IV/IV B.Tech IT R(15) SEN/I-1

IV/IV B.Tech IT Autonomous Syllabus R-15

CRYPTOGRAPHY & NETWORK SECURITY

COURSE IT412

Instruction: 3 Periods & 1 Tut /week End Exam: 3 Hours **CREDITS: 3** Sessional Marks: 40M End Exam Marks: 60M

COURSE OBJECTIVE:

- 1. Learn fundamentals of cryptography and its application to network security.
- 2. Understand network security threats, security services, and countermeasures. Including basic encryption techniques, cryptographic algorithms, authentication and digital signature, public key infrastructure, access control, security models, as well as their applications to IP security, Web security, trusted operating systems.
- **3.** Understand vulnerability analysis of network security.
- **4.** Acquire background on hash functions; authentication; firewalls; intrusion detection techniques.

COURSE OUTCOMES:

On completing this course student will be able to

- CO1 Able to encrypt and decrypt information using some of the standard algorithms
- CO2 To develop strategies to protect organization information assets from common attacks.
- CO3 Understand how authentication is implemented in wireless systems
- **CO4** Acquire knowledge on the role of a "professional computing practitioner" with particular regard to an understanding of legal and ethical issues

CO PO CO												
RELATION	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
MATRIX												
CO 1				3								
CO 2			3									2
CO 3				3							2	
CO 4								3				

UNIT –I (Text Book -1)

- Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security
- Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, stenography, key range and key size, possible types of attacks, Key Distribution, Diffie-Hellman Key exchange algorithm

UNIT – II (Text Book -1)

- Symmetric key Ciphers: Introduction, Algorithm modes and types, An overview of symmetric key cryptography, Algorithms- DES, AES, IDEA,Blowfish,RC4, Differential and Linear Crypt analysis.
- Asymmetric key Ciphers: Principles of public key cryp to systems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.

UNIT – III (Text Book -2)

- Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures.
- Authentication Applications: Kerberos, X.509 Authentication Service, Public Key Infrastructure, Biometric Authentication.

UNIT – IV (Text Book -2)

- E-Mail Security: Pretty Good Privacy, S/MIME
- **IP** Security: IP security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, keymanagement.

UNIT – V (Text Book -1 & 2)

- Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction
- Intruders, virus and Firewalls: Intruders, Intrusion detection, password management, virus and related threats, Countermeasures, Firewall design principles, types of firewalls
- Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

Text Book:

- I. William Stallings, Cryptography And Network Security, 4th Edition, (Pearson Education/PHI).
- II. Cryptography and Network security, Atul Kahate, Tata McGraw-Hill Pub company Ltd., New Delhi

(10 Periods)

(15 Periods)

(15 Periods)

(10 Periods)

(10 Periods)

Reference Books:

- I. Network Security Private Communication in a public world, Charlie Kaufman, Radia Perlman & Mike Speciner, Prentice Hall of India Private Ltd., New Delhi
- II. Network Security Essentials Applications and Standards, William Stallings, Pearson Education, New Delhi
- III. Network Security: The Complete Reference by Roberta Bragg, Mark Phodes-Ousley, Keith Strassberg Tata Mcgraw-Hill

IT413

DATA ANALYTICS

CREDITS: 3

Instruction: 3 Periods & 1 Tut /week End- Exam: 3 Hours Sessional Marks: 40 End-Exam-Marks: 60

Course Objectives:

- 1. Optimize business decisions and create competitive advantage with Big data analytics
- 2. Explore the fundamental concepts of big data analytics and Hadoop Platform
- 3. Understand the applications using the Map Reduce concepts
- 4. Introduce programming tools such as PIG and HIVE in Hadoop Ecosystem

Course Outcomes:

On completing this course student will be able to

CO1: Describe the characteristics of big data and demonstrate the Business Implications for Big Data

applications using Apache Hadoop Eco system.

CO2: Apply Big data analytics and Hadoop concepts to solve Big Data related challenges.

CO3: Analyze the functioning of of Hadoop Distributed file system (HDFS) and Map Reduce techniques

and apply these concepts on large data sets.

CO4: Write queries for big data applications using hive query language to retrieve information. **CO5:** Develop pig scripts to retrieve information for big data applications.

CU	ui se n	Iau IA.												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3							1	1	1		1	3	2
CO2	3	2			2			1	1	1		1	3	2
CO3		3	2		2			1	1	1		1	3	2
CO4		3	2		2			1	1	1		1	3	2
CO5		3	2		2			1	1	1		1	3	2

UNIT I (10 Periods)

Classification of Digital Data : Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, Big Data and Other Characteristics of Data Which are not Definitional Traits of Big Data, purpose of Big Data, Information Consumer versus Produce Information, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment ,A Typical Hadoop Environment ,co existence of Big Data and Data warehouse changes in the Realms of Big Data

UNIT II (10 Periods)

Big Data Analytics and Hadoop : Classification of Analytics, Greatest Challenges that Prevent Businesses from Capitalizing on Big Data, Top Challenges Facing Big Data, Importance of Big Data Analytics, Kind of Technologies to Meet the Challenges Posed by Big Data, Data Science ,Data Scientist, Terminologies Used in Big Data Environments, Basically Available Soft State

Eventual Consistency (BASE) ,Few Top Analytics Tools The Big Data Technology Landscape : NoSQL (Not Only SQL) , Hadoop UNIT III (10 Periods)

5

IV/IV B.Tech IT Autonomous Syllabus R-15

Introduction to Hadoop : Introducing Hadoop , RDBMS versus Hadoop, Distributed Computing Challenges , History of Hadoop, Hadoop Overview, Use Case of Hadoop, Hadoop Distributors ,HDFS (Hadoop Distributed File System),Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet another Resource Negotiator),Interacting with Hadoop Ecosystem

Introduction to MAPREDUCE Programming : Introduction ,Mapper , Reducer ,Combiner ,Partitioner , Searching , Sorting , Compression

UNIT IV (8 Periods)

Introduction to Hive : Hive and Hive Architecture, Hive Data Types, Hive File Format ,Hive Query Language (HQL), RCFile Implementation ,SerDe , User-Defined Function (UDF)

UNIT V (10 Periods)

Introduction to Pig : Pig and Anatomy of Pig ,Pig on Hadoop ,Pig Philosophy ,Use Case for Pig: ETL Processing ,Pig Latin Overview ,Data Types in Pig ,Running Pig , Execution Modes of Pig,HDFS Commands ,Relational Operators , Eval Function ,Complex Data Types, Piggy Bank User-Defined Functions (UDF) ,Parameter Substitution ,Diagnostic Operator , Word Count Example using Pig , When to use Pig?, When not to use Pig? , Pig at Yahoo!, Pig versus Hive

Textbooks:

6

1. Seema Acharya and Subhashini Chellappan, Big Data and Analytics, Wiley publication

Reference Books:

- 1. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch ,"Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", 1st Edition, TMH,2012.
 - 2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly

ARTIFICIAL INTELLIGENCE & ROBOTICS

COURSE IT414 (A)

Instruction: 4 Periods & 1 Tut /week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

COURSE OBJECTIVE:

This course has been designed to:

- Explain how heuristics offer ways to pursue goals in exponentially large search spaces
- Describe the representation and use of knowledge in inference-based problem solving by knowledge-based agents
- Apply probability theory to describe and model agents operating in uncertain environments
 - Describe ways to supervise agents to learn and improve their behavior
 - Explain adaptive learning from the environment
 - Relate theories of mind and the future of AI to ethical issues raised by artificial cognitive systems

COURSE OUTCOMES:

On completing this course student will be able to

CO1Distinguish the concepts of State Space and Heuristic Search Algorithms.

