IT- 7001 – Cloud Computing

Unit-I

Introduction: Historical development ,Vision of Cloud Computing, Characteristics of cloud computing as per NIST , Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments .Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP ,Social networking .

Unit-II

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance,
Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management.
Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

Unit –III

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce , Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

Unit-IV

Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Secutity Architecture.

Unit-V

Market Based Management of Clouds , Federated Clouds/Inter Cloud: Characterization & Definition ,Cloud Federation Stack , Third Party Cloud Services .
Case study : Google App Engine, Microsoft Azure , Hadoop , Amazon , Aneka

List of Experiments:

1. Installation and configuration of Hadoop/Euceliptus etc.
2. Service deployment & Usage over cloud.
3. Management of cloud resources.
4. Using existing cloud characteristics & Service models .
5. Cloud Security Management.
6. Performance evaluation of services over cloud .

Recommended Text:
1. Buyya, Selvi ," Mastering Cloud Computing ",TMH Pub
2. Kumar Saurabh, "Cloud Computing" , Wiley Pub
3. Krutz , Vines, "Cloud Security " , Wiley Pub
4. Velte, "Cloud Computing- A Practical Approach" ,TMH Pub
5. Sosinsky, " Cloud Computing" , Wiley Pub

IT- 7002 – Object Oriented Analysis and Design

Unit I: Overview of Object Oriented concepts: Objects and classes, abstraction, generalization and inheritance, encapsulation, multiple inheritance, aggregation abstraction classes, polymorphism, link and association, Need for object oriented approach

Unit II: System design life cycle, object oriented S/W development process model, Object Oriented Analysis, Object Modeling Technique (OMT): object model, function model, relationship among models, object diagrams, state diagrams, data flow diagrams, analysis.

Unit III: Object oriented Design: Overview of object design, Combination the models, Designing algorithms, design optimization, Implementation of control, Adjustment, Design of association, object representation, physical packaging, documenting design decision, comparison of use-case driven approach.

Unit IV: Translation Object Oriented design into implementation, Programming style, Documentation, characterization of object oriented languages, Comparison of object oriented language like C++, JAVA, object programming.

Unit V: Unified Modeling Language (UML): Class diagram sequence diagram Use case diagram, Collaboration, diagram, state, chart diagram, Activity diagram, component diagram, deployment diagram, Object oriented Database: Relational Vs .object oriented database, the architecture of object oriented database, query language for Object Oriented database.

References:-
   Satzinger, Jackson and Burd, "Object oriented Analysis and design with the Unified
Process", CENGAGE Learning.
   Michael Blaha and J. Rumbugh, "Object oriented Modeling and design with UML",
Pearson Education
   O'Docherty, "Object Oriented Analysis and Design Understanding, System Development
with UML2.0", Wiley India.

List of Experiment:-
1 Ddraw Object, state, Data flow Diagram of ATM.
2 Draw Object, state, Data flow Diagram of Telephone Call.
3 Draw Object, state, Data flow Diagram of Library Information System.
4 Draw Object, state, Data flow Diagram of Airline reservation System.
5 Draw Object, state, Data flow Diagram of Calculator.
6 Draw Object, state, Data flow Diagram of College Management system.
7 Draw Object, state, Data flow Diagram of Payroll System.
8 Draw Object, state, Data flow Diagram of Railway Reservation system.
9 Draw Object, state, Data flow Diagram of Online Sales.
10 Draw Object, state, Data flow Diagram of Examination result display System of a University.

IT- 7003 – Wireless & Mobile Computing

Unit I: Antenna , radiation pattern, antenna types, antenna gain, propagation modes, types of fading. Model for wireless digital communication, multiple access technique-SDMA, TDMA, FDMA, CDMA, DAMA, PRMA, MAC/CA, Cellular network organization, operations of cellular system, mobile radio propogation effects, , handoff, power control, sectorization, traffic engineering, Infinite sources, lost calls cleared, grade of service, poison arrival process

Unit II: GSM- Services, system architecture, radio interface, logical channels, protocols, localization and calling, handover, security, HSCSD, GPRS-architecture, Interfaces, Channels, mobility management DECT, TETRA, UMTS.

