addressing, Multihoming, Deviations from Regular Web, IoT identification and Data Protocols(IPv4, IPv6, MQTT, CoAP, XMPP and AMQP)	8
III	Connectivity Technologies: Introduction, IEEE 802.15.4, ZigBee, 6LoWPAN, RFID, HART and Wireless HART, NFC, Bluetooth, Z-Wave, ISA 100.11A.	8
IV	Wireless Sensor Network: Introduction, Components of Sensor Node, Modes of Detection, Challenges in WSN. UAV Network: Introduction, UAV Network (Feature, Challenges and Topology) FANET: Introduction, FANET design consideration.	8
V	Application of IoT: Smart Homes – Introduction, Origin of Smart Homes, Smart Home Technologies. Smart Cities – Characteristics of Smart Cities, Smart City Framework, Challenges in Smart Cities. Connected Vehicles – Introduction, levels of Automation, Vehicle to Everything(V2X) Paradigm, Vehicular Ad-hoc Network (VANETs)	8
Total Hours		40

Course Outcomes:

CO1: To understand the Fundamentals of IoT.

CO2: To know about the networking concepts of IoT.

CO3: To know about the different connectivity technologies.

CO4: To know about the WSN and UAV network.

CO5: To know about the various applications of IoT.

Text Book

1. Arshdeep Bagha and Vijay Madisetti, “Internet of Things – A hands-on approach”, Orient Blackswan Private Limited - New Delhi.
2. Dr. Jeeva Jose, Internet of Things, Khanna Publishing House.
3. Nitesh Dhanjani, Abusing the Internet of Things, Shroff Publisher/O’Reilly Publisher.

Reference Books

1. Internet of Things, RMD Sundaram Shriram K Vasudevan, Abhishek S Nagarajan,John Wiley and Sons.
2. Internet of Things, Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram,John Wiley & Sons.
3. Cuno Pfister, “Getting Started with the Internet of Things”, Shroff Publisher/MakerMedia.
4. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach toConnecting Everything”, 1 st Edition, Apress Publications.
5. Massimo Banzi, Michael Shiloh Make: Getting Started with the Arduino, Shroff Publisher/Maker Media Publishers.

List/Links of e-learning resource

- https://onlinecourses.nptel.ac.in/noc19_cs65/preview

Modes of Evaluation and Rubric

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CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	**2**	**1**	**2**										**1**	**2**
CO-2	**2**	**1**	**1**										**1**	**2**
CO-3	**2**	**1**	**1**										**1**	**2**
CO-4	**2**	**1**	**1**	**1**									**1**	**2**
CO-5	**2**	**1**	**1**	**1**									**1**	**2**

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

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DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT
Subject Category	OC	Subject Code:	IT 505 (B)	Subject Name		Soft Computing

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10				100	3	0	0	3

Prerequisites:

- Basic Knowledge of programming and data structures.

Course Objective:

1. To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for real-world problems.
2. To provide adequate knowledge of non-traditional technologies and fundamentals of artificial neural networks, back propagation networks, fuzzy sets, fuzzy logic, geneticalgorithms in solving social and engineering problems.
3. To provide comprehensive knowledge of associative memory networks and adaptive resonance theory.

UNITs	Descriptions	Hrs.
I	Introduction to Soft Computing: Soft computing vs. hard computing, evolution of soft computing, features and types of soft computing, applications of soft computing, basics of machine learning.	8
II	Neural Networks and Back Propagation networks: Basic concepts of Neural Networks, Model of Artificial Neuron, Neural Network Architectures, Characteristics of neural networks, Learning Methods, Early neural network architectures, Application domains. Back propagation network (BPN), Back propagation Learning, Applications of BPN, Parameter selection, Variations of Back propagation Algorithms.	8
III	Associative Memory Networks: Auto correlators, hetero correlators: Kosko's discrete Bi-direction associative memory (BAM), Exponential BAM, Application of Character Recognition. Unsupervised learning: Adaptive Resonance: Adaptive Resonance Theory (ART), Classical ART Networks, Simplifies ART Architecture, Features, algorithms and Illustration of ART1 and ART2 model, Related Applications.	8
IV	Fuzzy Sets and Fuzzy Relations**:** Fuzzy versus Crisp, Crisp Sets, Fuzzy sets, Membership functions, fuzzy set operations, properties of Fuzzy sets, Crisp Relations, Fuzzy relations – Fuzzy Cartesian product, Operations of Fuzzy Relations. Fuzzy Logic and Inference: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Quantifiers, Fuzzy Inference, Fuzzy knowledge and rule-based system, fuzzy decision making, Defuzzification,	8