CO2Solve problems in propositional logic, predicate calculus and other axiomatic systems.

CO3 Identify the role of knowledge representation, problem solving and learning in intelligent systems.

CO4 Differentiate traditional systems ,Rule-based and Expert Systems and examine the working of Neural networks.

CO5Analyze the framework for keeping track of the positions and velocities of objects in space

	PO1	PO	PO1	PO1	PO1	PSO	PSO							
		2	3	4	5	6	7	8	9	0	1	2	1	2
CO 1	2	3	2					1	1	1		1	2	2
CO 2	3	1						1	1	1		1	2	2
CO 3	3	1	2					1	1	1		1	2	2
CO 4	2	3	2	1	1			1	1	1		1	2	2
CO 5	2	3	2	1	1			1	1	1		1	2	2

concepts: Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic.

UNIT III:

UNIT II:

UNIT I:

deepening a*, constraint satisfaction.

Knowledge representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames advanced knowledge representation techniques:

UNIT IV:

Expert system and applications: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems, truth maintenance systems. Uncertainty measure: probability theory: Introduction, probability theory, Bayesian belief networks, certainty factor theory, Dempster-Shafer theory

UNIT V: (TextBook 2)

Introduction, position and orientation of objects, objects coordinate frame Rotation matrix, Euler angles Roll, pitch and yaw angles coordinate Transformations, Joint variables and position of end effector, Dot and cross products, coordinate frames, Rotations, Homogeneous coordinates..

Text Books:

- 1. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning,
- 2. Robert J. Schilling, Fundamentals of Robotics Analysis and Control, PHI Learning., 2009.

Reference Books:

8

- I. Artificial intelligence, structures and Strategies for Complex problem solving, George.F.Lugar, 5th edition, PEA
- Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer II.
- Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier III.

SYLLABUS

AI, applications, tic-tac-tie game playing, development of AI languages, current trends in AI. Problem solving: state-space search and control strategies : Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-

(13 Periods) Introduction to artificial intelligence: Introduction, history, intelligent systems, foundations of

(13 Periods)

(13 Periods)

(12 Periods)

(13 Periods) Logic

PARALLEL COMPUTING

COURSE IT414 (B) Instruction: 4 Periods & 1 Tut /week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

COURSE OBJECTIVE:

This course covers the design of advanced modern computing systems. In particular, the design of modern microprocessors, characteristics of the memory hierarchy, and issues involved in multi-threading and multi-processing are discussed. The main objective of this course is to provide students with an understanding and appreciation of the fundamental issues and tradeoffs involved in the design and evaluation of modern computers

COURSE OUTCOMES:

Understand the concepts and terminology of high performance computing **CO1** Can analyze the need for high performance and parallel programming models.

- **CO2** Can write and analyze the behavior of high performance parallel programs for distributed memory architectures (using MPI).
- **CO3** Can write and analyze the behavior of high performance parallel programs for shared memory architectures (using Pthreads and OpenMP).
- CO4 Can write simple programs for the GPU.

CO PO CO RELATION MATRIX PO1	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2		2	2			2		3	2
CO 2	2			2	2	2						2
CO 3	3	2	2		2	2			2		3	2
CO 4	3	2	2		2	2			2		3	2

(12 Periods)

(12 Periods)

(12 Periods)

(12 Periods)

Introduction to Parallel hardware and software, need for high performance systems and Parallel Programming, SISD, SIMD, MISD, MIMD models, Performance issues.

UNIT II:

Processors, PThreads, Thread Creation, Passing arguments to Thread function, Simple matrix multiplication using Pthreads, critical sections, mutexes, semaphores, barriers and conditional variables, locks, thread safety, simple programming assignments.

UNIT III:

Open MP Programming: introduction, reduction clause, parallel for-loop scheduling, atomic directive, critical sections and locks, private directive, Programming assignments, n body solvers using openMP.

UNIT IV:

Introduction to MPI programming: MPI primitives such as MPI_Send, MPI-Recv, MPI_Init, MPI-Finalize, etc., Application of MPI to Trepizoidal rule, Collective Communication primitives in MPI, MPI derived datatypes, Performance evaluation of MPI programs, Parallel sorting algorithms, Tree search solved using MPI, Programming Assignments.

UNIT V:

(14 Periods)

Introduction to GPU computing, GPUs as Parallel Computers, Architecture of a Modern GPU Graphics pipelines, GPGPU, Data Parallelism and CUDA C Programming, CUDA Threads Organization, Simple Matrix multiplication using CUDA, CUDA memories.

Text Books:

- 1. An Introduction to Parallel Programming, Peter S Pacheco, Elsevier, 2011
- 2. Programming Massively Parallel Processors A hands-on Approach By David B. Kirk and Wen-mei W. Hwu, Morgan Kaufmann, 2010.
- 3. Programming Massively Parallel Processors, Kirk & Hwu, Elsevier, 2012

Reference Books:

- I. CUDA by example: An introduction to General Purpose GPU Programming, Jason, Sanders, . Edward Kandrit, Perason, 2011
- II. CUDA Programming, Shame Cook, Elsevier
- III. High Performance Heterogeneous Computing, Jack Dongarra, Alexey & Lastovetsky, Wiley
- IV. Parallel computing theory and practice, Michel J.Quinn, TMH

UNIT I:

DATA WARE HOUSING AND MINING

COURSE IT414 (C)

Instruction: End Exam: 3 Hours **CREDITS:** Sessional Marks: 40M End Exam Marks: 60M

COURSE OBJECTIVE:

- 1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
- 2. Examine the types of the data to be mined and apply preprocessing methods on raw data.
- **3.** Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

COURSE OUTCOMES:

Students who complete this course should be able to:

- **CO1**. Apply Data Preprocessing steps Data Cleaning, Data Transformation and Data reduction on the given data set to ensure that the data is correct, consistent and usable.
- **CO2**. Design Datawarehouse for a given database application using starnet schema, fact constellation schema and snowflake schema.
- **CO3**. Analyze the data and describe the concepts using Concept Description and discrimination and attribute relevance analysis. Analyze and discover the associations in the given data using Association Rule Mining algorithms: Apriori and FP Growth.
- **CO4**. Analyze the data and predict the outcome using classification techniques: Bayesian Classification, Backpropogation, Decision Tree and Clustering Algorithms: K-Means on the given dataset