Unit III: IEEE 802.11: LAN-architecture, 802.11 a, b and g, protocol architecture, physical layer, MAC layer , MAC management, HIPERLAN-protocol architecture, physical layer, access control sub layer, MAC sub layer. Bluetooth-user scenarios- physical layer, MAC layer.

Unit IV: Mobile IP, DHCP, Ad hoc networks: Characteristics, performance issue, routing in mobile host. Wireless sensor network, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP. Introduction to WAP.

Unit V: Intruders, Intrusion detection, password management, viruses and related threads, worms, trojan horse defense, difference biometrics and authentication system, firewall design principle.

References:-
1 J. Schiller, "Mobile Communication", Addision , Wiley
2 William Stalling, "Wireless Communication and Network", Pearson Education
3 Upena Dalal," Wireless Communication", Oxford Higher Education
4 Dr. Kamilo Feher, "Wireless Digital communication", PHI
5 William C.Y Lee, "Mobile Communication Design Fundamental" , John Wiley.

Suggested List of Practicals:
1. To implement mobile network using open source softwares like NS2 etc.
2. Implement Code Division Multiple Access (CDMA).
3. To write a programme to implement concept of frequency reuse when given size of geographical area and the set of available frequencies.
4. Study of OPNET tool for modeling and simulation of different cellular standards.
5. Study and Analysis of wired network.
6. Study and Analysis of wireless network.
7. Study and Analysis of Bluetooth.
8. Study of Mobile IP.
9. Write programs using WML (Wireless Markup Language)

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IT 7004(A) Elective –III Cyber Security & Forensics

Unit I- Cybercrimes and Attacks
Introduction, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Industrial Spying/Industrial Espionage, Hacking, Software Piracy, Password Sniffing, Credit Card Frauds, Cyberstalking, Botnets, Phishing, Pharming, Man-in-the-Middle attack, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Malware, Ransomware, Types of Identity Theft, Techniques of ID Theft, Cyber terrorism, Browser Attacks, Reverse Engineering, Cross site scripting

Unit II-Cyber Security Concepts
Introduction to Cyber Security, Cyber Security Goals, Cyber Security policy, Domain of Cyber Security Policy, Elements, Cyber Security Evolution, Implementing Hardware Based Security, Software Based Firewalls, Security Standards, Assessing Threat Levels, Forming an Incident Response Team, Reporting Cybercrime, Difference between cyber forensics and cyber security

Unit III-Cyber Forensics Fundamentals
Introduction to cyber forensics, needs of cyber forensic, cyber forensic and digital evidences, Internet Fraud, Storage Fundamentals, File System Concepts, challenges in cyber forensic, Data and Evidence Recovery- Deleted File Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics, Preserve and safely handle original media, Document a "Chain of Custody", Complete time line analysis of computer files based on file creation, file modification and file access, Recover Internet Usage Data, Recover Swap Files/Temporary Files/Cache Files, Introduction to Encase Forensic Edition, Forensic Tool Kit (FTK) etc,

Unit IV- Cyber Forensics Investigation Introduction to Cyber Forensic Investigation, Investigation Tools, e-Discovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Encryption and Decryption methods, Search and Seizure of Computers, Recovering deleted evidences, Password Cracking.

