Krishna University

Department of Computer Science
Ph D Course Work Syllabus

Programme Structure for Upcoming Batch

S NO	Paper	Course Name	Max Marks
1	Paper-I	Research Methodology	100
2	Paper-II (Elective-I)		
		Advanced Database Management Systems	100
		Advanced Computer Networks	100
		Advanced Operating Systems	100
		Image Processing	100
		Advanced Data Structures and Algorithms	100
3	Paper-III (Elective-II)		
		Data Mining	100
		High Performance Computing	100
		Soft Computing	100
		Next Generation Networks	100
		Social Network Analysis	100

28/09/2017

Krishna University

Department of Computer Science

Ph D coursework syllabus

ADVANCED DATABASE MANAGEMENT SYSTEMS

Unit 1:

Database Design and Implementation, · Relational Database Design, Introduction to Query Languages,· Advanced SQL and PL/SQL,· Database Implementation and Tools.

Unit-II

DBMS Advanced Features and Distributed Database, Database System Catalogs, Query Compiler, · Query Processing and Evaluation, · Transaction Management and Recovery, · Database Security and Authorization, ·Distributed Database.

Unit-III

Enhanced Database Models, · Object-Oriented Database, Database and XML.

NoSQL : NoSQL Key/Value databases using MongoDB

Unit-VI

Emerging Trends and Example DBMS Architectures, Emerging Database Models, Technologies, and Applications-I, Emerging Database Models, Technologies, and Application

Unit-V

Multimedia Databases: Multimedia Data Types, Data Compression Methods, Multimedia Data Base Management Systems requirements and architectures, Query in Multimedia database, Multimedia data in WWW.

28/09/2024

Text Books:

1. Rini Chakrabharathi Shil Bhadra Dasguptha, Advanced Database Management Systems, Dreamtech Press, 2011.
2. Multimedia Databases, Oya Kallpsiz, Yildiz Technical University, Computer Science Department, Yildl istanbul, Turkeyp

Reference Books:

1. R. Ramakrishnan, J. Gehrke, Database Management Systems, McGraw Hill, 2004
2. A. Silberschatz, H. Korth, S. Sudarshan, Database system concepts, 5/e, McGraw Hill, 2008.
3. NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence

25/09/2021

Krishna University
Department of Computer Science
Ph D coursework syllabus

Advanced Computer Networks

Unit-I

1 Advanced Internetworking
- Global Internet
- IP Version
- Multicast
- Multiprotocol Label Switching
- Routing Among Mobile Devices

Unit-II

Congestion Control
- Issues in Resource Allocation
- Queuing Disciplines
- TCP Congestion Control
- Advanced Congestion Control
- Quality of Service

Unit-III

End-to-End Data
- Presentation Formatting
- Multimedia Data

Unit-IV

Network Security
- Trust and Threats
- Cryptographic Building Blocks
- Key Pre distribution
- Authentication Protocols
- Example Systems

Unit-V

Applications
- Traditional Applications
- Multimedia Applications
- Infrastructure Applications

5..4 Overlay Networks

28/09/2021

Text Books

1. Computer Networks: A Systems Approach, *ReleaseVersion6.1*, Peterson and Davie
2. Computer Networks: A Systems Approach", by Larry Peterson and Bruce Davie.
3. Computer Networking: A Top-Down Approach Featuring the Internet, by James F. Kurose and Keith W. R

Reference Books

1. Computer Networks, Andrew S Tanenbaum, Fourth Edition
2. Principles of Computer Networks and Communiations, Barry Dumas, Morris Schwartz, Prentice Hall Higher Education

Krishna University

Department of Computer Science

Ph D coursework syllabus

ADVANCED OPERATING SYSTEMS

UNIT 1 **Introduction to Distributed Systems:** Goals – Advantages of distributed systems overcentralized systems – disadvantages of distributed systems. Hardware & Software Concepts.loosely coupled systems. network operating systems. Network file systems. design Issues –transparency – Flexibility – performance.–scalability.

UNIT 2 **Remote Procedure Calling:** Introduction . Features of RPC. User package. Design issues.Classes of RPC system . Interface definition language. exception handling. delivery guarantees.implementation . interface processing . binding. Locating the binder. RPC in Unix system

UNIT 3 **Synchronization in Distributed systems:** Clock synchronization. Logical Clocks. Physical Clocks. Clock synchronization algorithms. Mutual exclusion. A centralized algorithms. Adistributed algorithms. A token ring algorithms. comparison of the three algorithms. Electionalgorithms. The Bully algorithms. Ring algorithms. Dead Locks in distributed systems. Distributeddeadlock detection.