-														
	PO	PS	PS											
	1	2	3	4	5	6	7	8	9	10	11	12	01	02
CO 1	3	2						1	1	1		1	3	2
CO 2	1	2	3					1	1	1		1	3	2
CO 3	2	3						1	1	1		1	3	2
CO 4	2	3						1	1	1		1	3	2

IV/IV B.Tech IT Autonomous Syllabus R-15

SYLLABUS

UNIT I: Introduction to Data Mining: Motivation and importance, What is Data Mining, Relational Databases, Data Warehouses, Transactional Databases, Advanced Database Systems and Advanced Database Applications, Data Mining Functionalities, Interestingness of a pattern Classification of Data Mining Systems, Major issues in Data Mining . Data Mining Primitives: What defines a Data Mining Task Architectures of Data Mining Systems. why Pre-process the Data, Data Cleaning, Data Integration and Transformation Data Reduction, Discretization and Concept Hierarchy Generation

UNIT II:

Data Warehouse and OLAP Technology for Data Mining ,What is a Data Warehouse? Multi-Dimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Development of Data Cube Technology, Data Warehousing to Data Mining

UNIT III:

Concept Description: Characterization and comparison What is Concept Description, Data Generalization and summarization-based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between different Classes, Mining Descriptive Statistical Measures in large Databases

UNIT IV:

Mining Association rule in large Databases Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint- Based Association Mining

UNIT V:

(12 Periods)

Classification and prediction Concepts and Issues regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods.

Cluster Analysis: What is Cluster Analysis, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning algorithms

Text Books:

1. Data Mining Concepts and Techniques Jiawei Han and Micheline Kamber Morgan Kaufman Publications

Reference Books:

- I. Data Mining Introductory and Advanced Topics, Margaret H Dunhan, Pearson Education.
- II. Data Mining, Ian H. Witten Eibe Frank, Morgan Kaufman Publications.
- III. Data Mining by Tan, Steinbach, Vipin Kumar, Pearson Education.

(14 Periods)

(11 Periods)

(12 Periods)

(11 Periods)

SOFTWARE PROJECT MANAGEMENT

COURSE IT414 (D)

Instruction: 4 Periods & 1 Tut. /Week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

COURSE OBJECTIVE:

- 1. To outline the need for Software Project Management
- 2. To highlight different techniques for software cost estimation and activity planning

COURSE OUTCOMES:

Upon the successful completion of the course, students will be able to: **CO1** Understand the principles of software project management

CO2 Demonstrate cost estimation

CO3 Understand risk management and control the project

CO4 Manage the software project

CO PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
RELATION												
MATRIX												
CO 1	3	2	2	2	2	3	-	3	1	-	1	3
CO 2	3	3	3	3	3	2	-	3	3	-	3	3
CO 3	2	3	3	3	3	3	-	3	2	-	2	3
CO 4	2	2	2	2	3	2	-	2	2	-	2	3

UNIT I:

Project evaluation and project planning :Importance of Software Project Management -Activities Methodologies - Categorization of Software Projects - Setting objectives -Management Principles - Management Control - Project portfolio Management - Cost-benefit evaluation technology - Risk evaluation - Strategic program Management - Stepwise Project Planning.

UNIT II:

Project life cycle and effort estimation : Software process and Process Models - Choice of Process models - mental delivery - Rapid Application development - Agile methods - Extreme Programming - SCRUM - Managing interactive processes - Basics of Software estimation -Effort and Cost estimation techniques - COSMIC Full function points - COCOMO II A Parametric Productivity Model - Staffing Pattern

UNIT III:

Activity planning and risk management: Objectives of Activity planning – Project schedules – Activities - Sequencing and scheduling - Network Planning models - Forward Pass & Backward Pass techniques - Critical path (CRM) method - Risk identification - Assessment -Monitoring - PERT technique - Monte Carlo simulation - Resource Allocation - Creation of critical patterns - Cost schedules.

UNIT IV:

Project management and control : Framework for Management and control - Collection of data Project termination - Visualizing progress - Cost monitoring - Earned Value Analysis-Project tracking - Change control- Software Configuration Management - Managing contracts -Contract Management.

UNIT V:

Staffing in software projects : Managing people - Organizational behavior - Best methods of staff selection - Motivation - The Oldham-Hackman job characteristic model - Ethical and Programmed concerns - Working in teams - Decision making - Team structures - Virtual teams – Communications genres – Communication plans.

Text Books:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management - Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

Reference Books:

- Robert K. Wysocki "Effective Software Project Management" Wiley Publication, 2011. I.
- II. Walker Royce: "Software Project Management"- Addison-Wesley, 1998.

14

(13 Periods)

(13 Periods)

(13 Periods)

(13 Periods)

(12 Periods)

MACHINE LEARNING

COURSE IT415 (A)

Instruction: 4 Periods & 1 Tut. /Week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

COURSE OBJECTIVE:

- I. The objective of this course is to give students basic knowledge about the key algorithms and theory that form the foundation of machine learning.
- II. Identify and apply the appropriate Machine learning technique to classification, Pattern Recognition, and Optimization and Decision problems.

COURSE OUTCOMES:

Student will be able to

CO 1 Illustrate the steps in the design of learning Systems with an application.

CO 2 Analyze the data and predict decisions using Decision Tree Learning Algorithms.

CO 3 Classify the textual data by using Multiclass Classification Algorithms.

CO 4 Analyze and Formulate Computational Learning Theory for Finite and Infinite hypothesis spaces

CO 5 Describe machine learning paradigms: supervised and unsupervised learning, inductive and

deductive learning and case based reasoning and learning.

	PO	PO1	PO1	PO1	PS	PSO								
	1	2	3	4	5	6	7	8	9	0	1	2	01	2
CO	3	2						1	1	1		1	3	2
1														
CO	2	3						1	1	1		1	3	2
2														
CO	3	2						1	1	1		1	3	2
3														
CO	2	3	3					1	1	1		1	3	2
4														
CO	3							1	1	1			3	2
5														

Introduction: Definition of learning systems, Goals and applications of machine learning. Aspects of developing a learning system: training data, concept representation, Function approximation.

UNIT II:

UNIT I:

Decision Tree Learning: Decision Tree Representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, issues in decision tree learning.

UNIT III:

Bayesian Learning: Bayes Theorem and concept learning, Maximum likelihood and least squared error hypothesis, Maximum likelihood hypothesis for predicting probabilities, Bayes optimal classifier, Naive Bayes classifier, An example to classify text, Bayesian belief networks.

UNIT IV:

Computational Learning Theory: Probability learning an approximately correct hypothesis, Sample complexity for finite hypothesis spaces, Sample complexity for infinite hypothesis spaces.

