श्री चन्द्रशेखरेन्द्र सरस्वती विश्वमहाविद्यालयः
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Syllabus PhD – Entrance Examinations - Department of Computer Science and Engineering

UNIT-I COMPUTER NETWORK SECURITY AND DATA MINING

Cipher Principles – Data Encryption Standard – Modes of Operation - Triple DES – simplified AES- RSA - Diffie-Hellman key Exchange- Euclid's algorithm- Hash function-S/MIME-Quantum computing – crypto Algorithms –crypto Attacks.Introduction to Data Mining – Types of Data – Data System – Major Issues in Data Mining – Data Sets and Attribute Values – Data Independence - Data Pre-processing – Types of Learning – Supervised Learning – Unsupervised Learning – Data Classification – Classification Methods – Decision Tree Classification – Support Vector Machine - Clustering – Clustering Techniques and Algorithms – Data Warehousing and OLAP Technologies – Data Warehouse Architecture – Steps for Design and Construction of Data Warehouse.

UNIT-II SOFTWARE ENGINEERING AND SERVICE ORIENTED ARCHITECTURE

Introduction–S/W Engineering Paradigm,Layers,Software Engineering Principles-objectives,work tasks,scope of software process-Software characteristics- Boehm approach-IEEE standards-Structured analysis-Structured design and types-Transform mapping and Transaction mapping-Detailed design-User interface design process-software maintenance. Introducing SOA:Fundamental SOA- Common Misperceptions about SOA- Common tangible benefits of SOA- Common pitfalls of adopting SOA. The Evolution of SOA:-from XML to Web services to SOA, The continuing evolution of SOA, The roots of SOA. Web Services and Primitive SOA: The Web services framework- Services, Service descriptions, messaging with SOAP.

UNIT-III MACHINE LEARNING

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Support Vector Machines Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map.Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process Hidden Markov Models – Tracking Methods

UNIT-IV IMAGE PROCESSING AND BIG DATA

Introduction: steps and Components of an Image Processing System.Visual Perception, Image sensing & Acquisition, Image Sampling & Quantization, Some Basic Relationships between Pixels. Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding. Image Enhancement in the Spatial Domain,Image Enhancement in the Frequency Domain, Image Restoration, Image Compression. Introduction to Big Data Analytics:Types of Digital Data- Characteristics– Apache Hadoop, Analysing Data with Hadoop, Hadoop Streaming, YARN- Using R for Initial Analysis of the Data - R programming, initial exploration - analysis of the data using R - basic visualization using R –Basic Scripting- MapReduce – Algorithms - Frameworks: Applications on Big Data Using Pig and Hive –in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper

UNIT-V INTERNET OF THINGS AND CLOUD COMPUTING

Introduction to IoT, IoT reference Model and Architecture, M2M Communication, Real- world design constraints, IoT Design Challenges, Security challenges, IoT Applications,Introduction to different IoT tools, developing applications through IoT tools, developingsensor-based application through embedded system platform.Cloud - Introduction, Evolution, cloud deployment model, cloud service model, Virtualization and its types, Virtual machine manager (VMM), Cloud application, Cloud service provider(CSP), Cloud security, Cloud storage