Unit V- Cyber Laws
Introduction to IT laws & Cyber Crimes, Cyber Laws, IPR, Legal System of Information Technology, Social Engineering,

Reference Books
1. Nina Godbole and Sunit Belpure , Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley
2. Jennifer L. Bayuk, J. Healey, P. Rohmeyer, Marcus Sachs, Jeffrey Schmidt, Joseph Weiss Cyber Security Policy Guidebook, John Wiley & Sons 2012.
3. Vivek sood, Cyber law simplified, Tata Mc GrawHill, Education (India).
4. Eoghan Casey, Handbook of digital forensic and investigation.
5. Clint P Garrison, Digital forensic for network, internet and cloud computing.
6. Panagiotis Kandlis, Digital crime and forensic science in cyberspace, information society S.A Greece IDEA Group Publishing.

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IT 7004(B) Elective –III E-Commerce & Governance

Unit I: Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal; environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

Unit II: Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

Unit III: E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

Unit IV: E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of nation wide networking in egovernance, e-seva.

Unit V: E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

References:-

1 Gary P. Schneider, "E-commerce", Cengage Learning India.

2 C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.

3 V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private

   Limited.

4 David Whiteley, "E-commerce study , technology and applications", TMH.

5 J. Satyanarayan, "E-government: The science of the possible", PHI Learning Private Limited.

6 P.T. Joseph, "E-Commerce An Indian Perspective", PHI Learning Private Limited.

7 Hanson and Kalyanam, "E-Commerce and Web Marketing", Cengage Learning India.

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IT 7004 (C) Elective –III Simulation and Modeling

Unit I: PHYSICAL MODELING: Concept of system and environment, continuous and discrete system, linear and nonlinear system, stochastic activities, static and dynamic models, principles used in modeling, Basic simulation modeling, Role of simulation in model evaluation and studies, Advantages and Disadvantages of simulation. Modeling of systems, Iconic, analog and Mathematical Modeling.

Unit II: COMPUTER BASED SYSTM SIMULATION: Technique of simulation, Monte Carlo method, experimental nature of simulation, numerical computation techniques, calumnious system models, analog and hybrid simulation, feedback systems, Buildings simulation models- Financial Model for an office Building, Sensitivity analysis for office building Model.

Unit III: SYSTEM DYNAMICS MODELING: Identification of problem situation, Exponential Growth Model and Decay Model, Logistic Curve, System Dynamic Diagrams, Simulation of System Dynamics-Waiting Times in Single Server Queuing System.

Unit IV: PROBABILITY CONCEPTS IN SIMULATION: Stochastic variables, discrete and continuous probability functions, Distributed Random numbers, generation of random numbers-Uniform and Non Uniform Random numbers, variance reduction techniques-Introduction, Common Random numbers-Rationale, Applicability and Synchronization.

Unit V: SIMULATION SOFTWARE: Introduction, Comparison of Simulation Package with Programming Languages, Classification of Simulation Software, Desirable Software features, General Purpose Simulation Package-ARENA, EXTEND, Study of SIMULA, DYNAMO,

References:-

1 Gorden G., "System simulation", Printice Hall.

2 Averill M Law " Simulation Modeling and Analysis", TMH

3 Seila, Ceric and Tadikamalla " Applied Simulation Modeling", Cengage Learning.

4 Severance, " System Modelling & Simulation : An Introduction",John Wiley

5 Payer T., "Introduction to system simulation", McGraw Hill.

6 Allan Carrie, "Simulation and Modeling" McGraw Hill.

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IT 7005 (A) Elective –IV Ad-hoc Networks

Unit I: Introduction :Introduction-Fundamentals of Wireless Communication Technology, The Electromagnetic Spectrum, GSM, GPRS, PCS, WLAN and UMTS, Components of Packet Radios,
Routing in PRNETs, Route calculation, Pacing techniques, Ad Hoc Wireless Networks, Heterogeneity in Mobile Devices, Wireless Sensor Networks, Traffic Profiles, Types of Ad Hoc Mobile Communications, Types of Mobile Host Movements, Challenges Facing Ad Hoc Mobile Networks.

