KAKATIYA UNIVERSITY  
WARANGAL-506009, TELANGANA.

Ph. D COURSE WORK  
Department of Computer Science  
Pre-Ph.D Examination Syllabus  
For Academic year 2015-16 onwards

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Department of Computer Science, Kakatiya University
RESEARCH METHODOLOGY

UNIT 1
INTRODUCTION: Meaning, Objectives, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India. DEFINING THE RESEARCH PROBLEM: Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem.

UNIT 2

UNIT 3

UNIT 4

UNIT 5
Citation: MLA and APA, Publication, Impact factor: definition and calculation, H-index: introduction, calculation, g-index, Plagiarism: introduction, Ethics and morals, Copyright, Trademarks and Patents.
REFERENCES:


3. URL: www.wikipedia.org


Department of Computer Science, Kakatiya University
SOFTWARE ENGINEERING

UNIT 1

UNIT 2
Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT 3
Design concepts: Design process, Design concepts, design model. Architecture Design: Software architecture, architectural styles, architectural design, assessing alternative architectural designs, architectural mappings using data flow. Component-level design: Designing class based components, conducting component level design. Object Oriented Design using UML, Designing class based components, conducting component level design.

UNIT 4

UNIT 5
Software testing strategies: A strategic approach to software testing, strategic issues, test strategies for conventional software, validation testing, system testing.

Reference Book:

3. Software Engineering By Ghezzi (Phi)
4. Software Engineering Fundamentals By Behforooz And Hudson Oxford University Press
6. Software Engineering Theory & Practice By Pfleeger (Pearson)
7. Software Engineering By Kr Agarwal & Yogesh Singh (New Age)
8. Object Oriented Software Engineering by SR Schach (TMH)
CLOUD COMPUTING

UNIT 1


UNIT 2
Cloud Computing Architecture: Cloud computing stack: Comparison with traditional computing architecture(client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services; Service Models (XaaS): Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS); Deployment Models: Public cloud, Private cloud, Hybrid cloud, Community cloud.

UNIT 3
Infrastructure as a Service (IaaS): Introduction to IaaS, IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hyper-visors, Machine Image, Virtual Machine (VM).

Resource Virtualization: Server, storage, Network, Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage in cloud computing(storage as a service); Examples: Amazon EC2, Renting, EC2 Compute Unit, Platform and Storage, pricing, customers, Eucalyptus.


UNIT 4
Software as a Service (PaaS): Introduction to SaaS, Web services, Web2.0, WebOS, and Case Study on SaaS. Service Management in Cloud Computing: Service Level Agreements(SLAs), Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling; Benefiting enormously, Managing Data, Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing.

UNIT 5
Reference Book
BIG DATA ANALYTICS

UNIT 1

UNIT 2
Integration of Big Data and Data Warehouse, Data Driven Architecture, Information Management and Lifecycle, Big Data Analytics, Visualization and Data Scientist, Implementing The "Big Data" Data, Choices in Setting up R for Business Analytics, R Interfaces, Manipulating Data, Exploring Data, Building Regression Models, Clustering and Data Segmentation, Forecasting and Time Series Models.

UNIT 3
Writing Hadoop Map Reduce Programs, Integrating R and Hadoop, Using Hadoop Streaming with R, Learning Data Analytics with R and Hadoop, Understanding Big Data Analysis with Machine Learning, Big Data, Web Data, A Cross-Section of Big Data Sources and the Value They Hold, Taming Big Data, The Evolution of Analytic Scalability.

UNIT 4

UNIT 5

References:
1. Data Warehousing in the Age of Big Data by Krish Krishnan, Morgan Kaufmann.
3. Big Data Analytics with R and Hadoop by Vignesh Prajapati
5. “Big Data Analytics - From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph” By David Loshin, Morgan Kaufmann
CLOUD SECURITY

UNIT 1
Security Concepts: Confidentiality, privacy, integrity, authentication, non-repudiation, availability, access control, defence in depth, least privilege, how these concepts apply in the cloud, what these concepts mean and their importance in PaaS, IaaS and SaaS. e.g. User authentication in the cloud;
Cryptographic Systems: Symmetric cryptography, stream ciphers, block ciphers, modes of operation, public-key cryptography, hashing, digital signatures, public-key infrastructures, key management, X.509 certificates, OpenSSL.

UNIT 2
Multi-tenancy Issues: Isolation of users/VMs from each other. How the cloud provider can provide this;
Virtualization System Security Issues: e.g. ESX and ESXi Security, ESX file system security, storage considerations, backup and recovery;

UNIT 3
Virtualization System Vulnerabilities: Management console vulnerabilities, management server vulnerabilities, administrative VM vulnerabilities, guest VM vulnerabilities, hypervisor vulnerabilities, hypervisor escape vulnerabilities, configuration issues, malware (botnets etc).

