SPPU B.E./B.Tech IT Sem 8 syllabus

Distributed Computing System

414462: Distributed Computing System

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UNIT I FUNDAMENTALS AND ARCHITECTURES 7 Hrs
Introduction: Characteristics and examples of distributed systems, Design goals, Types of distributed systems, Trends in distributed systems, Focus on Resource Sharing, Challenges. Architectures: Architectural styles, middleware and middleware organization, system architectures, Example architectures.
Case Study: The World Wide Web

UNIT II COMMUNICATION AND COORDINATION 7 Hrs
Communication: Introduction, Layered protocols , Types of communication, Inter-process Communication, Remote Procedure Call (RPC), Message oriented communication, Multicast Communication, Network Virtualization: Overlay Network
Coordination: Clock Synchronization, Logical Clocks, Mutual Exclusion, Election algorithms, Distributed event matching, Gossip Based coordination
Case Study: IBM's Websphere Message-Queuing System

UNIT III REPLICATION AND FAULT TOLERANCE 7 Hrs

Replication: Reasons for replication, Replica management, Failure masking and replication, Consistency protocols, Catching and replication in web,Fault Tolerance: Introduction, Failure models, Fault systems with arbitrary failures, Reliable client server communication, Reliable group communication, Distributed commit, Recovery, Checkpoints.
Case Study: Catching and Replication in Web

UNIT IV DISTRIBUTED FILES AND MULTIMEDIA SYSTEMS 7 Hrs

Distributed File Systems: Introduction, File System Architecture, Sun Network File System, and HDFS. Name Services: Introduction, Name Services and the Domain Name System, Directory Services.
Case Study- 1: The Global Name Service, 2. The X.500 Directory Service.
Distributed Multimedia Systems: Characteristics of Multimedia Data, Quality of Service Management, Resource management, Stream Adaptation.
Case Study: BitTorrent and End System Multicast.

UNIT V DISTRIBUTED WEB BASED SYSTEM 7 Hrs

Architecture of Traditional Web-Based Systems, Apache Web Server, Web Server Clusters, Communication by Hypertext Transfer Protocol, Synchronization, Web Proxy Caching, Replication for Web Hosting Systems, Replication of Web Applications, Fault Tolerance in distributed web based systems, Security Concerns.
Case Study: HyperText Transfer Protocol (HTTP)

UNIT VI SECURITY IN DISTRIBUTED SYSTEMS 7 Hrs

Introduction to Security: Security Threats, Policies, and Mechanisms, Design Issues, Cryptography.
Secure Channels: Authentication, Message Integrity and Confidentiality, Secure Group Communication,
Access Control: General Issues in Access Control, Firewalls, Secure Mobile Code, Denial of Service (DOS).
Security Management: Key Management, Secure Group Management, Authorization Management.
Emerging Trends In Distributed Systems: Grid Computing, Service Oriented Architectures (SOA).
Case Study: Kerberos.

Text Books

1. Maarten van Steen, Andrew S. Tanenbaum, Distributed Systems , PHI, 3rd Edition
Version 3.01, ISBN: 978-15-430573-8-6(Printed).
2. Andrew S. Tanenbaum, Maarten van Steen, Distributed Systems – Principles and
Paradigms, PHI, 2nd Edition, ISBN: 978-0130888938.

Reference Books

1. George Coulouris, Distributed Systems: Concepts and Design,Pearson, 5th edition, Jean Dollimore, Tim Kindberg, Gordon Blair, ISBN:13: 978-0132143011, ISBN:10: 0132143011.
2. Abhijit Belapurkar, Anirban Chakrabarti, Harigopal Ponnapalli, Niranjan Varadarajan, Srinivas Padmanabhuni, Srikanth Sunderrajan, Distributed System Security: Issues,Processes and solutions, Willey online Library, ISBN: 978-0-470-51988-2.
3. Sunita Mahajan, Seema Shah, Distributed Computing, Oxford University Press, 2nd Edition, ISBN-13: 978-0198093480

Ubiquitous Computing

414463: Ubiquitous Computing

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UNIT I INTRODUCTION TO UBIQUITOUS COMPUTING 7 Hrs

Concept of Ubiquitous Computing and Advantages, Ubiquitous Computing Applications and Scope, Properties of Ubiquitous Computing, Modelling the Key Ubiquitous Computing Properties. Ubiquitous System Environment Interaction. Architectural Design for UbiCom
Systems: Smart DEI Model.

