RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Computer Science and Engineering, VII-Semester

CS701 Software Architectures

Pre-Requisite: Software Engineering

Course Outcomes:
After completing the course student should be able to:

1. Describe the Fundamentals of software architecture, qualities and terminologies.
2. Understand the fundamental principles and guidelines for software architecture design, architectural styles, patterns, and frameworks.
3. Use implementation techniques of Software architecture for effective software development.
4. Apply core values and principles of software architectures for enterprise application development.

Course Contents:

Unit 1. Overview of Software development methodology and software quality model, different models of software development and their issues. Introduction to software architecture, evolution of software architecture, software components and connectors, common software architecture frameworks, Architecture business cycle – architectural patterns – reference model.

Unit 2. Software architecture models: structural models, framework models, dynamic models, process models. Architectures styles: dataflow architecture, pipes and filters architecture, call-and return architecture, data-centered architecture, layered architecture, agent based architecture, Micro-services architecture, Reactive Architecture, Representational state transfer architecture etc.

Unit 3. Software architecture implementation technologies: Software Architecture Description Languages (ADLs), Struts, Hibernate, Node JS, Angular JS, J2EE – JSP, Servlets, EJBs; middleware: JDBC, JNDI, JMS, RMI and CORBA etc. Role of UML in software architecture.

Unit 4. Software Architecture analysis and design: requirements for architecture and the life-cycle view of architecture design and analysis methods, architecture-based economic analysis: Cost Benefit Analysis Method (CBAM), Architecture Tradeoff Analysis Method (ATAM). Active Reviews for Intermediate Design (ARID), Attribute Driven Design method (ADD), architecture reuse, Domain –specific Software architecture.

Unit 5. Software Architecture documentation: principles of sound documentation, refinement, context diagrams, variability, software interfaces. Documenting the behavior of software elements and software systems, documentation package using a seven-part template.

Text Books

1. Bass, L., P. Clements, and R. Kazman, “Software Architecture in Practice”, Second Edition, Prentice-Hall.

2. Jim Keogh, “J2EE – Complete Reference”, Tata McGraw Hill.

3. Dikel, David, D. Kane, and J. Wilson, “Software Architecture: Organizational Principles and Practices”, Prentice-Hall.

Reference Books

1. Bennett, Douglas, “Designing Hard Software: The Essential Tasks”, Prentice-Hall, 1997.

2. Clements, Paul, R. Kazman, M. Klein, “Evaluating Software Architectures: Methods and Case Studies”, Addison Wesley, 2001.

3. Albin, S. “The Art of Software Architecture”, Indiana: Wiley, 2003.

4. Robert Mee, and Randy Stafford, “Patterns of Enterprise Application Architecture”, Addison-Wesley, 2002.

5. Witt, B., T. Baker and E. Meritt, “Software Architecture and Design: Principles, Models and Methods”, Nostrand Reinhold, 1994.

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New Scheme Based On AICTE Flexible Curricula

Computer Science and Engineering, VII-Semester

Departmental Elective – CS702 (A) Computational Intelligence

Course Outcomes:
After completing the course student should be able to:

1. Describe in-depth about theories, methods, and algorithms in computation Intelligence.
2. Compare and contrast traditional algorithms with nature inspired algorithms.
3. Examine the nature of a problem at hand and determine whether a computation intelligent technique/algorithm can solve it efficiently enough.
4. Design and implement Computation Intelligence algorithms and approaches for solving real-life problems.

Course Contents:

Unit1: Introduction to Computational Intelligence; types of Computational Intelligence, components of Computational Intelligence. Concept of Learning/Training model. Parametric Models, Nonparametric Models. Multilayer Networks: Feed Forward network, Feedback network.

Unit2. Fuzzy Systems: Fuzzy set theory: Fuzzy sets and operations, Membership Functions, Concept of Fuzzy relations and their composition, Concept of Fuzzy Measures; Fuzzy Logic: Fuzzy Rules, Inferencing; Fuzzy Control - Selection of Membership Functions, Fuzzyfication, Rule Based Design & Inferencing, Defuzzyfication.

Unit3. Genetic Algorithms: Basic Genetics, Concepts, Working Principle, Creation of Offsprings, Encoding, Fitness Function, Selection Functions, Genetic Operators-Reproduction, Crossover, Mutation; Genetic Modeling, Benefits.