	Application of fuzzy logic.	
V	Genetic Algorithms**:** History of Genetic Algorithm, Basic concepts, Creation of offspring, working principles, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, crossover, inversion & deletion, mutation operator, Bitwise operator, Generational Cycle, Convergence of GA,Applications & advances in GA, Differences & similarities between GA & other traditional method, Hybrid systems, evolutionary computing, Genetic Algorithm based on Backpropagation networks- Implementation and comparison on performance of traditional algorithms with Genetic Algorithm.	8
Total Hours		40

Course Outcomes:

CO-1: Apply neural networks, bidirectional associative memories and adaptive resonance theory for solving different engineering problems.
CO-2: Identify and describe soft computing techniques and build supervised learning and unsupervised learning networks.
CO-3: Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
CO-4: Apply genetic algorithms to combinatorial optimization problems.
CO-5: Evaluate and compare solutions by various soft computing approaches for a given problem.

Text Book & Reference Books-

1. S, Rajasekaran& G.A. VijayalakshmiPai, “Neural Networks, Fuzzy systems and evolutionary algorithms: Synthesis and Applications”, PHI Publication, 2 ndEd. 2017.
2. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, John Wiley and Sons, 3 rded, 2011.
3. S.N. Sivanandam& S.N. Deepa, “Principles of Soft Computing”, Wiley Publications, 3rded, 2018.
4. Jang, Jyh-Shing Roger, Chuen-Tsai Sun, and EijiMizutani. "Neuro-fuzzy and soft computinga computational approach to learning and machine intelligence" Pearson, 1997.

List/Links of e-learning resource

- https://archive.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 practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	3		2										
CO-2	2	2												
CO-3	2	1	3											
CO-4	1	2												
CO-5	3	3		2										

Suggestive list of experiments:

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DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT				
Subject Category	OC	Subject Code:	IT 505 (C)	Subject Name	Natural Language Processing					

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	--	--	--	100	3	0	0	3

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics.

Course Objective:

1 Natural language processing deals with written text.
2 Learn how to process written text from basic of fundamental knowledge.
3 Regular expression and probabilistic model with n-grams.
4 Recognizing Speech and parsing with grammar

UNITs	Descriptions	Hrs.
I	Introduction to NLP: History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP, Applications of NLP, build an NLP pipeline , Phases of NLP, NLP APIs, NLP Libraries.	8
II	Unigram Language Model, Bigram, Trigram, N-gram, Advanced smoothing for language modeling, Empirical Comparison of Smoothing Techniques, Applications of Language Modeling, Natural Language Generation, Parts of Speech Tagging, Morphology, Named Entity Recognition	8
III	Words and Word Forms: Bag of words, skip-gram, Continuous Bag-OfWords, Embedding representations for words Lexical Semantics, Word Sense Disambiguation, Knowledge Based and Supervised Word Sense Disambiguation.	8
IV	Text Analysis, Summarization and Extraction: Sentiment Mining, Text Classification, Text Summarization, Information Extraction, Named Entity Recognition, Relation Extraction, Question Answering in Multilingual Setting; NLP in Information Retrieval, Cross-Lingual IR.	8
V	Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation (SMT), Parameter learning in SMT (IBM models) using EM), Encoder-decoder architecture, Neural Machine Translation.	8
Total Hours		40

Course Outcomes:

CO1: Understand comprehend the key concepts of NLP and identify the NLP challenges and issues.
CO2: Develop Language Modeling for various text corpora across the different languages
CO3: Illustrate computational methods to understand language phenomena of word sense

disambiguation. CO4 : Design and develop applications for text or information extraction/summarization/classification.
CO5: Apply different Machine translation techniques for translating a source to target language(s).