Instance-Based Learning: Constructing explicit generalizations versus comparing to past specific examples, K-Nearest-neighbor algorithm, Case-based learning.

UNIT V:

(12 Periods)

Machine learning paradigms: Introduction, machine learning systems, supervised and unsupervised learning, inductive learning, deductive learning, clustering, Support vector machines, Case based reasoning and learning.

Text Books:

1. Machine Learning, Tom M.Mitchell, MGH

Reference Books:

- I. Introduction to machine Learning, 2nd ed, Ethem Alpaydin, PHI
- II. Baldi, P. and Brunak, S. (2002). Bioinformatics: A Machine Learning Approach. Cambridge, MA: MIT Press.
- III. Kearns, M. and Vazirani, U. (1994). Computational Learning Theory. Cambridge, MA: MIT Press.

(13 Periods)

(13 Periods)

(13 Periods)

(13 Periods)

STORAGE AREA NETWORKS

COURSE IT415 (B) Instruction: End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

COURSE OBJECTIVE:

Ability to demonstrate storage area networks and their products and to provide the mechanisms for backup/recovery.

COURSE OUTCOMES:

Understand the concepts and terminology of high performance computing **CO 1** Understand Storage Area Networks characteristics and components.

CO 2 Become familiar with the SAN application environment, network storage and topologies

CO 3 Identifying the issues and down time's in relation with the SAN failure

CO 4 Understand the technology related to back up's

CO 5 Analyze and understand the security and monitoring aspects in SAN's

CO PO CO												
RELATION	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
MATRIX												
CO 1	1			1		1			1			2
CO 2	2		2	2		1			1			2
CO 3	2			2		1			1			2
CO 4	2			3		1		2	1			2

(15 Periods)

(10 Periods)

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment, Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

UNIT II

UNIT I

Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems, High-level architecture and working of an intelligent storage system Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need, Understand the appropriateness of the different networked storage options for different application environments

UNIT III

List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

UNIT IV

Architecture of backup/recovery and the different backup/recovery topologies replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

UNIT V

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center. Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain Virtualization technologies, block-level and file-level virtualization technologies and processes.

Text Books:

1. EMC Corporation, Information Storage and Management, Wiley.

Reference Books:

- Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, I. 2003.
- II. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
- III. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

18

(10 Periods)

(10 Periods)

(10 Periods)

USER EXPERIENCE(Ux)

COURSE IT415 (C) Instruction: 4 Periods & 1 Tut. /Week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

COURSE OBJECTIVE:

COURSE OUTCOMES:

Understand the concepts and terminology of high performance computing CO 1 analyze users' needs, usability goals and user experience goals of a software application

- **CO 2** use software prototyping tools to design user interfaces that take into account human capabilities and constraints, users' needs, usability goals
- CO 3 implement functional user interface prototypes based on the design process
- CO 4 critically evaluate the usability of software application

CO PO CO RELATION MATRIX	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	2	3	3		2		3			3	
CO 2	1	3	3	3		2		3			3	
CO 3	1	3	3	3		2		3			3	
CO 4	1	2	3	3		2		3			3	

UNIT I

Usability of Interactive Systems: Introduction, Usability Requirements, Usability Measures, Usability Motivations, Universal Usability,

Guidelines, Principles, and Theories: Introduction, Guidelines, Principles, Theories Object-Action Interface, Model

Managing Design Processes: Introduction, Organizational Design to Support Usability The Three Pillars of Design, Development Methodologies, Ethnographic Observation, Participatory Design, Scenario Development Social Impact Statement for Early Design Review, Legal issues

UNIT II

Evaluating Interface Designs: Introduction, Expert Reviews, and Usability Testing and Laboratories, Survey Instruments, Acceptance Tests, Evaluation during Active Use, Controlled Psychologically Oriented Experiments

Software Tools: Introduction, Specification Methods, Interface-Building Tools, Evaluation and Critiquing Tools

Direct Manipulation and Virtual Environments: Introduction, Examples of Direct Manipulation, Discussion of Direct Manipulation, 3D Interfaces, Teleoperation, Virtual and Augmented Reality

UNIT III

Menu Selection, Form Filling, and Dialog Boxes: Introduction, Task-Related Menu Organization, Single Menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, And Data Entry with Menus: Form Filling, Dialog Boxes, And Alternatives, Audio Menus and Menus for Small Displays

Command and Natural Languages: Introduction, Functionality to Support Users Tasks, Command-Organization Strategies, the Benefits of Structure, Naming and Abbreviations, Natural Language in Computing

Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays-Small and Large, Printers

UNIT IV

(13 Periods)

Collaboration: Introduction, Goals of Collaboration, Asynchronous Distributed Interfaces: Different Time, Different Place Synchronous Distributed Interfaces: Different Place, Same Time Face-to-Face Interfaces: Same Place, Same Time

Quality of Service: Introduction, Models of Response-Time Impacts, Expectations and Attitudes, User Productivity, Variability in Response Time, Frustrating Experiences

Balancing Function and Fashion: Introduction, Error Messages, Non anthropomorphic Design, Display Design, Window Design, Color

UNIT V

(12 Periods)

User Manuals, Online Help, and Tutorials: Introduction, Paper Versus Online Manuals, Reading from Paper Versus from Displays, Shaping the Content of the Manuals, Online Manuals

(13 Periods)

(13 Periods)

(13 Periods)

and Help, OnlineTutorials, Demonstrations, and Guides, Online Communities for User Assistance, The Development Process

Information Search and Visualization: Introduction, Search in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Search Interfaces, Information Visualization

Text Book:

1. Ben Sheiderman, "Design The User Interface", Pearson Education, 1998.

Reference Books:

I. Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley& Sons, 2001. Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd., 2002

ANALYTICS LAB

COURSE IT416 Instruction: 3 Periods End Exam: 3 Hours **CREDITS: 2** Sessional Marks: 50M End Exam Marks: 50M

COURSE OBJECTIVE:

- Identify Big Data and its Business Implications.
- List the components of Hadoop and Hadoop Eco-System
- Access and Process Data on Distributed File System
- Manage Job Execution in Hadoop Environment

COURSE OUTCOMES:

- 1. Understand the Big Data Platform and its Use cases
- 2. demonstrate HDFS Concepts and Interfacing with HDFS
- 3. use Map Reduce Jobs in various applications
- 4. Apply analytics on Structured, Unstructured Data.

CO PO CO RELATIO N MATRIX	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO 1	3	2		2		2			2		2	3
CO 2	2					2			2		2	2
CO 3	2					2			2		2	2
CO 4	2					2			2		2	2

List of the Experiments

- 1. Installing and configuring Hadoop
- 2. Run Hadoop commands
- 3. Data structure implementation in java : LinkedList ,Stack,Queue,Set,Map
- 4. Setting up HDFS and monitoring UI
- 5. Implement word count / frequency programs using mapreduce
- 6. Implement an map reduce program that processes a weather dataset
- 7. Simple analytics using Map Reduce.
- 8. Visualize data using any plotting framework
- 9. Plotting the Hadoop results using GNU plot and Calculating histograms using Map Reduce.
- 10. Apache Pig installation and running latin scripts

Reference Book:

.