UNIT 4
Virtualization System-Specific Attacks: Guest hopping, attacks on the VM (delete the VM, attack on the control of the VM, code or file injection into the virtualized file structure), VM migration attack, hyperjacking.
Technologies for Virtualization-Based Security Enhancement: IBM security virtual server protection, virtualization-based sandboxing;

UNIT 5
Storage Security: HIDPS, log management, Data Loss Prevention. Location of the Perimeter. Legal and Compliance Issues: Responsibility, ownership of data, right to penetration test. Local law where data is held, examination of modern Security Standards (eg PCIDSS), how standards deal with cloud services and virtualization, compliance for the cloud provider vs. compliance for the customer.

Reference Books:
UNIT 1

UNIT 2

UNIT 3

UNIT 4
Data Preprocessing: Overview, Data cleaning, Data Integration, Data Reduction, Data Transformation, Data cleaning: Missing Values, Noisy data, Data cleaning as a process. Data Integration: Entity identification problem, Redundancy and Correlation Analysis, Tuple duplication, Data value conflict detection and Resolution. Data Reduction: Overview, wavelet transforms, Principle components Analysis, Attribute subset selection, Regression and log-linear models, Histograms, clustering, sampling, Data cube Aggregation. Data Transformation and Data Discretization by Binning.
Discretization by Histogram Analysis, Discretization by cluster, Decision Tree and correlation Analysis, concept Hierarchy generation for Nominal data.

UNIT 5

Reference Books:

1. Data Mining Concept & Techniques, Jiawei Han Micheline Kamber Jian Pei, 3rd Edition, M K Publishers.
2. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student Edition
4. Data Warehousing in the real world, low price edition, Sam Anahory, Dennis Murray, Pearson Education.
5. Data warehousing Tool kit
8. Data Mining Introductory And Advanced Topics –Margaret H Dunham, Pearson Education
10. The Data Warehouse Life Cycle Tool Kit – Ralph Kimball Wiley Student Edition
11. Data Warehousing, Data Mining & Olap By Alex Berson And Stephen J. Smith (TMH)
12. Data Warehousing By S Mohanthy (TMH)
13. Data Warehousing Using Oracle By Deshpande (Dreamtech)
14. Data Warehousing By Amitesh Sinha (Thomson)
15. Tan- Data mining concepts, pearson.
DIGITAL IMAGE PROCESSING

UNIT 1

UNIT 2

UNIT 3

UNIT 4

UNIT 5

Reference Books:
CRYPTOGRAPHY AND NETWORK SECURITY

UNIT 1

UNIT 2

UNIT 3

UNIT 4

Department of Computer Science, Kakatiya University
UNIT 5


References:

MOBILE COMPUTING AND ADHOC NETWORKS

UNIT 1

UNIT 2

UNIT 3
Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues. Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT 4
Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT 5
Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

REFERENCES:


SOFT COMPUTING

**Unit - 1**
Introduction: Artificial Neural Networks, Advantages of Neural Networks, Application Scope of Neural Networks, Fuzzy Logic, Genetic Algorithm, Hybrid Systems, Neuro Fuzzy Hybrid System, Neuro Genetic Hybrid System
Artificial Neural Networks(ANN): Biological Neural Networks, Brain vs Computer Comparison between biological neural and artificial neural, Evaluation of Neural Networks, Basic Models of Artificial Neural Networks, Supervised Learning, Un-Supervised Learning, Reinforcement Learning, Activation Functions, Important Terminologies of ANN's.

**Unit - 2**

**Unit - 3**
Defuzzification: Introduction, Lambda-Cuts for Fuzzy Sets (Alpha-Cuts), Lambda-Cuts for Fuzzy Relations, Defuzzification Methods, Max-Membership Principle, Centroid Method, Weighted Average Method, Mean-Max Membership, Center of Sums.

**Unit - 4**

**Unit - 5**

Department of Computer Science, Kakatiya University

Reference Books:

KAKATIYA UNIVERSITY, WARANGAL
Department of Computer Science
Model Question Paper- Pre-Ph.D Examination

Note: Questions are to be asked from the respective units of syllabus copy enclosed.

Max Hours: 3-Hours

Max Marks: 100
Answer all questions, each question carries 20 Marks. 5X 20 = 100

UNIT-I

Q.1 (a)
(b)
(OR)
Q.2 (a)
(b)

UNIT-II

Q.3 (a)
(b)
(OR)
Q.4 (a)
(b)

UNIT-III

Q.5 (a)
(b)
(OR)
Q.6 (a)
(b)

UNIT-IV

Q.7 (a)
(b)
(OR)
Q.8 (a)
(b)

UNIT-V

Q.9 (a)
(b)
(OR)
Q.10 (a)
(b)