Unit II: Ad Hoc wireless MAC protocols- Introduction, Synchronous and asynchronous MAC protocols, Problem in Ad Hoc channel access, Receiver-initiated and sender-initiated MAC protocols, Existing Ad Hoc MAC protocols, Ad Hoc Routing Protocols- Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols: Table-Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV), Wireless Routing Protocol (WRP), Cluster Switch Gateway Routing (CSGR), Source-Initiated On-Demand Approaches - Ad Hoc On-Demand Distance Vector Routing (AODV), Dynamic Source Routing (DSR), Temporally Ordered Routing Algorithm (TORA), Signal Stability Routing (SSR) Location- Aided Routing (LAR), Power-Aware Routing (PAR), Zone Routing Protocol (ZRP).

Unit III: Multicast routing In Ad Hoc Networks : Introduction, Issues in Designing a Multicast Routing Protocol, Operation of Multicast Routing Protocols, An Architecture Reference Model for Multicast Routing Protocols, Classifications of Multicast Routing Protocols, Tree-Based Multicast Routing Protocols, Mesh-Based Multicast Routing Protocols, Summary of Tree-and Mesh-Based Protocols - Energy-Efficient Multicasting, Multicasting with Quality of Service Guarantees, Application Dependent Multicast Routing, Comparisons of Multicast Routing Protocols.

Unit IV: Transport Layer, Security Protocols : Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks, Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

Unit V: QoS and Energy Management : Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classifications of QoS Solutions, MAC Layer Solutions, Network Layer
Solutions, QoS Frameworks for Ad Hoc Wireless Networks, Energy Management in Ad Hoc Wireless Networks – Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Energy Management Schemes, Battery Management Schemes, Transmission
Power Management Schemes, System Power Management Schemes.

References Books:-

1 C. Siva Ram Murthy and B.S. Manoj "Ad Hoc Wireless Networks: Architectures and
   Protocols", Pearson Education.
2 C.K. Toh, "Ad Hoc Mobile Wireless Networks: Protocols and Systems", Pearson Education.
3 George Aggelou, "Mobile Wireless Networks", Tata McGraw- Hill.
4 Charles E. Perkins, Ad Hoc Networking, Pearson Education.

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IT 7005 (B)Elective –IV Artificial Intelligence

Unit I: Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies.

Unit II: Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning.

Unit III: Probabilistic reasoning, Baye's theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning.

Unit IV: Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

Unit V: Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.

References:-

1 Rich E and Knight K, "Artificial Intelligence", TMH, New Delhi.

2 Nelsson N.J., "Principles of Artificial Intelligence", Springer Verlag, Berlin.

IT 7005 (C)Elective –IV Embedded System

Unit I: Introduction to Embedded System, Categories, Requirements, Applications, Challenges and Issues. Core of Embedded system, Memory, Sensors and Actuators, communication interface, Embedded firmware, system components.

Unit II: Fundamental issues of hardware software co-design, computational models in embedded designdata flow graph, control flow graph, state machine model, sequential programmed model, concurrent model, unified modeling language.

Unit III: Architecture of 8085 microcontroller, memory organization, registers, interrupts, addressing modes, instruction sets.

Unit IV: Embedded firmware design approaches- OS based, Super loop based. Embedded firmware development languages- Assembly language based, high level language based, mixed. Programming in embedded C.

Unit V: Types of Operating system, Task, process and threads, Multi processing and multi task, Task scheduling, Task communication, Task synchronization.

References:-

1 Shibu K V, "Introduction to Embedded System", TMH.

2 David E Simon, "An Embedded Software Primer", Pearson education Asia, 2001.

3 Steven F. Barett, Daniel J. Pack, "Embedded Systems" Pearson education, First Impression 2008.

4 Vahid Frank, Tony Givargis, "Embedded System Design", John Wiley and Sons, Inc.

5 Dream Tech Software Team, "Programming for Embedded Systems" Wiley Publishing house Inc.

6 Sriram V Iyer, Pankaj Gupta, "Embedded Real time Systems Programming", TMH.

7 Raj Kamal, "Embedded Systems", TMH.