P.T.V.A.'s
M.L.Dahanukar College of Commerce
Teaching Plan: 2021 – 2022
Department: Information Technology

Class: M.Sc (part I) – Sem-II
Subject: BIG DATA ANALYTICS
Name of the Faculty: Prof. Supritha Bhandary

Month	Topics to be Covered	Internal Assessment	Number of Lectures
JAN	Introduction to Big Data, Characteristics of Data, and Big Data Evolution of Big Data, Definition of Big Data, Challenges with big data, Why Big data? Data Warehouse environment, Traditional Business Intelligence versus Big Data.		04
FEB	Examples of big Data Analytics. Big Data Analytics, Classification of Analytics, Challenges of Big Data, Importance of Big Data, Big Data Technologies, Data Science, Responsibilities, Soft state eventual consistency. Data Analytics Life Cycle Analytical Theory and Methods: Clustering and Associated Algorithms, Association Rules		16
MAR	Apriori Algorithm, Candidate Rules, Applications of Association Rules, Validation and Testing, Diagnostics, Regression, Linear Regression, Logistic Regression, Additional Regression Models Analytical Theory and Methods: Classification, Decision Trees, Naïve Bayes, Diagnostics of Classifiers, Additional Classification Methods, Categorizing Documents by Topics, Determining Sentiments, Data Product, Building Data Products at Scale with Hadoop, Data Science Pipeline		18
APR	Hadoop Ecosystem, Operating System for Big Data, Concepts, Hadoop Architecture Distributed Analysis and Patterns, Computing with Keys, Design Patterns, Last-Mile Analytics, Data Mining and Warehousing, Analytics with higher level APIs, Pig, Spark's higher level APIs		22

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ML Dahanukar College

Teaching Plan: 2021 - 22

Department: I.T.   **Class: MSc.(I.T.) Part-I**   **Semester: II**

Subject: Image Processing

Name of the Faculty: Ms. Rasika Sawant

Month	Topics to be Covered	Internal Assessment	Number of Lectures
January	**Unit I** Introduction Digital Image Fundamentals		08
February	Intensity Transformations and Spatial Filtering **Unit II** Filtering in the Frequency Domain Image Restoration and Reconstruction		18
March	**Unit III:** Wavelet and Other Image Transforms Color Image Processing Image Compression and Watermarking **Unit IV:** Morphological Image Processing		16
April	Image Segmentation I: Edge Detection, Thresholding, and Region Detection **Unit IV:** Image Segmentation II: Active Contours: Snakes and Level Sets Feature Extraction		18

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M.L. Dahanukar College of Commerce

Teaching plan 2021 - 22

Department: I.T.   **Class: M.Sc.(I.T.) PART1**   **Semester: II**

Subject: Microservices Architecture

Name of the Faculty: Ganesh Bhagwat

Month	Topics to be Covered	Internal Assessment	Number of Lectures
JAN	UNIT 1 Microservices: Understanding Microservices, Adopting Microservices, The Microservices Way. Microservices Value Proposition: Deriving Business Value, defining a Goal-Oriented, Layered Approach, Applying the Goal-Oriented, Layered Approach.		04
FEB	Designing Microservice Systems: The Systems Approach to Microservices, A Microservices Design Process, Establishing a Foundation: Goals and Principles, Platforms, Culture. UNIT 2 Service Design: Microservice Boundaries, API design for Microservices, Data and Microservices, Distributed Transactions and Sagas, Asynchronous Message-Passing and Microservices, dealing with Dependencies, System Design and Operations: Independent Deployability, More Servers, Docker and Microservices, Role of Service Discovery, Need for an API Gateway, Monitoring and Alerting. Adopting Microservices in Practice: Solution Architecture Guidance, Organizational Guidance, Culture Guidance, Tools and Process Guidance, Services Guidance		16
MARCH	UNIT 3 Building Microservices with ASP.NET Core: Introduction, Installing .NET Core, Building a Console App, Building ASP.NET Core App. Delivering Continuously: Introduction to Docker, Continuous integration with Wercker, Continuous Integration with Circle		16