UNIT 4 **Process and Processors in distributed systems:** Threads. Introduction. Usage. Design issuesfor thread packages. An example for thread packages. System models. The workstation model.The processor pool model. The hybrid model . Processor allocation. Allocation models. Designissues. Implementation issues.

UNIT 5 **Distributed File and Directory Services:** Distributed file service requirements. File servicecomponents . Flat file service . Directory Service. Client module. Design issues. implementationtechniques. **Distributed shared memory Introduction:** Shared memory. Consistency models. Page basedDistributed shared memory. Shared – variable Distributed shared memory. Object basedDistributed Shared Memory

Text Books :

1. Distributed Operating systems. Andrew s.Tanenbanm

Reference Books :

1. Advanced Concepts in Operating Systems. Singhal and Niranjan G.Shivaratri
2. Modern Operating Systems. Shriram K. Vasudevan. Subashri Vasudevan. Kaushik Velusamy. Sunandhini Muralidharan

28/04/2017

Krishna University
Department of Computer Science
Ph D coursework syllabus

IMAGE PROCESSING
(Elective-I)

Unit-I

Image Features - Harris corner detector, Scale Invariant Feature Transform (SIFT), Speeded Up Robust Features (SURF), edge detection, Hough Transform

Unit-II

Image Enhancement - Noise models, image denoising using linear filters, order statistics based filters and wavelet shrinkage methods, image sharpening, image super-resolution

Unit-III

Image Segmentation - Graph-based techniques, Active Contours, Active Shape Models, Active Appearance Models
Image Compression - Entropy coding, lossless JPEG, perceptually lossless coding, quantization, JPEG, JPEG2000

Unit-IV

Image Quality - Natural scene statistics, quality assessment based on structural and statistical approaches, blind quality assessment

Unit-V

Statistical tools - Kalman Filter, Hidden Markov Models
Video Processing - Video standards, motion estimation, compression
Object representation and recognition

Text Books:

1) David A. Forsyth and Jean Ponce, Computer Vision: A Modern Approach, Pearson Education, 2003
2) Richard Szeliski, Computer Vision: Algorithms and Applications, Springer, 2010.
3) Simon J.D. Prince, Computer Vision: Models, Learning, and Inference, Cambridge University Press, 2012.
4) Current Literature.

References:

1. A Tutorial on Hidden Markov Models and Selected Applications in Speech Recognition, L.R. Rabiner, Proc. of the IEEE, 1989.
2. Recognizing Human Action in Time-Sequential Images using Hidden Markov Model, J. Yamato, J. Ohya and K. Ishii, CVPR 1992.

28/09/2017

Krishna University

Department of Computer Science

Ph D coursework syllabus

Advanced Data Structures and Algorithms

Unit-I

Basic algorithms: Asymptotic notation, recursion, divide-and-conquer paradigm, basic data structures; possibly fast Fourier Transform.

Unit-II

Sorting: Merge sort, bucket and radix sort; medians and order statistics.

Unit-III

Data structures: Priority queues and heaps, dictionaries, hash tables, bloom filters, binary search trees, interval trees.

Unit-IV

Additional possible topics: union-find, range trees, fractional cascading etc.
More algorithms: Dynamic programming, graph algorithms: DFS, BFS, topological sorting, shortest path algorithms, network flow problems.

Unit-V

Additional topics: String algorithms, suffix trees, geometric algorithms.

Text Books :

1. Introduction to algorithms: Cormen, Leiserson, Rivest and Stein

References:

1. Online lecture notes by Jeff Erickson
2. The Algorithm Design Manual: Steven Skiena
3. Algorithm Design: Kleinberg and Tardos
4. Data structures and algorithm analysis in C++(Java): Mark Weiss
5. Data structures and algorithms in C++(Java): Adam Drozdek
6. Data structures and algorithms: Aho, Hopcroft and Ullman

28/09/2017

Department of Computer Science
Ph D coursework syllabus

Data Mining

Unit 1 **Classification and Prediction** - Introduction classification by decision tree induction. Bayesian Classification. Other classification methods. classification by back propagation. Prediction. classifier accuracy

Unit 2 **Cluster analysis** – Introduction. types of data in cluster analysis. a categorization of major clustering methods. partitioning methods. hierarchical methods

Density based methods: DBSCAN. Grid-based method : STING . Model based clustering method: Statistical Approach. outlier analysis.