1. Hadoop Map Reduce Cookbook, Srinath Perera & Thilina Gunarathne, 2013, PACKT PUBLISHING.

COURSE IT417

NETWORK SECURITY LAB CREDITS: 2

Instruction: 3 Periods End- Exam : 3 Hours Sessional Marks: 50M End-Exam-Marks: 50M

COURSE OBJECTIVES:

1) Learn to implement the algorithms DES, RSA, MD5, SHA-1

2) Learn to use network security tools like GnuPG, KFsensor, Net Strumbler

COURSE OUTCOMES:

At the end of the course, the student should be able to:

1) Implement the cipher techniques

2) Develop the various security algorithms

3) Use different open source tools for network security and analysis

CO PO CO RELATIO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
N MATRIX PO1												
CO 1	3	2	2	3	2							2
CO 2	3	3	3	3	2	3		3			3	3
CO 3	3	3	3	3	3	3		3			3	3

LIST OF EXPERIMENTS:

1. Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:

- a) Caesar Cipher
- b) Playfair Cipher

c) Hill Cipher

2. Implement the following algorithms

a) DES

b) RSA Algorithm

c) Diffiee-Hellman

3. Implement the Signature Scheme - Digital Signature Standard

4. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG)

5. Installation of rootkits and study about the variety of options

6. Demonstrate how to test Firewall using any tool(FireHOL, Nmap or any other software)

LIST OF HARDWARE REQUIREMENTS & SOFTWARE REQUIREMENTS

• SOFTWARE REQUIREMENTS Java or equivalent compiler GnuPG KF Sensor or Equivalent Snort Net Stumbler or Equivalent FireHOL Nmap

• HARDWARE REQUIREMENTS

Standalone desktops (or) Server supporting 30 terminals or more

IV/IV B.Tech IT Autonomous Syllabus R-15

IV/IV B.Tech IT R(15) SEN/I-2

IV/IV B.Tech IT Autonomous Syllabus R-15

SOFT COMPUTING

COURSE IT421(A)

Instruction: 4 Periods & 1 Tut. /Week End- Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40 End Exam Marks: 60

COURSE OBJECTIVE:

The course would aim to make the student understand the basic idea of problem solving through the principles of soft computing, which would be seen as a well-balanced integration of fuzzy logic, evolutionary computing, and neural information processing.

- To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience.
- To familiarize with genetic algorithms.
- To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems.

To provide the mathematical background for carrying out the optimization associated with neural network learning.

COURSE OUTCOMES:

Upon completion of the course, students should:

CO1 Identify and describe soft computing techniques and their roles in building intelligent systems.

CO2 Recognize the feasibility of applying a soft computing methodology for a particular problem.

CO3 Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.

CO4 Apply genetic algorithms to combinatorial optimization problems.

CO5 Apply neural networks to pattern classification and regression problems.

CO PO CO RELATION MATRIX	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2	3	2							2
CO 2	3	3	3	3	2	3		3			3	3
CO 3	3	3	3	3	3	3		3			3	3
CO 4	3	3	3	3	3	3		3			3	3
CO 5	3	3	3	3	3	3		3			3	3

UNIT I

Fuzzy Logic:

Fuzzy Set Theory: Basic Definition and Terminology, Set Theoretic Operations, MF Formulation and Parameterization, MF of two dimensions, Fuzzy Union, Intersection and Complement.

UNIT II

Fuzzy Rules and Fuzzy Reasoning: Extension Principles and Fuzzy Relations, Fuzzy IF THEN Rules, Fuzzy Reasoning. Fuzzy Inference System Introduction, Mamdani Fuzzy models, Other Variants, Sugeno Fuzzy Models, Tekamoto Fuzzy Models.

UNIT III

Genetic Algorithms:

Fundamentals of Genetic Algorithms: Basic Concepts Creation, Offspring's Encoding, Fitness functions, Reproduction, Genetic Modeling: Inheritance Operators, Cross over, Inversion and detection, Mutation operator, Bitwise operators.

UNIT IV

Artificial Neural Networks:

Introduction, Architecture, Back Propagation and feed Forward Networks, Offline Learning, Online Learning.

Supervised Learning of Neural Networks: Introduction, Perceptrons, Adaline Back Propagation Multilayer Perceptrons, Back Propagation Learning Rules, Methods of Speeding. Radial Basis Function Networks, Functional Expansion Networks.

UNIT V

Neuro-FuzzyModeling:

Adaptive Neuro-Fuzzy Inference Systems - Architecture - Hybrid Learning Algorithm -Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling - Framework Neuron Functions for Adaptive Networks - Neuro Fuzzy Spectrum.

Text Books:

28

1. J.S.R. Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing" PHI/Pearson Education, New Delhi 2004.

Reference Books:

- T. J. Ross, "Fuzzy Logic with Engineering Applications." TMH, New York, 1997. I.
- D. E. Goldberg, Genetic Algorithms in Search Optimization and Machine Learning, II. Addison Wesley, 3rd Ed.
- III. B. Kosko, Neural Network and fuzzy systems, Prentice Hall of India, 2006
- IV. Kecman, Learning and Soft Computing, Pearson, 1st Ed, 2001.

(12 Periods)

(13 Periods)

(13 Periods)

(13 Periods)

(13 Periods)

COGNITIVE COMPUTING

COURSE IT421(B) Instruction: 4 Periods & 1 Tut. /Week End- Exam: 3 Hours

Instructor

COURSE OBJECTIVE:

- Use the Innovation Canvas to justify potentially successful products.
- Explain various ways in which to develop a product idea.

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

- 1. Understand applications in Cognitive Computing.
- 2. Understand Natural language processor role in Cognitive computing.
- 3. Learn future directions of Cognitive Computing.
- 4. Evaluate the process of taking a product to market.