UNIT II UBIQUITOUS COMPUTING SMART DEVICES AND SERVICES 7 Hrs

Smart Devices and Service properties, Smart mobile devices and Users, Mobile code, Smart Card Devices and Networks, Service Architecture Models. Service Provision Life-Cycle. Virtual Machines and Operating Systems, OS for Mobile Computers and Communicator Devices.

UNIT III ACTUATION AND CONTROL 7 Hrs

Tagging the Physical World, Sensors and Networks, Micro- Electro-Mechanical Systems (MEMS), Embedded Systems and Real-Time Systems. Programmable and PID type control system, Robots.

UNIT IV HUMAN COMPUTER INTERACTION 7 Hrs

User Interfaces and Interaction for devices, Abstract user interface

through Basic Smart Wearable and Implanted Devices. Human-Centered Design (HCD).
User Models: Direct and indirect user input and modelling, modelling users' planned tasks and multiple tasks-based computing.

UNIT V UBIQUITOUS COMPUTING PRIVACY 7 Hrs
Ubiquitous computing privacy definition, Solove's taxonomy of privacy, legal background, Interpersonal privacy, Ubicomp challenges to privacy: Collection scale, manner and motivation, data types, data accessibility; Case study of privacy solution such as Protecting RFID tags, ways of addressing privacy in Ubicomp.

UNIT VI UBIQUITOUS COMMUNICATION AND MANAGEMENT 7 Hrs
Data Networks, Audio Networks, Wireless Data Networks, Ubiquitous Networks, Service oriented networks, network design issues; Configuration and Security management, Service oriented computer and information management, Context awareness.

Text Books
1. Stefan Poslad, Ubiquitous Computing, Wiley, Student Edition, ISBN:9788126527335 John Krumm, Ubiquitous Computing Fundamentals.

Reference Books
1. Yin-Leng Theng and Henry B. L. Duh, Ubiquitous Computing, IGI, 2nd Edition, ISBN: 9781599046938.
2. Adam Greenfield, Everyware the Drawing age of Ubiquitous Computing, AIGA, 1st Edition, ISBN: 9780321384010.
3. Laurence T. Yeng, Evi Syukur and Seng W. Loke, Handbook on Mobile and Ubiquitous Computing, CRC, 2nd Edition, ISBN: 9781439848111.

Internet and Web Programming (Elective-III)

414464D: Elective III Internet and Web Programming

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UNIT I INTERNET AND WEB PROGRAMMING ESSENTIALS 8

Hrs
The Internet, Introduction Basic Internet Protocol, The World Wide Web, Introduction to Web Programming, Web Clients, Web Servers, Browser and Search Engines.
Markup Languages : Introduction to HTML, Static and dynamic HTML, Structure of HTML documents, HTML Elements, Linking in HTML, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML Database integration, , Forms Control, Form Elements, Applying Styles, values, selectors, class, ids, inheritance, layout, backgrounds, borders, margin, padding, lists, fonts, text formatting, positioning. HTML5. Introduction to Style Sheet, Inserting CSS in an HTML page, CSS selectors, Introduction to XML, XML key component, Transforming XML into XSLT, DTD: Schema, elements, attributes, Introduction to JSON.

UNIT II CLIENT SIDE PROGRAMMING 8 Hrs
JavaScript: Overview of JavaScript, using JS in an HTML (Embedded, External), Data types, Control Structures, Arrays, Functions and Scopes, Objects in JS, DOM: DOM levels, DOM Objects and their properties and methods, Manipulating DOM, JQuery: Introduction to JQuery, Introduction to AJAX, Working of AJAX, AJAX processing steps, coding AJAX script. Introduction to Angular JS.

UNIT III SERVER SIDE PROGRAMMING 8 Hrs

Introduction to Server Side technology and TOMCAT, Servlet: Introduction to Servlet, need and advantages, Servlet Lifecycle, Creating and testing of sample Servlet, session management. JSP: Introduction to JSP, advantages of JSP over Servlet, elements of JSP page: directives, comments, scripting elements, actions and templates, JDBC Connectivity with JSP.
PHP: Introduction to PHP, Features, PHP script, PHP syntax, conditions & Loops, Functions, String manipulation, Arrays & Functions, Form handling, Cookies & Sessions, using MySQL with PHP.

UNIT IV WEB SERVICES AND CONTENT MANAGEMENT SYSTEMS 8 Hrs
Introduction to Web Services, Web Services Architecture, XML Messaging, SOAP, WSDL, UDDI, REST, Java Web Services, Amazon Web Services, DevOps, Introduction to Content Management System

(CMS), Wordpress / Joomla, Advanced Technology: Bootstrap, JSF, Spring.