Unit 3 **Multimedia Data Mining:** Similarity search in multimedia. . Multidimensional analysis of multimedia data. classification and Prediction analysis of multimedia data. Mining associations in Multimedia. Audi and Video mining

Unit 4 Mining the WWW: Mining webpage layout structure. Mining web's link structures to identify authoritative web pages. mining multimedia data on the web. Web usuage mining

Unit 5 Graph Mining: Methods for mining frequest subgraphs. Mining variant and constrainined substructure patterns. Applications: Graph indexing. Similarity search. classification and clustering

Text books

	Author	Title	Publisher
1	Jiawei Han Micheline Kamber	Data mining & Techniques	Morgan Kaufmann Publishers (Unit-III to V)
2	Margaret H.Dunham	Data Mining : Introductory and Advanced Topics	Pearson Publications
3	Charu C. Aggarwal	Data Mining	Springer Publication

28/09/2024

Krishna University

Department of Computer Science

Ph D coursework syllabus

High Performance Computing

Unit-I

Graphics Processing:

Introduction to Heterogeneous Parallel Computing. GPU architecture. Thread hierarchy. GPU Memory Hierarchy.

Unit-II

GPGPU Programming:

Vector Addition. Matrix Multiplication algorithms.1D. 2D. and 3D Stencil Operations. Image Processing algorithms–Image Blur. Grayscaling. Histogramming. Convolution. Scan. Reduction techniques

Unit III

Many Integrated Cores:

Introduction to Many Integrated Cores. MIC. Xeon Phi architecture. Thread hierarchy. Memory Hierarchy. Memory Bandwidth and performance considerations.

Unit IV

Xeon Phi Programming:

Vector Addition. Matrix Multiplication algorithms.1D. 2D.and 3D Stencil Operations

Unit-V

Message Passing Interface:

MPI Introduction. Collective communication. Data grouping for communication

Text Books ;

1. Wen-MeiWHwu,David BKirk. Programming Massively Parallel Processors AHands- on Approach. Morgann Kaufmann. 3e.

Reference Books :

1. Rezaur Rahman. Intel Xeon Phi Coprocessor Architecture and Tools. Apress Open. 2013.
2. Barbara Chapman. Gabriele Jost. Ruudvander Pas. Using Open MP. MITPress.2008.
3. Gropp. Lusk.Skjellum.Using MPI.Using MPI. 2014.

Krishna University

Department of Computer Science

Ph D coursework syllabus

Soft Computing

Unit-I

Overview of Soft Computing. Difference between Soft and Hard computing. Brief descriptions of different components of soft computing including Artificial intelligence systems Neural networks. fuzzy logic. genetic algorithms. Artificial neural networks Vs Biological neural networks. ANN architecture.

Unit II

Basic building block of an artificial neuron. Activation functions. Introduction to Early ANN architectures (basics only)-McCulloch & Pitts model. Perceptron. ADALINE. MADALINE .

Unit -III

Artificial Neural Networks: Supervised Learning: Introduction and how brain works. Neuron as a simple computing element. The perception. Back propagation networks: architecture. multilayer perception. back propagation learning-input layer. accelerated learning in multilayer perceptron. The Hopfield network. Bidirectional associative memories (BAM). RBF Neural Network.

Unit -IV

Artificial Neural Networks: Unsupervised Learning: Hebbian Learning. Generalized Hebbian learning algorithm. Competitive learning. Self- Organizing Computational Maps: Kohonen Network.

Fuzzy Logic Crisp & fuzzy sets fuzzy relations fuzzy conditional statements fuzzy rules fuzzy algorithm. Fuzzy logic controller.

Unit- V

Genetic algorithms basic concepts. encoding. fitness function. reproduction-Roulette wheel. Boltzmann. tournament. rank. and steady state selections. Convergence of GA. Applications of GA case studies. Introduction to genetic programming- basic concepts.