CO PO CO RELATION MATRIX	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	2	3	3		2		3			3	
CO 2	1	3	3	3		2		3			3	
CO 3	1	3	3	3		2		3			3	
CO 4	1	2	3	3		2		3			3	
CO 5	1	2	3	3		2		3			3	

SYLLABUS

(13 Periods)

(13 Periods)

CREDITS: 4

Sessional Marks: 40

End Exam Marks: 60

Foundation of Cognitive Computing: cognitive computing as a new generation, the uses of cognitive systems, system cognitive, gaining insights from data, Artificial Intelligence as the foundation of cognitive computing, understanding cognition

Design Principles for Cognitive Systems:

Components of a cognitive system, building the corpus, bringing data into cognitive system, machine learning, hypotheses generation and scoring, presentation and visualization services

UNIT II (chapter 3 & 5)

UNIT I (chapter 1 & 2)

Natural Language Processing in support of a Cognitive System: Role of NLP in a cognitive system, semantic web, Applying Natural language technologies to Business problems Representing knowledge in Taxonomies and Ontologies: Representing knowledge, Defining Taxonomies and Ontologies, knowledge representation, models for knowledge representation, implementation considerations

UNIT III (chapter 4 & 6)

Relationship between Big Data and Cognitive Computing : Dealing with human-generated data, defining big data, architectural foundation, analytical data warehouses, Hadoop, data in motion and streaming data, integration of big data with traditional data

Applying Advanced Analytics to cognitive computing: Advanced analytics is on a path to cognitive computing, Key capabilities in advanced analytics, Using advanced analytics to create value, Impact of open source tools on advanced analytics

UNIT IV(chapter 8 & 10)

The Business Implications of Cognitive Computing : Preparing for change ,advantages of new disruptive models , knowledge meaning to business, difference with a cognitive systems approach , meshing data together differently, using business knowledge to plan for the future , answering business questions in new ways , building business specific solutions , making cognitive computing a reality , cognitive application changing the market

The process of building a cognitive application:

Emerging cognitive platform, defining the objective, defining the domain, understanding the intended users and their attributes, questions and exploring insights, training and testing

UNIT V (chapter 11 & 12)

Building a cognitive health care application: Foundations of cognitive computing for healthcare, constituents in healthcare ecosystem, learning from patterns in healthcare Data, Building on a foundation of big data analytics, cognitive applications across the health care eco system, starting with a cognitive application for healthcare, using cognitive applications to improve health and wellness, using a cognitive application to enhance the electronic medical record Using cognitive application to improve clinical teaching

Smarter cities-Cognitive Computing in Government: cities operation, characteristics of smart city, rise of open data movement with fuel cognitive cities, internet of everything and smarter cities, understanding the owner ship and value of data, cities are adopting smarter technology today for major functions, smarter approaches to preventative healthcare, building a smarter transportation infrastructure using analytics to close workforce skills gap, creating a cognitive community infrastructure, next phase of cognitive cities

TEXTBOOK:

I. Judith H Hurwitz, Marcia Kaufman, Adrian Bowles , "Cognitive computing and Big Data Analytics" , Wiley

(13 Periods)

(13 Periods)

(12 Periods)

CLOUD COMPUTING

COURSE IT421(C)

Instruction: End- Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40 End Exam Marks: 60

COURSE OBJECTIVE:

The objective of this course is to provide graduate students of B.Tech Information Technology with the comprehensive and in-depth knowledge of Cloud Computing concepts, technologies, architecture and applications by introducing and researching state of the art in Cloud Computing fundamental issues, technologies, applications and implementations.

COURSE OUTCOMES:

UNIT I : (Text Book 1)

Upon successful completion of the course, the student will be able to:

CO1 Understand the evolution of cloud computing paradigm and its architecture

CO2 Explain and characterize different cloud deployment models, service models and technological drivers

CO3 Understand the programming model and application environment including the role of the Operating systems

CO4 Analyze open source support and networking of cloud

CO5 Identify the security issues in cloud computing

CO PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
RELATION												
MATRIX												
CO 1	3	1				1					1	
CO 2	3	2		1		1			2			3
CO 3	3	2	3								2	3
CO 4	3	2	2	1	2	1			2			3
CO 5	3	1				1	1	2			2	3

SYLLABUS

(15 Periods)

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Biocomputing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing, Network Computing

Cloud Computing Fundamentals: Motivation for Cloud Computing: The Need for Cloud Computing. Defining Cloud Computing: NIST Definition of Cloud Computing, Cloud Computing Is a Service, Cloud Computing Is a Platform 5-4-3 Principles of Cloud computing: Five Essential Characteristics, Four Cloud Deployment Models, Three Service Offering Models Cloud Ecosystem, Requirements for Cloud Services, Cloud Application, Benefits and Drawbacks Cloud Computing Architecture and Management : Cloud Architecture, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Migrating Application to Cloud

UNIT II : (Text Book 1)

Cloud Deployment Models : Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud **Cloud Service Models :** Infrastructure as a Service, Platform as a Service, Software as a Service, Other Cloud Service Models **Technological Drivers for Cloud Computing:** SOA and Cloud: SOA and SOC, Benefits of SOA, Technologies Used by SOA, Similarities and Differences between SOA and Cloud Computing. **Virtualization**: Approaches in Virtualization, Hypervisor and Its Role, Types of Virtualization Multi-core Technology, Memory and Storage Technologies, Networking Technologies Web 2.0, Web 3.0

UNIT III : (Text Book 1)

Programming Models in Cloud : BSP Model, MapReduce Model, SAGA, Transformer, Grid Batch Framework **Operating Systems :** Role of OS in Cloud Computing, Features of Cloud OS, Cloud OS Requirements, Cloud-Based OS Application Environment **Application Environment :** Need for Effective ADE, Application Development Methodologies, Power of Cloud Computing in Application Development Cloud Application Development Platforms: Windows Azure, Google App Engine, Force.com, Manjrasoft Aneka **Cloud Computing APIs:** Rackspace, IBM, Intel **Software Development in Cloud :** Introduction, Different perspectives on SaaS development, New challenges, Cloud aware software development using PaaS technology

UNIT IV: (Text Book 1)

Networking for Cloud Computing : Introduction, Overview of Data Center Environment, Networking Issues in Data Centers **Cloud Service Providers :** Introduction, EMC, Google, Amazon Web Services, Microsoft, IBM, Salesforce, Rackspace

Open Source Support for Cloud

Introduction, Open Source in Cloud Computing: An Overview, Difference between Open Source and

Closed Source, Advantages of Having an Open Source

Open Source Tools for IaaS: Eucalyptus, Openstack

Open Source Tools for PaaS: Red Hat OpenShift Origin

Open Source Tools for SaaS: Google Drive, Dropbox

Open Source Tools for Research: CloudSim

UNIT V: (Text Book 1)

(10 Periods)

Security Aspects Data Security, Virtualization Security, Network Security Platform-Related Security, Security Issues in Cloud Service Models, Software-as-a-Service Security Issues, Platform-as-a-Service Security Issues

Advanced Concepts in Cloud Computing Intercloud, Cloud Management, Mobile Cloud, Media Cloud, Interoperability and Standards, Cloud Governance, Computational Intelligence in Cloud, Green Cloud, Cloud Analytics

Text Books:

1. K. Chandrasekaran, Essentials of Cloud Computing, CRC Press, 2015

Reference Books:

- II. Barrie Sosinsky, Cloud Computing Bible, Wiley-India, 2010
- III. RajkumarBuyya, James Broberg, Andrzej M. Goscinski, Cloud Computing: Principles and Paradigms, Wiley, 2011
- IV. Nikos Antonopoulos, Lee Gillam, Cloud Computing: Principles, Systems and Applications, Springer, 2012

(13 Periods)

(12 Periods)

(10 Periods)

E-COMMERCE

COURSE IT421 (D)

Instruction: 4 Periods & 1 Tut /week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

Course Objectives:

To provide knowledge about the protocols, methods, security issues in electronic commerce as well as about enterprise resource planning tools, models and techniques.