Unit4. Rough Set Theory - Introduction, Fundamental Concepts, Set approximation, Rough membership, Attributes, Optimization. Hidden Markov Models, Decision tree model.

Unit5. Introduction to Swarm Intelligence, Swarm Intelligence Techniques: Ant Colony Optimization, Particle Swarm Optimization, Bee Colony Optimization etc. Applications of Computational Intelligence.

Recommended Books:

1. Russell C. Eberhart and Yuhui Shi, Computational Intelligence: Concepts to Implementations, Morgan Kaufmann Publishers.
2. Andries P. Engelbrecht, Computational Intelligence: An Introduction, Wiley Publishing.
3. Simon Haykin, Neural Networks: A Comprehensive Foundation, Prentice Hall.
4. David E. Goldberg, Genetic Algorithm in Search Optimization and Machine Learning, Pearson Education.
5. Jagdish Chand Bansal, Pramod Kumar Singh, Nikhil R. Pal, Evolutionary and Swarm Intelligence Algorithms, Springer Publishing, 2019.
6. S. Rajeskaran, G.A. VijaylakshmiPai, “Neural Networks, Fuzzy Logic, GeneticAlgorithms Synthesis and Applications”.
7. J.S. Roger Jang, C.T.Sun, E. Mizutani, “Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning & Machine Intelligence”, PHI, 2002.

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New Scheme Based On AICTE Flexible Curricula

Computer Science and Engineering, VII-Semester

Departmental Elective – CS702 (B) Deep & Reinforcement Learning

Pre-Requisite: Machine Learning

Course Outcomes:
After completing the course student should be able to:

5. Describe in-depth about theories, models and algorithms in machine learning.
6. Compare and contrast different learning algorithms with parameters.
7. Examine the nature of a problem at hand and find the appropriate learning algorithms and it's parameters that can solve it efficiently enough.
8. Design and implement of deep and reinforcement learningapproaches for solving real-life problems.

Course Contents:

Unit 1: History of Deep Learning, McCulloch Pitts Neuron, Thresholding Logic, Activation functions, Gradient Descent (GD), Momentum Based GD, Nesterov Accelerated GD, Stochastic GD, AdaGrad, RMSProp, Adam, Eigenvalue Decomposition. Recurrent Neural Networks, Backpropagation through time (BPTT), Vanishing and Exploding Gradients, Truncated BPTT, GRU, LSTMs, Encoder Decoder Models, Attention Mechanism, Attention overimages.

Unit 2: Autoencoders and relation to PCA, Regularization in autoencoders, Denoisingautoencoders, Sparse autoencoders, Contractive autoencoders, Regularization: Bias Variance Tradeoff, L2 regularization, Early stopping, Dataset augmentation, Parameter sharing and tying, Injecting noise at input, Ensemble methods, Dropout, Batch Normalization, Instance Normalization, Group Normalization.

Unit 3: Greedy Layerwise Pre-training, Better activation functions, Better weight initialization methods, Learning Vectorial Representations Of Words, Convolutional Neural Networks, LeNet, AlexNet, ZF-Net, VGGNet, GoogLeNet, ResNet, Visualizing Convolutional Neural Networks, Guided Backpropagation, Deep Dream, Deep Art, Recent Trends in Deep Learning Architectures.

Unit 4: Introduction to reinforcement learning(RL), Bandit algorithms – UCB, PAC,Median Elimination, Policy Gradient, Full RL & MDPs, Bellman Optimality, Dynamic Programming - Value iteration, Policy iteration, and Q-learning & Temporal Difference Methods, Temporal-Difference Learning, Eligibility Traces, Function Approximation, Least Squares Methods

Unit 5: Fitted Q, Deep Q-Learning , Advanced Q-learning algorithms , Learning policies by imitating optimal controllers , DQN & Policy Gradient, Policy Gradient Algorithms for Full RL, Hierarchical RL,POMDPs, Actor-Critic Method, Inverse reinforcement learning, Maximum Entropy Deep Inverse Reinforcement Learning, Generative Adversarial Imitation Learning,Recent Trends in RL Architectures.