	CI, Deploying to Dicker Hub. Building Microservice with ASP.NET Core: Microservice, Team Service, API First Development, Test First Controller, Creating a CI pipeline, Integration Testing, Running the team service Docker Image. Backing Services: 12 24 Microservices Ecosystems, Building the location Service, Enhancing Team Service		
APRIL	UNIT 4 Creating Data Service: Choosing a Data Store, Building a Postgres Repository, Databases are Backing Services, Integration Testing Real Repositories, Exercise the Data Service.Event Sourcing and CQRS: Event Sourcing, CQRS pattern, Event Sourcing and CQRS, Running the samples. Building an ASP.NET Core Web Application: ASP.NET Core Basics, Building Cloud-Native Web Applications. Service Discovery: Cloud Native Factors, Netflix Eureka, Discovering and Advertising ASP.NET Core Services. DNS and Platform Supported Discovery. UNIT 5 Configuring Microservice Ecosystems: Using Environment Variables with Docker, Using Spring Cloud Config Server, Configuring Microservices with etcd, Securing Applications and Microservices: Security in the Cloud, Securing ASP.NET		16
MAY	Core Web Apps, Securing ASP.NET Core Microservices. Building Real-Time Apps and Services: Real-Time Applications Defined, Websockets in the Cloud, Using a Cloud Messaging Provider, Building the Proximity Monitor. Putting It All Together: Identifying and Fixing Anti-Patterns, Continuing the Debate over Composite Microservices, The Future		08

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M.L.Dahanukar College of Commerce

Teaching Plan: 2021 - 22

Department: I.T.   **Class: M.Sc.(I.T.) Part-I**   **Semester: II**

Subject: Modern Networking

Name of the Faculty: Mr. Chayan Bhattacharjee

Month	Topics to be Covered	Internal Assessment	Number of Lectures
January	Unit I: Modern Networking Elements of Modern Networking: The Networking Ecosystem, Example Network Architectures, Global Network Architecture, A Typical Network Hierarchy Ethernet Applications of Ethernet Standards Ethernet Data Rates Wi-Fi Applications of Wi-Fi, Standards Wi-Fi Data Rates 4G/5G Cellular First Generation Second Generation, Third Generation Fourth Generation Fifth Generation, Cloud Computing Cloud Computing Concepts The Benefits of Cloud Computing Cloud Networking Cloud Storage, Internet of Things: Things on the Internet of Things		08
February	Unit 1 (Cont.): Evolution Layers of the Internet of Things, Network Convergence Unified Communications, Requirements and Technology Types of Network and Internet Traffic, Elastic Traffic, Inelastic Traffic, Real-Time Traffic Characteristics Demand: Big Data, Cloud Computing, and Mobile Traffic Big Data Cloud Computing, Mobile Traffic, Requirements: QoS and QoE, Quality of Service, Quality of Experience, Routing Characteristics, Packet Forwarding, Congestion Control ,Effects of Congestion, Congestion Control Techniques, SDN and NFV Software- Defined Networking, Network Functions Virtualization Modern Networking Elements. Unit II: Software-Defined Networks SDN: Background and Motivation, Evolving Network Requirements Demand Is Increasing, Supply Is Increasing Traffic Patterns Are More Complex Traditional Network Architectures are Inadequate, The SDN Approach Requirements SDN Architecture Characteristics of Software-Defined Networking, SDN- and NFV-Related Standards Standards-Developing Organizations Industry Consortia Open Development Initiatives, SDN Data Plane and OpenFlow SDN Data Plane, Data Plane Functions Data Plane Protocols OpenFlow Logical Network Device Flow Table Structure Flow Table Pipeline, The Use of Multiple Tables Group Table OpenFlow Protocol, SDN Control Plane SDN Control Plane Architecture Control Plane Functions, Southbound Interface Northbound Interface Routing, ITU-T Model, OpenDaylight OpenDaylight Architecture OpenDaylight Helium, REST REST Constraints Example REST API, Cooperation and Coordination Among Controllers, Centralized Versus Distributed		16