Course Outcomes:

Upon the successful completion of the course, students will be able to:

CO1 Illustrate the fundamental concepts of Electronic commerce environment and modes

CO2 Select the approaches and authenticative methods for safe E-Commerce

CO3 Develop secure E-mail technologies for E-Commerce

CO4 Evaluate the key aspects of Internet Resources for Commerce, internet Access

		PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	O10	PO11	PO12	PSO1	PSO2
	PO1													
CO-1	2	3	2	2	2	2	3	-	2	-	3	3	2	3
CO-2	2	2	2	2	2	2	3	-	1	-	3	3	2	3
CO-3	1	1	3	2	2	2	3	-	2	-	2	3	2	3
CO-4	2	3	3	2	2	3	3	-	2	-	3	3	2	3

SYLLABUS

UNIT-I:

PERIODS-14

Electronic commerce environment and opportunities: Back ground – The Electronic commerce Environment – Electronic Market Place Technologies.

Modes of electronic commerce: Overview – EDI – Migration to open EDI – E commerce with WWW/Internet – Commerce Net Advocacy – Web commerce going forward.

UNIT-II:

PERIODS-12

Approaches to safe electronic Commerce – Overview – Source – Transport Protocols – Secure Transactions – Secure Electronic Payment Protocol – Secure Electronic Transaction – Certificates for Authentication – Security on Web Servers and enterprise networks.

UNIT-III:

PERIODS-14

Electronic cash and electronic payment schemes – Internet Monitory Payment and Security requirements – payment and purchase order process – online electronic cash. Master card/ Visa Secure electronic transaction: Introduction – Business requirements - Concepts

- Payment Processing.

UNIT-IV:

PERIODS-12

Email and Secure Email Technologies for Electronic Commerce: Introduction – The means of Distribution – A model for Message Handling – How Does a Email Work.

UNIT-V:

PERIODS-12

Internet Resources for Commerce: Introduction – Technologies for Web Servers – Internet Applications for commerce – Internet Charges – Internet Access and Architecture – Searching the Internet.

Text Books:

I. Web Commerce Technology Hand Book Daniel Minoli, Emma Minoli McGraw Hill, First Edition.

Reference Books:

I. Frontiers of Electronic Commerce Ravi Kalakotar, Andrew B.Whinston, Pearson Education.

IMAGE PROCESSING

COURSE IT422 (A)

Instruction: 4 Periods & 1 Tut /week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

Course Objectives:

- Cover the basic theory and algorithms that are widely used in digital image processing.
- Expose students to current technologies and issues that are specific to image processing systems.
- Hands-on experience in using computers to process images.
- Formulate solutions to general image processing problems
- Familiar with image manipulations and analysis

Course Outcomes:

Upon the successful completion of the course, students will be able to:

CO1 Explain Basic Concepts in Image Processing and various color models

CO2 Apply Spatial Domain Techniques for Image Enhancement

CO3 List the Image Compression Techniques

CO4 Discuss Various Morphological Algorithms

CO5 Classify Various Image Segmentation Techniques

CO PO CO RELATION MATRIX	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3	3	3	3		3			3	3
CO 2	2	2	3	3	3	3		3			3	3
CO 3	2	3	3	3	3	3		3			3	3
CO 4	2	3	3	3	3	3		3			3	3
CO 5	2	3	3	3	3	3		3			3	3

IV/IV B.Tech IT Autonomous Syllabus R-15

SYLLABUS

UNIT I: (13 Periods) Digital Image Fundamentals: Digital Image Processing - Examples of fields that Use Image Processing, Fundamental Steps & Components in Digital Image Processing; Image Sampling and Quantization- Basic Concepts of Digital Images, Spatial and Gray level Resolution - Zooming and Shrinking; Basic Relationship Between Pixels.

Color Image Processing: Fundamentals, Color Models – RGB, CMYK, HIS and Pseudo Color.

UNIT II:

Image Enhancement: Basic Gray level Transformations. Histogram processing, Arithmetic/Logical Operations- Image Subtraction and Image Averaging, Basics of Spatial Filtering. Smoothening Spatial Filters, Sharpening Spatial Filters.

UNIT III:

Image Compression: Redundancy- Coding, Inter Pixel, Psycho-Visual, Fidelity Criteria; Image Compression Models-The Source Encoder and Decoder, The Channel Encoder and Decoder; Error- Free compression-Variable Length Coding, LZW Coding, Bit-Plane Coding, Image Compression Standard – JPEG

UNIT IV:

Image Morphology: Preliminaries- Basic Concepts from Set Theory, Logical Operations Involving Binary Images, Dilation and erosion, opening and closing, The Hit or Miss Transformation, Basic Morphological algorithms-Boundary Extraction, Region Filling Extraction of Connected Components, Convex Hull, Thinning, Thickening, Skeletons, Pruning.

UNIT V:

Image Segmentation: Detection of discontinuities-point detection, line detection, edge detection, edge linking and boundary detection-local processing, global processing via Graph-Theoretic techniques, Thresholding-Basic Global Thresholding, Basic Adaptive Thresholding, Optimal Global and Adaptive Thresholding, Region- Based Segmentation-Basic Formulation, Region growing, Region Splitting and Merging.

Text Books:

1. Digital Image Processing – R.C. Gonzalez & R.E. Woods, Addison Wesley / Pearson Education, 3rd Edition, 2010.

Reference Books:

I. Fundamentals of Digital Image Processing-A.K. Jain, PHI.

(12 Periods)

(13 Periods)

(13 Periods)

(13 Periods)

36

CYBER SECURITY

COURSE IT422 (B)

Instruction: 4 Periods & 1 Tut /week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

PREREQUISITE: Fundamentals of computers, knowledge in any program language.

COURSE OUTCOMES:

Understand the concepts and terminology of high performance computing **CO 1** Understand cyber crimes and types of cyber attacks

CO 2 Know how to prevent themselves from cyber attacks

CO 3 Identify applicable cyber laws

CO PO CO RELATION MATRIX	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1					2	2	3				
CO 2	3	3				3	3	3				
CO 3	2	3				3	3	3				

IV/IV B.Tech IT Autonomous Syllabus R-15

VI.

II.

III.

IV.

V.

Text Books:

Reference Books:

2012.

1. Nina Godbole & Sunit Belapure "Cyber Security", Wiley India, 2012.

Vivek Sood, Cyber Law Simplified, TMH, 2012.

UNIT V:

Cyber crimes and Cyber security: The Legal Perspectives: Cyber crime and the Legal Landscape around the World, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber crime Scenario in India, Consequences of, Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Amendments to the Indian IT Act, Cyber crime and Punishment, Cyber law, Technology and Students: Indian Scenario

Understanding Cell Phone Working Characteristics, Handheld Devices and Digital Forensics, Toolkits for Hand-Held Device Forensics, Forensics of iPods and Digital Music Devices

Digital Forensics Case Illustrations, Real Life Use of Forensics, Case-studies on Financial Frauds in

for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era

DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks

Harish Chander, "cyber laws & IT protection", PHI learning pvt.ltd, 2012.