Text books:

1. R. Rajasekaran and G. A and Vijayalakshmi Pa. *Neural Networks, Fuzzy Logic, and Genetic Algorithms: Synthesis and Applications*. Prentice Hall of India
2. D. E. Goldberg. *Genetic Algorithms in Search, Optimisation, and Machine Learning*. Addison-Wesley

References

1. L. Fausett. *Fundamentals of Neural Networks*. Prentice Hall
2. T. Ross. *Fuzzy Logic with Engineering Applications*. Tata McGraw Hill
3. Soft Computing – Fundamental Techniques and Applications. Saroj Kaushik. Sunita Tewari. McGrawHill Education

28/09/2024

Krishna University

Department of Computer Science

Ph D coursework syllabus

Next Generation Networks

Unit-I

Next Generation Networks (NGN) Architecture. Issues and Challenges in NGN. Mobility Management

Unit-II

Mobility Management: Handover management. Horizontal handover and vertical handover. location management

Unit-III

Data aware Networking (DAN). architecture of DAN. Issues and challenges in DAN

Unit-IV

Software Defined Networks(SDN): Need of central controlling of Network devices. Architecture of SDN. Northbound Interface .Southbound Interface

Unit-V

Context Aware Computing (CBC). architecture of CBC. advantages of CBC 5G networks. Features of 5G networks

Text Books/Main Reference Document:

1. International Telecommunication Union- Telecommunication Standardization Sector (ITU-T) Y.2323(12/2018): Requirement and Capabilities of orchestration in next generation networks
2. Software defined-WAN for the digital age : a bold transition to next generation networking. Wang. David W. CRC Press

References:

1. Q.3714(01/2018) : Signaling Requirement of SDN-based access networks with media-independent management capabilities.

2. Y.3071(03/2017): Data aware networking(information centric networking)-requirements and capabilities. Y.3033(01/2014): Framework of data aware networking for future networks

28/09/2017

Krishna University
Department of Computer Science
Ph D coursework syllabus

Social Network Analysis

UNIT I

INTRODUCTION
Introduction to Web - Limitations of current Web – Development of Semantic Web – Emergence of the Social Web – Statistical Properties of Social Networks -Network analysis - Development of Social Network Analysis - Key concepts and measures in network analysis - Discussion networks - Blogs and online communities - Web-based networks.

UNIT II

MODELING AND VISUALIZATION : Visualizing Online Social Networks - A Taxonomy of Visualizations - Graph Representation - Centrality- Clustering - Node-Edge Diagrams - Visualizing Social Networks with Matrix- Based Representations- Node-Link Diagrams - Hybrid Representations - Modelling and aggregating social network data Random Walks and their Applications –Use of Hadoop and Map Reduce - Ontological representation of social individuals and relationships.

UNIT III

MINING COMMUNITIES : Aggregating and reasoning with social network data. Advanced Representations – Extracting evolution of Web Community from a Series of Web Archive - Detecting Communities in Social Networks - Evaluating Communities – Core Methods for Community Detection & Mining - Applications of Community Mining Algorithms - Node Classification in Social Networks.s

UNIT IV

EVOLUTION : Evolution in Social Networks – Framework - Tracing Smoothly Evolving Communities - Models and Algorithms for Social Influence Analysis - Influence Related Statistics - Social Similarity and Influence - Influence Maximization in Viral Marketing - Algorithms and Systems for Expert Location in Social Networks - Expert Location without Graph Constraints - with Score Propagation – Expert Team Formation - Link Prediction in Social Networks - Feature based Link Prediction – Bayesian Probabilistic Models - Probabilistic Relational Models.

UNIT V

APPLICATIONS : A Learning Based Approach for Real Time Emotion Classification of Tweets. A New Linguistic Approach to Assess the Opinion of Users in Social Network Environments. Explaining Scientific and Technical Emergence Forecasting. Social Network Analysis for Biometric Template Protection

Text Books :

1. Ajith Abraham, Aboul Ella Hassanien, Václav Snášel, —Computational Social Network Analysis: Trends, Tools and Research Advances‖, Springer, 2012

References :

2. Borko Furht, —Handbook of Social Network Technologies and Applications‖, Springer, 1 st edition, 2011
3. Charu C. Aggarwal, —Social Network Data Analytics‖, Springer: 2014
4. Giles, Mark Smith, John Yen, —Advances in Social Network Mining and Analysis‖, Springer, 2010
5. Guandong Xu , Yanchun Zhang and Lin Li, —Web Mining and Social Networking Techniques and applications‖, Springer, 1st edition, 2012
6. Peter Mika, —Social Networks and the Semantic Web‖, Springer, 1st edition, 2007.
7. Przemyslaw Kazienko, Nitesh Chawla,‖Applications of Social Media and Social Network Analysis‖, Springer,2015

25/09/2021