UNIT V MOBILE WEB DEVELOPMENT 8 Hrs

What is Mobile Web? Understanding Mobile Devices, Mobile Data Usage, Mobiles and Desktops, Building an HTML page, Getting jQuery Mobile, Implementing jQuery Mobile, Working with data attributes, Working with jQuery Mobile Pages, Enhancing Pages with Headers, Footers, and Toolbars; Working with Lists, Building a Simple Mobile Website, Working
with Forms and jQuery Mobile, Creating Modal Dialogs and Widgets, Creating Grids, Panels, and Other Widgets; jQuery Mobile Configuration, Utilities, and JavaScript Methods; Working with Events.

UNIT VI WEB SECURITY AND CYBER ETHICS 8 Hrs

Overview of Web Security: Need of Web Security, Breach of Web Security, What need to be Secure on Web? Can Web be secure? Aspects of Web Security, Purpose of Web Security, A Security Equation, Defining Security Equation, Common Threats on Web, User level Security, Server Level Security, Cyber ethics, Issues in Cyber ethics.

Text Books

1. Kogent Learning Solutions Inc,Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition ,ISBN: 9788177228496.
2. Raymond Camden, Andy Matthews, jQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891.
3. Ethan Cerami, Web Services Essentials, O'Reilly Media, First Edition, 0-596-00224-6.
4. Shweta Bhasin, Web Security Basics, Premier Press, First Edition, ISBN: l978-1592000067.

Reference Books

1. Dr.Hiren Joshi, Web Technology and Application Development, DreamTech, First,ISBN:978-93- 5004-088-1.
2. Santosh Kumar K., DT Editorial Services,Black Book, JDBC 4.2, Servlet 3.1 & JSP
2.3,Dreamtech Press, Second Edition, ISBN:978-8177228700.
3. Steven M. Schafer, “HTML, XHTML and CSS”, Wiley India Edition,

Fourth Edition, 978-81-265-1635-3.
4. B. V. Kumar, S. Sangeetha, S.V. Subrahmanya, J2EE Architecture, an illustrative gateway to enterprise solutions, Tata McGraw Hill Publishing Company, Second Edition, ISBN:978-0-070-621-633.
5. Ivan Bayross,"Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP,BPB Publications,4th Edition,ISBN:978-8183330084.
6. Brain Fling, Mobile Design and Development, O'REILLY, First Edition, ISBN: 13:978-81-8404-817-9.
7. Jason Hunter, Java Servlet Programming, O'reilly Publications, 2nd Edition, ISBN: 978-0-596-00040-0.
8. Adam Bretz & Colin J Ihrig, Full Stack Javascript Development with MEAN, SPD, First Edition, ISBN:978-0992461256.

IOT (Elective-III)

414464A: Elective III Internet of Things (IoT)

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UNIT I INTRODUCTION TO INTERNET OF THINGS 8 Hrs
What is the Internet of Things? Internet of Things Definitions and Frameworks : IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities, Physical Design of IoT: IoT Protocols, Logical Design of IoT: Functional block, communication Model, Communication API's, IoT Enabling Technologies: WSN, cloud computing, Big data Analytics, communication Protocols, Embedded systems, IoT levels and Deployment
templates: Level 1 to Level 5.

UNIT II IoT NETWORK ARCHITECTURE AND DESIGN 8 Hrs
The one M2M IoT Standardized Architecture, The IoT World Forum (IoTWF) Standardized Architecture, A Simplified IoT Architecture, IoT protocol stack, The Core IoT Functional Stack, IoT Data Management and Compute Stack: Fog Computing, Edge Computing, The Hierarchy of Edge, Fog, and Cloud IoT and M2M: Introduction to M2M, Difference between IoT and M2M, SDN and NFV for IoT.

UNIT III SMART OBJECTS: THE "THINGS" IN IoT 8 Hrs
Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects: Communications Criteria, IoT Access Technologies:

IEEE 802.15.4, IEEE 802.15.4g and 802.15.4e, IEEE 1901.2a, LoRaWAN.

UNIT IV ADDRESSING TECHNIQUES FOR THE IoT 8 Hrs
Address Capabilities, IPv6 Protocol Overview, IPv6 Tunneling, IPsec in IPv6, Header Compression Schemes, Quality of Service in IPv6, Migration Strategies to IPv6, Mobile IPV6 technologies for the IoT: Protocol Details, IPv6 over low-power WPAN (6LoWPAN).