Dhiren R Patel, "Information security theory & practice", PHI learning pvt ltd, 2010.

Pankaj Agarwal : Information Security & Cyber Laws (Acme Learning), Excel, 2013.

MS.M.K.Geetha & Ms.Swapne Raman"Cyber Crimes and Fraud Management, "MACMILLAN,

Cyber Domain, Digital Signature-Related Crime Scenarios

Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on, Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures

Password

(10 Periods) Tools and Methods Used in Cybercrime: Proxy Servers and Anonymizers, Phishing,

(10 Periods)

(10 Periods)

(10 Periods)

UNIT I: (8 Periods) Introduction to Cyber crime: definition and origins of the world, Cyber crime and information security, Classifications of cyber crime, Cyber crime and the Indian ITA 2000, A global Perspective on cyber

crimes, Cyber offenses: Planning the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cyber crimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing

Cyber crime using Mobile and Wireless Devices: Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in, Mobile and Wireless Computing Era, Security Challenges Posed by

Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography,

UNIT II:

UNIT III:

UNIT IV:

Forensics of Handheld Devices

ENTERPRISE RESOURCE PLANNING

COURSE IT422 (C) Instruction: 4 Periods & 1 Tut /week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

PREREQUISITE: Fundamentals of computers, knowledge in any program language.

COURSE OUTCOMES:

After completion of this course, a student will be able to:

CO 1 Select the fundamental concepts of ERP systems their architecture, and working of different modules in ERP.

CO 2 Decide how to implement activities of ERP project management cycle **CO 3** Identify the emerging trends in ERP developments.

	PO1	PO2	PO3	PO4	PO5	PO6	207	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3			1		1		1		1	3	1	1	2
CO2	3	3	1	3	1	1		1		1	3	1	1	3
CO3	3	3				1		1		1	3	1	1	3

Introduction: Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional integrated ERP systems.

UNIT II:

UNIT I:

ERP SOLUTIONS AND FUNCTIONAL MODULES: Overview of ERP software solutions- Small, medium and large enterprise vendor solutions, BPR, and best business practices - Business process Management, Functional modules.

UNIT III:

ERP IMPLEMENTATION: Planning Evaluation and selection of ERP systems - Implementation life cycle - ERP implementation, Methodology and Framework- Training – Data Migration. People Organization in implementation Consultants, Vendors and Employees.

UNIT IV:

POST IMPLEMENTATION: Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of ERP Implementation.

UNIT V:

EMERGING TRENDS ON ERP: Extended ERP systems and ERP add-ons -CRM & SCM, Business analytics - Future trends in ERP systems-web enabled, Wireless technologies, cloud computing.

Text Books:

1. Alexis Leon, ERP demystified, second Edition Tata McGraw-Hill, 2008.

Reference Books:

- I. Sinha P. Magal and Jeffery Word, Essentials of Business Process and Information System, Wiley India, 2012
- II. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
- III. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
- IV. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009
- V. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2006.
- VI. Summer, ERP, Pearson Education, 2008

(8 Periods)

(10 Periods)

(10 Periods)

(10 Periods)

(10 Periods)

INTERNET OF THINGS

COURSE IT422 (D)

Instruction: 4 Periods & 1 Tut /week End Exam: 3 Hours **CREDITS: 4** Sessional Marks: 40M End Exam Marks: 60M

PREREQUISITE: Fundamentals of computers, C programming, Computer Networks and microcontrollers.

COURSE OUTCOMES:

After completion of this course, a student will be able to:

- CO 1 Understand the concepts of Internet of Things
- CO 2 Know basic communication protocols in IoT
- **CO 3** Design IoT applications in different domains and Implement basic IoT applications on embedded platforms
- **CO4** Learn real world application scenarios of IoT along with its societal and economic impact using case studies.

CO PO CO RELATI ON MATRIX	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	1				2	1								
CO 2	2	2		2										
CO 3	3	3		3									3	3
CO 4	3	3		3	2	2								3

UNIT I: (TextBook 1)

Introduction: Internet of Things Vision, Emerging Trends, Economic Significance, Technical Building Blocks, Physical design of IoT, Things of IoT, IoT Protocols, Logical design of IoT, IoT functional blocks, IoT communication models, IoT Communication APIs, IoT enabling technologies, IoT levels and deployment templates, IoT Issues and Challenges, Applications.

UNIT II: (TextBook 3)

Communication Protocols: Protocol Standardization for IoT, Efforts, M2M and WSN Protocols, SCADA and RFID Protocols, Issues with IoT Standardization, Unified Data Standards, Protocols – IEEE 802.15.4, BACNet Protocol, Modbus, KNX, Zigbee Architecture, Network layer, APS layer.

UNIT III: (TextBook 1)

IoT Physical Devices and Endpoints: Basic building blocks of and IoT device, Exemplary device: Raspberry Pi, Raspberry Pi interfaces, Programming Arduino with sensor interfaces.

UNIT IV: (TextBook 2)

Cloud of Things: Grid/SOA and Cloud Computing, Cloud Middleware, Cloud Standards – Cloud Providers and Systems, Mobile Cloud Computing, The Cloud of Things Architecture, Cloud Storage Models, Communication API and Xively Cloud for IoT (TextBook 1)

UNIT V: (TextBook 1)

Web Application Framework: Amazon Web Services for IoT **IoT Application Case Studies:** Home Intrusion Detection, Weather Monitoring System, Air Pollution Monitoring, Smart Irrigation.

Text books

- 1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things A hands-on approach", Universities Press, ISBN: 0: 0996025510, 13: 978-0996025515
- 2. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.

ISBN : 9781439892992

3. Dieter Uckelmann, Mark Harrison, Florian Michahelles, "Architecting the Internet of Things", Springer, 2011. ISBN: 978-3-642-19156-5

Reference Books:

I. David Easley and Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning About a Highly Connected World", Cambridge University Press, 2010, ISBN:10: 0521195330

10 Periods

8 Periods

10 Periods

10 Periods

10 Periods

42

- II. Olivier Hersent, Omar Elloumi and David Boswarthick, "The Internet of Things: Applications to the Smart Grid and Building Automation", Wiley, 2012, 9781119958345
- III. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things Key applications and Protocols", Wiley, 2012, ISBN:978-1-119-99435-0
- IV. Barrie Sosinsky, "Cloud Computing Bible", Wiley-India, 2010.ISBN: 978-0-470-90356-8
- V. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley, 2014, ISBN: 978-1-118-43063-7
- VI. Christopher Hallinan, "Embedded Linux Primer", Prentice Hall, ISBN:13: 978-0-13-167984-9