Text Books:

1. Deep Learning, An MIT Press book, Ian Goodfellow and YoshuaBengio and Aaron Courville
2. Pattern Classification- Richard O. Duda, Peter E. Hart, David G. Stork, John Wiley & Sons Inc.
3. Reinforcement Learning: An Introduction, Sutton and Barto, 2nd Edition.
4. Reinforcement Learning: State-of-the-Art, Marco Wiering and Martijn van Otterlo, Eds

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New Scheme Based On AICTE Flexible Curricula

Computer Science and Engineering, VII-Semester

Departmental Elective – CS702 (C) Wireless & Mobile Computing

COURSE OUTCOMES:
Students should be able to:
CO1: Design and create traditional networks
CO2: Understand the different issues in MAC and routing issues in multi hop wireless and ad-hoc networks and existing solutions for the same.
CO3: Evaluate the transport layer issues in wireless networks due to error's and mobility of nodes and understand existing solutions for the same.
CO4: Explain the architecture of GSM.
CO5: Discuss the services, emerging issues and future trends in M-Commerce.

Unit 1: Review of traditional networks: Review of LAN, MAN, WAN, Intranet, Internet, and interconnectivity devices: bridges, Routers etc. Review of TCP/IP Protocol Architecture: ARP/RARP, IP addressing, IP Datagram format and its Delivery, Routing table format, ICMP Messages, Subnetting, Supernetting and CIDR, DNS. NAT: Private addressing and NAT, SNAT, DNAT, NAT and firewalls, VLANS: Concepts, Comparison with Real LANS, Type of VLAN, Tagging, IPV6: address structure, address space and header.

Unit 2: Study of traditional routing and transport: Routing Protocols: BGP- Concept of hidden network and autonomous system, An Exterior gateway protocol, Different messages of BGP. Interior Gateway protocol: RIP, OSPF. Multiplexing and ports, TCP: Segment format, Sockets, Synchronization, Three Way Hand Shaking, Variable window size and Flow control, Timeout and Retransmission algorithms, Connection Control, Silly window Syndrome. Example of TCP: Taho, Reno, Sack etc. UDP: Message Encapsulation, Format and Pseudo header.

Unit 3: Wireless LAN: Transmission Medium For WLANs, MAC problems, Hidden and Exposed terminals, Near and Far terminals, Infrastructure and Ad hoc Networks, IEEE 802.11- System arch, Protocol arch, Physical layer, Concept of spread spectrum, MAC and its management, Power management, Security. Mobile IP: unsuitability of Traditional IP; Goals, Terminology, Agent advertisement and discovery, Registration, Tunneling techniques. Ad hoc network routing: Ad hoc Network routing v/s Traditional IP routing, types of routing protocols, Examples: OADV, DSDV, DSR, ZRP etc.

Unit 4: Mobile transport layer: unsuitability of Traditional TCP; I-TCP, S-TCP, M-TCP. Wireless Cellular networks: Cellular system, Cellular networks v/s WLAN, GSM – Services, system architecture, Localization and calling, handover and Roaming.

Unit 5: Mobile Device Operating Systems: Special Constraints & Requirements, Commercial Mobile Operating Systems. Software Development Kit: iOS, Android etc.MCommerce : Structure , Pros &Cons, Mobile Payment System ,Security Issues

TEXT BOOKS RECOMMENDED:

1. Comer, "Internetworking with TCP/ IP Vol-I", 5th edition, Addison Wesley, 2006.
2. Jochen Schiller "Mobile communication", 2nd edition, Pearson education, 2008

REFERENCE:

1. W. Richard Stevens, "TCP/IP Illustrated Vol-I", Addison-Wesley.
2. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education.
3. Uwe Hansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer
4. Android Developers : http://developer.android.com/index.html
5. Apple Developer : https://developer.apple.com/
6. Windows Phone Dev Center : http://developer.windowsphone.com/
7. BlackBerry Developer : http://developer.blackberry.com/.

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New Scheme Based On AICTE Flexible Curricula

Computer Science and Engineering, VII-Semester

Departmental Elective – CS702 (D) Big Data

Course Outcomes:

1. **Students should be able to understand the concept and challenges of Big data.**
2. **Students should be able to demonstrate knowledge of big data analytics.**
3. **Students should be able to develop Big Data Solutions using Hadoop Eco System**
4. **Students should be able to gain hands-on experience on large-scale analytics tools.**
5. **Students should be able to analyse the social network graphs.**

Course Content

Unit1: Introduction to Big data, Big data characteristics, Types of big data, Traditional versus Big data, Evolution of Big data, challenges with Big Data, Technologies available for Big Data, Infrastructure for Big data, Use of Data Analytics, Desired properties of Big Data system.