	Controllers, High- Availability Clusters Federated SDN Networks, Border Gateway Protocol Routing and QoS Between Domains, Using BGP for QoS Management IETF SDNi OpenDaylight SNDi SDN Application Plane SDN Application Plane Architecture Northbound Interface Network Services Abstraction Layer Network Applications, User Interface, Network Services Abstraction Layer Abstractions in SDN,		
March	Unit II (Cont.): Frenetic Traffic Engineering PolicyCop Measurement and Monitoring Security OpenDaylight DDoS Application Data Center Networking, Big Data over SDN Cloud Networking over SDN Mobility and Wireless Information-Centric Networking CCNx, Use of an Abstraction Layer. Unit III: Virtualization, Network Functions Virtualization: Concepts and Architecture, Background and Motivation for NFV, Virtual Machines The Virtual Machine Monitor, Architectural Approaches Container Virtualization, NFV Concepts Simple Example of the Use of NFV, NFV Principles High-Level NFV Framework, NFV Benefits and Requirements NFV Benefits, NFV Requirements, NFV Reference Architecture NFV Management and Orchestration, Reference Points Implementation, NFV Functionality, NFV Infrastructure, Container Interface, Deployment of NFVI Containers, Logical Structure of NFVI Domains, Compute Domain, Hypervisor Domain, Infrastructure Network Domain, Virtualized Network Functions, VNF Interfaces, VNFC to VNFC Communication, VNF Scaling, NFV Management and Orchestration, Virtualized Infrastructure Manager, Virtual Network Function Manager, NFV Orchestrator, Repositories, Element Management, OSS/BSS, NFV Use Cases Architectural Use Cases, Service-Oriented Use Cases, SDN and NFV Network Virtualization, Virtual LANs ,The Use of Virtual LANs, Defining VLANs, Communicating VLAN Membership, IEEE 802.1Q VLAN Standard, Nested VLANs, OpenFlow VLAN Support, Virtual Private Networks, IPsec VPNs, MPLS VPNs, Network Virtualization, Simplified Example, Network Virtualization Architecture, Benefits of Network Virtualization, OpenDaylight's Virtual Tenant Network, Software-Defined Infrastructure, Software- Defined Storage, SDI Architecture		16
April	Unit IV: Defining and Supporting User Needs, Quality of Service, Background, QoS Architectural Framework, Data Plane, Control Plane, Management Plane, Integrated Services Architecture, ISA Approach ISA Components, ISA Services, Queuing Discipline, Differentiated Services, Services, DiffServ Field, DiffServ Configuration and Operation, Per-Hop Behavior, Default Forwarding PHB, Service Level Agreements, IP Performance Metrics, OpenFlow QoS Support, Queue Structures, Meters, QoE: User Quality of Experience, Why QoE?, Online Video Content Delivery, Service Failures Due to Inadequate QoE Considerations QoE-Related Standardization Projects, Definition of Quality of Experience, Definition of Quality, Definition of Experience Quality Formation Process, Definition of Quality of Experience, QoE Strategies in Practice, The QoE/QoS Layered Model Summarizing and Merging the ,QoE/QoS Layers, Factors Influencing QoE, Measurements of		20

| | QoE, Subjective Assessment, Objective Assessment, End-User Device Analytics, Summarizing the QoE Measurement Methods, Applications of QoE Network Design Implications of QoS and QoE Classification of QoE/ QoS Mapping Models, Black-Box Media-Based QoS/QoE Mapping Models, Glass- Box Parameter-Based QoS/QoE Mapping Models, Gray-Box QoS/QoE Mapping Models, Tips for QoS/QoE Mapping Model Selection, IP Oriented Parameter-Based QoS/QoE Mapping Models Network Layer QoE/QoS Mapping Models for Video Services, Application Layer QoE/QoS Mapping Models for Video Services Actionable QoE over IP-Based Networks, The System-Oriented Actionable QoE Solution, The Service-Oriented Actionable QoE Solution, QoE Versus QoS Service Monitoring, QoS Monitoring Solutions, QoE Monitoring Solutions, QoE-Based Network and Service Management, QoE-Based Management of VoIP Calls, QoE-Based Host-Centric Vertical Handover, QoE-Based Network-Centric Vertical Handover Unit V: Modern Network Architecture: Clouds and Fog, Cloud Computing, Basic Concepts, Cloud Services, Software as a Service, Platform as a Service, Infrastructure as a Service, Other Cloud Services, XaaS, Cloud Deployment Models, Public Cloud Private Cloud Community Cloud, Hybrid Cloud, Cloud Architecture, NIST Cloud Computing Reference Architecture, ITU-T Cloud Computing Reference Architecture, SDN and NFV, Service Provider Perspective Private Cloud Perspective, ITU-TCloud Computing Functional Reference Architecture, The Internet of Things: Components The IoT Era Begins, The Scope of the Internet of Things Components of IoT-Enabled Things, Sensors, Actuators, Microcontrollers, Transceivers, RFID, The Internet of Things: Architecture and Implementation, IoT Architecture, ITU-T IoT Reference Model, IoT World Forum Reference Model, IoT Implementation, IoTivity, Cisco IoT System, ioBridge, Security Security Requirements, SDN Security Threats to SDN, Software- Defined Security, NFV Security, Attack Surfaces, ETSI Security Perspective, Security Techniques, Cloud Security, Security Issues and Concerns, Cloud Security Risks and Countermeasures, Data Protection in the Cloud, Cloud Security as a Service, Addressing Cloud ComputerSecurity Concerns, IoT Security, The Patching Vulnerability, IoT Security and Privacy Requirements Defined by ITU-TAn IoT Security Framework, Conclusion | | |

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