Text Book & Reference Books-

1. Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition Jurafsky, David, and James H. Martin, PEARSON "Designing the User Interface - Strategies for Effective Human Computer Interaction", by Ben Shneiderman ISBN: 9788131732557, Pearson Education (2010).

2.Foundations of Statistical Natural Language Processing, Manning, Christopher D., and Hinrich Schütze, Cambridge, MA: MIT Press.

3. Natural Language Understanding, James Allen. The Benjamin/Cummings Publishing.

4. Natural Language Processing with Python – Analyzing Text with the Natural Language ToolkitSteven Bird, Ewan Klein, and Edward Loper.

List/Links of e-learning resource

- https://archive.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 practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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Subject handled by department	Department of IT

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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT
Subject Category	DLC	Subject Code:	IT 506	Subject Category		IT Workshop (Matlab/Scilab)

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks Quiz				Theory Quiz
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
-	-	-	-	30	10	10	50	0	0	2	1

Prerequisites:

Nil

Course Objective:

The student should be made:

- Familiar with the MATLAB GUI and basic tool boxes
- Exposed to vector and matrix operations
- Familiar with arithmetic, logical and relational operations on matrix
- To practice script, function files, graphs, conditional and iterative statements in MATLAB. in MATLAB.

UNITs	Descriptions	Hrs.
I	Introductory Sessions Of MATLAB Training Course, Why MATLAB, MATLAB Interface, Introduction To Arrays And Matrices, MATLAB File Types, Basics Of MATLAB Programming, Handling Data And Data Flow in MATLAB, Data Types, Creating Variables, Scalars, Vectors And Matrix Operations & Operators	8
II	Define and writing of Script Files, define and writing of Function Files	8
III	MATLAB Graphics, Simple Graphics & Types, Plotting Functions, Creating And Editing Plots (2D & 3D), Handling Graphics	8
IV	MATLAB Programming , Conditional Statements, Iterative Statements, Flow Control,	8
V	Efficient Coding Practices, Linear Algebra, Polynomials, Curve Fitting, Differentiation & Integration , Introduction To MATLAB Toolboxes	8
Total Hours		40

Course Outcomes:

the students will be able to

- Learn and understand about basic datatypes, variables, scalars in MATLAB.
- Write script and function files in MATLAB.
- Plot and handle different kind of graphs in MATLAB.
- Program conditional and iterative statements
- Learn to program curve fitting, differentiation in MATLAB and learn about MATLAB Toolboxes.

Text Book & Reference Books-

Text Book

1. Rudra Pratap Singh, “Getting started with MATLAB”, Seventh Edition-Oxford.

Reference Books-

1. Holly Moore, “ MATLAB for Engineers” Third Edition – Pearson Publications
2. Stephen J. Chapman, “MATLAB Programming for Engineers” Fourth Edition – Thomson learning.

List/Links of e-learning resource

https://onlinecourses.nptel.ac.in/noc22_ma31/preview

- learn and understand about basic datatypes, variables, scalars in MATLAB.
- write script and function files in MATLAB.
- plot and handle different kind of graphs in MATLAB.
- Program conditional and iterative statements

  Learn to program curve fitting, differentiation in MATLAB and learn about MATLAB Toolboxes.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Quiz, term work, end semester practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	1	3		3									
CO-2	3	1	3		3									
CO-3	3	1	3		3									
CO-4	3	1	3		3									
CO-5	3	1	3	1	3									

Suggestive list of experiments:

1. Introduction to SDK of MATLAB
2. Basic Syntax and scalar arithmetic operations and calculations
3. Working with formulas
4. Arithmetic operations in matrix data
5. Matrix operations (Inverse, Transpose)
6. Reading an image file
7. Reading from and writing to a text file
8. Introduction to toolboxes 9. Data visualization and plotting
10. Relational operators in data
11. Logical operation in data
12. Loops in MATLAB
13. Computing Eigen value for a matrix
14. Random number generation - Montecarlo methods

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