Unit2: Introduction to Hadoop, Core Hadoop components, Hadoop Eco system, Hive Physical Architecture, Hadoop limitations, RDBMS Versus Hadoop, Hadoop Distributed File system, Processing Data with Hadoop, Managing Resources and Application with Hadoop YARN, MapReduce programming.

Unit3: Introduction to Hive Hive Architecture, Hive Data types, Hive Query Language, Introduction to Pig, Anatomy of Pig, Pig on Hadoop, Use Case for Pig, ETL Processing, Data types in Pig running Pig, Execution model of Pig, Operators, functions,Data types of Pig.

Unit4: Introduction to NoSQL, NoSQL Business Drivers, NoSQL Data architectural patterns, Variations of NOSQL architectural patterns using NoSQL to Manage Big Data, Introduction to MangoDB

Unit5: Mining social Network Graphs: Introduction Applications of social Network mining, Social Networks as a Graph, Types of social Networks, Clustering of social Graphs Direct Discovery of communities in a social graph, Introduction to recommender system.

Text Books:

1. RadhaShankarmani, M. Vijaylakshmi, " Big Data Analytics", Wiley, Secondedition
2. Seema Acharya, SubhashiniChellappan, " Big Data and Analytics", Wiley, Firstedition

Reference Books:

1. KaiHwang,Geoffrey C., Fox. Jack, J. Dongarra, “Distributed and Cloud Computing”, Elsevier, Firstedition
2. Michael Minelli, Michele Chambers, AmbigaDhiraj, “Big Data Big Analytics”,Wiley

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New Scheme Based On AICTE Flexible Curricula

Computer Science and Engineering, VII-Semester

Open Elective – CS703 (A) Cryptography & Information Security

COURSE OUTCOMES:

CO1: Understanding of the basics of Cryptography and Network Security and working knowledge of Mathematics used in Cryptology.
CO2: Understanding of previous attacks on cryptosystems to prevent future attacks from securing a message over an insecure channel by various means.
CO3: Knowledge about how to maintain the Confidentiality, Integrity and Availability of a data.
CO4: Understanding of various protocols for network security to protect against the network threats.
CO5: Getting hands-on experience of various Information Security Tools.

UNIT I:

Mathematical Background for Cryptography: Abstract Algebra, Number Theory, Modular Inverse, Extended Euclid Algorithm, Fermat's Little Theorem, Euler Phi-Function, Euler's theorem.
Introduction to Cryptography: Principles of Cryptography, Classical Cryptosystem, Cryptanalysis on Substitution Cipher (Frequency Analysis), Play Fair Cipher, Block Cipher. Data Encryption Standard (DES), Triple DES, Modes of Operation, Stream Cipher.

UNIT II:

Advanced Encryption Standard (AES), Introduction to Public Key Cryptosystem, Discrete Logarithmic Problem, Diffie-Hellman Key Exchange Computational & Decisional Diffie-Hellman Problem, RSA Assumptions & Cryptosystem,RSA Signatures & Schnorr Identification Schemes, Primarily Testing, Elliptic Curve over the Reals, Elliptic curve Modulo a Prime., Chinese Remainder Theorem.

UNIT III:

Message Authentication, Digital Signature, Key Management, Key Exchange, Hash Function. Universal Hashing, Cryptographic Hash Function, MD, Secure Hash Algorithm (SHA), Digital Signature Standard (DSS), Cryptanalysis: Time-Memory Trade-off Attack, Differential Cryptanalysis. Secure channel and authentication system like Kerberos.

UNIT IV:

Information Security: Threats in Networks, Network Security Controls–Architecture, Wireless Security, Honey pots, Traffic Flow Security, Firewalls – Design and Types of Firewalls, Personal Firewalls, IDS, **Email Security:** Services Security for Email Attacks Through Emails, Privacy-Authentication of Source Message, Pretty Good Privacy(PGP), S-MIME. **IP Security**: Overview of IPSec, IP& IP version 6 Authentication, Encapsulation Security Payload ESP, Internet Key Exchange IKE, **Web Security:** SSL/TLS, Basic protocols of security. Encoding –Secure Electronic Transaction SET.