UNIT V IoT PLATFORMS 8 Hrs
What is an IoT Device, Exemplary Devices: Raspberry Pi, Raspberry Pi Interfaces, Other IoT Devices: pcDuino, Beagle Bone Black, CubieBoard, ARDUINO.

UNIT VI IoT PHYSICAL SERVERS AND CLOUD OFFEREINGS 8 Hrs
Introduction to cloud storage models and communication API's, WAMP-AutoBahn for IoT, Python web application framework, Designing a RESTful web API, AMAZON web services for IoT, SkyNet IoT messaging platform, IoT case studies: Home Automation, Cities, Environment.

Text Books
1. Internet of Things: A Hands-On Approach Arshdeep Bahga, Vijay Madisetti VPT – Paperback 2015 978- 0996025515 628/- 2.
2. IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of
Things David Hanes, Gonzalo Salgueiro, Patrick Grossetete Cisco Press – Paperback – 16 Aug 2017 978-1- 58714-456- 1 599.
3. Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications Daniel Minoli Willy Publication s - 2013 978-1-118- 47347-4, 466.

Reference Books
1. Smart Internet of things projects Agus Kurniawan Packt - Sep 2016 978-1- 78646- 651-8 2 The Internet of Things Key Olivier Willy Publication 2nd Edition 978
2. Applications and protocols Hersent s 119- 99435-0, 3 The Internet of Things Connecting Objects to the Web Hakima Chaouchi, Willy

Publications 978-1- 84821- 140-7.

Social Media Analytics

Social Media Analytics

Credits:03

UNIT I- ANALYTICS IN SOCIAL MEDIA AND TYPES OF ANALYTICS TOOLS 7 Hrs

The foundation for analytics, Social media data sources, Defining social media data, data sources in social media channels, Estimated Data sources and Factual Data Sources, Public and Private data, data gathering in social media analytics.

UNIT II VISUALIZING SOCIAL NETWORKS 7 Hrs

Introduction, A Taxonomy of Visualization, The convergence of Visualization, Interaction and Analytics. Data mining in Social Media: Introduction, Motivations for Data mining in Social Media, Data mining methods for Social Media, Related Efforts.

UNIT III TEXT MINING IN SOCIAL NETWORKS 7 Hrs

Introduction, Keyword search, Classification Algorithms, Clustering Algorithms-Greedy Clustering, Hierarchical clustering, k-means clustering, Transfer Learning in heterogeneous Networks, Sampling of online social networks, Comparison of different algorithms used for mining, tools for text mining.

UNIT IV NETWORK MEASURES 7 Hrs

Centrality: Degree Centrality , Eigenvector Centrality, Katz Centrality , PageRank, Betweenness Centrality, Closeness Centrality ,Group Centrality ,Transitivity and Reciprocity, Balance and Status, Similarity: Structural Equivalence, Regular Equivalence

UNIT V BEHAVIOR ANALYTICS 7 Hrs

Individual Behavior: Individual Behavior Analysis, Individual Behavior Modeling, Individual Behavior Prediction Collective Behavior: Collective Behavior Analysis, Collective Behavior Modeling, Collective Behavior Prediction

UNIT VI CASE STUDY 7 Hrs

Mining Twitter: Overview, Exploring Twitter's API, Analyzing 140 Characters Mining Facebook: Overview, Exploring Facebook's Social Graph API's, Analyzing Social Graph Connections.

Text Books

1. Reza Zafarani Mohammad Ali Abbasi Huan Liu, Social Media Mining, Cambridge University Press, ISBN: 10: 1107018854. 2. Charu C. Aggarwal, Social Network Data Analytics, Springer, ISBN: 978-1-4419-8461-6.

Reference Books

1. Marshall Sponder, Social Media Analytics: Effective Tools for Building, Interpreting, and Using Metrics, McGraw Hill Education, 978-0-07-176829-0.

2. Matthew A. Russell, Mining the Social Web, O'Reilly, 2nd Edition, ISBN:10: 1449367615.

3. Jiawei Han University of Illinois at Urbana-Champaign Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 2nd Edition, ISBN: 13: 978-1-55860-901-3 ISBN: 10: 1-55860-901-6.

4. Bing Liu, Web Data Mining : Exploring Hyperlinks, Contents and Usage Data, Springer, 2 nd Edition, ISBN: 978-3-642-19459-7.