UNIT V:Cryptography and Information Security Tools: Spoofing tools**:** like Arping etc., **Foot printing Tools** (ex-nslookup, dig, Whois,etc..), **Vulnerabilities Scanning Tools** (i.e. Angry IP, HPing2, IP Scanner, Global Network Inventory Scanner, Net Tools Suite Pack.), NetBIOS Enumeration Using NetView Tool, **Steganography** Merge Streams, Image Hide, Stealth Files, Blindsideusing:**STools, Steghide, Steganos**.Stegdetect, Steganalysis - Stego Watch- Stego Detection Tool, **StegSpy**.**Trojans Detection Tools**(i.e. Netstat, fPort, TCPView, CurrPorts Tool, Process Viewer), Lan Scanner Tools (i.e.look@LAN, Wireshark, Tcpdump). **DoS Attack Understanding Tools-** Jolt2, Bubonic.c, Land and LaTierra, Targa, Nemesy Blast, Panther2, Crazy Pinger, Some Trouble, UDP Flood, FSMax.

Recommended Text:

1. Cryptography and Network Security Principles and Practice Fourth Edition,William Stallings, Pearson Education.
2. Network Security Essentials: Applications and Standards, by William Stallings.Prentice Hall.
3. Behrouz A Ferouzan, “Cryptography and NetworkSecurity” Tata Mc Graw Hills, 2007
4. Charles PPfleeger, Shari Lawrence Pfleeger “Security in Computing”, 4th Edition Prentice Hall of India, 2006.
5. Introduction to Modern Cryptography by Jonathan Katz and Yehuda Lindell, Chapman and Hall/CRC

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New Scheme Based On AICTE Flexible Curricula

Computer Science and Engineering, VII-Semester

Open Elective – CS703 (B) Data Mining and Warehousing

COURSE OBJECTIVES

- Student should understand the value of Historical data and data mining in solving real-world problems.
- Student should become affluent with the basic Supervised and unsupervised learning algorithms commonly used in data mining .
- Student develops the skill in using data mining for solving real-world problems.

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1. Data Warehousing: Introduction, Delivery Process, Data warehouse Architecture, Data Preprocessing: Data cleaning, Data Integration and transformation, Data reduction. Data warehouse Design: Datawarehouse schema, Partitioning strategy Data warehouse Implementation, Data Marts, Meta Data, Example of a Multidimensional Data model. Introduction to Pattern Warehousing.

2. OLAP Systems: Basic concepts, OLAP queries, Types of OLAP servers, OLAP operations etc. Data Warehouse Hardware and Operational Design: Security, Backup And Recovery,

3. Introduction to Data& Data Mining :Data Types, Quality of data, Data Preprocessing, Similarity measures, Summary statistics, Data distributions, Basic data mining tasks, Data Mining V/s knowledge discovery in databases. Issues in Data mining. Introduction to Fuzzy sets and fuzzy logic.

4. Supervised Learning: Classification: Statistical-based algorithms, Distance-based algorithms, Decision tree-based algorithms, Neural network-based algorithms, Rule-based algorithms, Probabilistic Classifiers

5. Clustering & Association Rule mining : Hierarchical algorithms, Partitional algorithms, Clustering large databases – BIRCH, DBSCAN, CURE algorithms.Association rules : Parallel and distributed algorithms such as Apriori and FP growth algorithms.

Books Recommended:

Text Books:

1. Pang – ningTan , Steinbach & Kumar, *"Introduction to Data Mining"*, Pearson Edu, 2019.
2. Jaiwei Han, Micheline Kamber, "*Data Mining : Concepts and Techniques*", Morgan Kaufmann Publishers.

Reference Books:

1. Margaret H. Dunham, "*Data Mining : Introductory and Advanced topics*", Pearson Edu., 2009.
2. Anahory& Murray, "*Data Warehousing in the Real World"*, Pearson Edu., 2009.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. Understand the need of designing Enterprise data warehouses andwill be enabled to approach business problems analytically by identifying opportunities to derive business.

CO2. Compare and contrast, various methods for storing & retrieving data from different data sources/repository.

CO3. Ascertain the application of data mining in various areas and Preprocess the given data and visualize it for a given application or data exploration/mining task

CO4. Apply supervised learning methods to given data sets such as classification and its various types.
CO5. Apply Unsupervised learning methods to given data sets such as clustering and its various types.
CO6 Apply Association rule Mining to various domains.

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Computer Science and Engineering, VII-Semester

Open Elective – CS703 (C) Agile Software Development

Pre-Requisite: Software Engineering

Course Outcomes:
After completing the course student should be able to:

5. Describe the fundamental principles and practices associated with each of the agile development methods.
6. Compare agile software development model with traditional development models and identify the benefits and pitfalls.
7. Use techniques and skills to establish and mentor Agile Teams for effective software development.
8. Apply core values and principles of Agile Methods in software development.

Course Contents:

Unit-I: Fundamentals of Agile Process: Introduction and background, Agile Manifesto and Principles, Stakeholders and Challenges, Overview of Agile Development Models: Scrum, Extreme Programming, Feature Driven Development, Crystal, Kanban, and Lean Software Development.

Unit-II: Agile Projects: Planning for Agile Teams: Scrum Teams, XP Teams, General Agile Teams, Team Distribution; Agile Project Lifecycles: Typical Agile Project Lifecycles, Phase Activities, Product Vision, Release Planning: Creating the Product Backlog, User Stories, Prioritizing and Estimating, Creating the Release Plan; Monitoring and Adapting: Managing Risks and Issues, Retrospectives.

Unit-III: Introduction to Scrum: Agile Scrum Framework, Scrum Artifacts, Meetings, Activities and Roles, Scrum Team Simulation, Scrum Planning Principles, Product and Release Planning, Sprinting: Planning, Execution, Review and Retrospective; User story definition and Characteristics, Acceptance tests and Verifying stories, Burn down chart, Daily scrum, Scrum Case Study.

Unit-IV: Introduction to Extreme Programming (XP): XP Lifecycle, The XP Team, XP Concepts: Refactoring, Technical Debt, Timeboxing, Stories, Velocity; Adopting XP: Pre-requisites, Challenges; Applying XP: Thinking- Pair Programming, Collaborating, Release, Planning, Development; XP Case Study.

Unit-V: Agile Software Design and Development: Agile design practices, Role of design Principles, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control; Agility and Quality Assurance: Agile Interaction Design, Agile approach to Quality Assurance, Test Driven Development, Pair programming: Issues and Challenges.

Recommended Books:

1. Robert C. Martin, Agile Software Development- Principles, Patterns and Practices, Prentice Hall, 2013.
2. Kenneth S. Rubin, Essential Scrum: A Practical Guide to the Most Popular Agile Process, Addison Wesley, 2012.
3. James Shore and Shane Warden, The Art of Agile Development, O'Reilly Media, 2007.
4. Craig Larman, ―Agile and Iterative Development: A manager's Guide, Addison-Wesley, 2004.
5. Ken Schawber, Mike Beedle, Agile Software Development with Scrum, Pearson, 2001.
6. Cohn, Mike, Agile Estimating and Planning, Pearson Education, 2006.
7. Cohn, Mike, User Stories Applied: For Agile Software Development Addison Wisley, 2004.

Online Resources:

1. IEEE Transactions on Software Engineering
2. IEEE Transactions on Dependable and Secure Computing
3. IET Software
4. ACM Transactions on Software Engineering and Methodology (TOSEM)
5. ACM SIGSOFT Software Engineering Notes

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New Scheme Based On AICTE Flexible Curricula

Computer Science and Engineering, VII-Semester

Open Elective – CS703 (D) Disaster Management

Course Objective

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I

INTRODUCTION TO DISASTERS

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters,pandemics,complexemergencies,Climatechange-DosandDont'sduringvarious types ofDisasters

UNIT II

APPROACHES TO DISASTER RISK REDUCTION

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processess and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III

INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources

UNITIV

DISASTER RISK MANAGEMENTININDIA

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment

UNITV

DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disastermanagement.

Text Books/Reference Books

1. Singhal J.P, Disaster Management, Laxmi Publications.
2. Tushar Bhattacharya, Disaster Science and Management, McGraw Hill India.
3. Govt. of India, Disaster Management, Government of India.